



**5G;  
5G System;  
Network Exposure Function Northbound APIs;  
Stage 3  
(3GPP TS 29.522 version 19.4.0 Release 19)**



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**Reference**RTS/TSGC-0329522vj40

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**Keywords**5G

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# Foreword

This Technical Specification has been produced by the 3<sup>rd</sup> Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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# 1 Scope

The present specification describes the protocol for the NEF Northbound interface between the NEF and the AF. The NEF Northbound interface and the related stage 2 functional requirements are defined in 3GPP TS 23.501 [3], 3GPP TS 23.502 [2], 3GPP TS 23.316 [28], 3GPP TS 23.288 [29], 3GPP TS 23.273 [36], 3GPP TS 23.548 [42], 3GPP TS 23.247 [53], 3GPP TS 23.503 [70], 3GPP TS 33.501 [6], 3GPP TS 33.535 [37], 3GPP TS 33.558 [56], 3GPP TS 26.531 [59], 3GPP TS 26.532 [60], 3GPP TS 26.502 [65], 3GPP TS 23.586 [76], 3GPP TS 23.369 [81] and 3GPP TS 23.256 [77].

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# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

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- [5] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.
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- [76] 3GPP TS 23.586: "Architectural Enhancements to support Ranging based services and Sidelink Positioning".
- [77] 3GPP TS 23.256: "Support of Uncrewed Aerial Systems (UAS) connectivity, identification and tracking; Stage 2".
- [78] 3GPP TS 29.175: "IP Multimedia Subsystem (IMS) Application Server (AS) Services Stage 3".
- [79] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".
- [80] 3GPP TS 29.562: "5G System; Home Subscriber Server (HSS) services; Stage 3".
- [81] 3GPP TS 23.369: "Architecture support for Ambient power-enabled Internet of Things; Stage 2".
- [82] 3GPP TS 29.566: "5G System; Energy Information Function Services; Stage 3".

[83] 3GPP TS 29.569: "5G System; Ambient IoT Function (AIOTF) Services; Stage 3".

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

**Application AM context:** Information about the capabilities that an AF application requires from the access network for a registered UE. It is established by the AF before or during the use of the service that requires it.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.503 [70], subclause 3.1 apply:

#### VPLMN specific URSP rules

For the purpose of the present document, the terms and definitions given in clause 3 of 3GPP TS 23.369 [81] also apply, including the ones referencing other specifications.

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

|                 |                                                    |
|-----------------|----------------------------------------------------|
| 5G-RG           | 5G Residential Gateway                             |
| A-KID           | AKMA Key Identifier                                |
| A-TID           | AKMA Temporary UE Identifier                       |
| A2X             | Aircraft-to-Everything                             |
| AAAnF           | AKMA Anchor Function                               |
| ACS             | Auto-Configuration Server                          |
| ADM             | AIoT Data Management                               |
| AI/ML           | Artificial Intelligence/Machine Learning           |
| AIoT            | Ambient IoT                                        |
| AIOTF           | Ambient IoT Function                               |
| AF              | Application Function                               |
| AKMA            | Authentication and Key Management for Applications |
| AM              | Access and Mobility management                     |
| ASTI            | Access Stratum TIme distribution                   |
| BAT             | Burst Arrival Time                                 |
| BDT             | Background Data Transfer                           |
| CAPIF           | Common API Framework                               |
| CP              | Communication Pattern                              |
| DN              | Data Network                                       |
| DNAI            | DN Access Identifier                               |
| DNN             | Data Network Name                                  |
| EAS             | Edge Application Server                            |
| ECS             | Edge Configuration Server                          |
| EHE             | Edge Hosting Environment                           |
| FQDN            | Fully Qualified Domain Name                        |
| GMLC            | Global Mobile Location Centre                      |
| GPSI            | Generic Public Subscription Identifier             |
| IPTV            | Internet Protocol Television                       |
| K <sub>AF</sub> | AKMA Application Key                               |
| MBS             | Multicast/Broadcast Service                        |
| MB-SMF          | Multicast/Broadcast Session Management Function    |
| MCC             | Mobile Country Code                                |

|         |                                                                |
|---------|----------------------------------------------------------------|
| MNC     | Mobile Network Code                                            |
| MO-LR   | Mobile Originated Location Request                             |
| MoQ     | Media over QUIC                                                |
| MPS     | Multimedia Priority Service                                    |
| NAT     | Network Address Translation                                    |
| NAPT    | Network Address Port Translation                               |
| NEF     | Network Exposure Function                                      |
| NSAC    | Network Slice Admission Control                                |
| NSACF   | Network Slice Admission Control Function                       |
| NWDAF   | Network Data Analytics Function                                |
| PCF     | Policy Control Function                                        |
| PEGC    | PIN Element with Gateway Capability                            |
| PCRF    | Policy and Charging Rule Function                              |
| PDTQ    | Planned Data Transfer with QoS requirements                    |
| PFD     | Packet Flow Description                                        |
| PFDF    | Packet Flow Description Function                               |
| PIN     | Personal IoT Network                                           |
| QUIC    | Quick UDP Internet Connections                                 |
| RCD     | Rich Call Data                                                 |
| REST    | Representational State Transfer                                |
| RNAA    | Resource owner-aware Northbound API Access                     |
| RSLPPI  | Ranging and SideLink Positioning Privacy Indication            |
| SCEF    | Service Capability Exposure Function                           |
| SFC     | Service Function Chain                                         |
| S-NSSAI | Single Network Slice Selection Assistance Information          |
| SSM     | Source Specific IP Multicast address                           |
| TAI     | Traffic Area Identity                                          |
| TMGI    | Temporary Mobile Group Identity                                |
| TNAP    | Trusted Network Access Point                                   |
| TSC     | Time Sensitive Communication                                   |
| TSCAI   | Time Sensitive Communication Assistance Information            |
| TSCTSF  | Time Sensitive Communication and Time Synchronization Function |
| TTNB    | Time To Next Burst                                             |
| UAS     | Uncrewed Aerial System                                         |
| UAV     | Uncrewed Aerial Vehicle                                        |
| UDP     | User Datagram Protocol                                         |
| UDR     | Unified Data Repository                                        |
| UP      | User Plane                                                     |
| UPF     | User Plane Function                                            |
| URSP    | UE Route Selection Policy                                      |
| USS     | UAS Service Supplier                                           |
| VFL     | Vertical Federated Learning                                    |
| WB      | Wide Band                                                      |

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## 4 NEF Northbound Interface

### 4.1 Overview

The NEF Northbound interface is between the NEF and the AF. It specifies RESTful/RPC APIs that allow the AF to access the services and capabilities provided by 3GPP network entities and securely exposed by the NEF.

This document also specifies the procedures triggered at the NEF by API requests from the AF and by event notifications received from 3GPP network entities.

The stage 2 level requirements and signalling flows for the NEF Northbound interface are defined in 3GPP TS 23.502 [2], 3GPP TS 23.247 [53] for MBS specific aspects, 3GPP TS 26.531 [59] for data reporting provisioning and Media Streaming Event Exposure specific aspects, 3GPP TS 23.256 [77] for UAS aspects, 3GPP TS 23.228 [79] for IMS aspects, 3GPP TS 23.369 [81] for AIoT aspects and 3GPP TS 23.288 [29] for VFL specific aspects.

The NEF Northbound interface supports the following procedures:

- 1) Procedures for Monitoring.
- 2) Procedures for Device Triggering.
- 3) Procedures for resource management of Background Data Transfer.
- 4) Procedures for CP Parameters, Network Configuration Parameters Provisioning, 5G LAN Parameters Provisioning, ACS Configuration Parameter Provisioning, Location Privacy Indication Parameters Provisioning, ECS address provisioning, Slice Parameters Provisioning, DNN and S-NSSAI specific Group Parameters Provisioning, Ranging and SideLink Positioning Privacy Indication (RSLPPI) Parameters Provisioning, Addressing Parameters Provisioning and CAG Information Parameters Provisioning.
- 5) Procedures for PFD Management.
- 6) Procedures for Traffic Influence.
- 7) Procedures for changing the chargeable party at session set up or during the session.
- 8) Procedures for AF required QoS.
- 9) Procedures for MSISDN-less Mobile Originated SMS.
- 10) Procedures for non-IP data delivery.
- 11) Procedures for analytics information exposure.
- 12) Procedure for applying BDT policy.
- 13) Procedures for Enhanced Coverage Restriction Control.
- 14) Procedures for IPTV Configuration.
- 15) Procedures for Service Parameter Provisioning.
- 16) Procedures for RACS Parameter Provisioning.
- 17) Procedures for Mobile Originated Location Request.
- 18) Procedures for AKMA.
- 19) Procedures for AF triggered Access and Mobility Influence.
- 20) Procedures for AF triggered Access and Mobility Policy Authorization.
- 21) Procedures for Time Synchronization Exposure.
- 22) Procedures for EAS Deployment information provisioning.
- 23) Procedures for TMGI allocation, deallocation, expiry timer refresh and timer expiry notification.
- 24) Procedures for MBS session management and MBS parameters provisioning.
- 25) Procedures for Data Reporting.
- 26) Procedures for Data Reporting Provisioning.
- 27) Procedures for AF specific UE ID retrieval.
- 28) Procedures for Media Streaming Event Exposure.
- 29) Procedures for MBS User Service management.
- 30) Procedures for MBS User Data Ingest Session management.
- 31) Procedures for MBS Group Message Delivery management.
- 32) Procedures for DNAI mapping.

- 33) Procedures for negotiation of Planned Data Transfer with QoS requirements.
- 34) Procedures for Member UE Slection Assistance.
- 37) Procedures for UE Address retrieval.
- 38) Procedures for ECS Address configuration in roaming.
- 39) Procedures for UAV Flight Assistance.
- 40) Procedures for UAV Flight information retrieval.
- 41) Procedures for IMS session management with data channel.
- 42) Procedures for IMS Event Exposure (EE) Services.
- 43) Procedures for IMS Parameters Provisioning.
- 44) Procedures for AIoT Management.
- 45) Procedures for VFL Training.
- 46) Procedures for VFL Inference.
- 45) Procedures for VFL NF Discovery.

Which correspond to the following services respectively, supported by the NEF as defined in 3GPP TS 23.502 [2], 3GPP TS 23.247 [53], 3GPP TS 26.531 [59], 3GPP TS 23.256 [77], 3GPP TS 23.228 [79], 3GPP TS 23.369 [81] or 3GPP TS 23.288 [29]:

- 1) Nnef\_EventExposure service and Nnef\_APISupportCapability service.
- 2) Nnef\_Trigger service.
- 3) Nnef\_BDTPNegotiation service.
- 4) Nnef\_ParameterProvision service.
- 5) Nnef\_PFDManagement service.
- 6) Nnef\_TrafficInfluence service.
- 7) Nnef\_ChargeableParty service.
- 8) Nnef\_AFsessionWithQoS service and Nnef\_AF\_Request\_for\_QoS service.
- 9) Nnef\_MSISDN-less\_MO\_SMS service.
- 10) Nnef\_NIDDConfiguration and Nnef\_NIDD services.
- 11) Nnef\_AnalyticsExposure service.
- 12) Nnef\_ApplyPolicy service.
- 13) Nnef\_ECRestriction service.
- 14) Nnef\_IPTVConfiguration service.
- 15) Nnef\_ServiceParameter service.
- 16) Nnef\_UCMFPprovisioning service.
- 17) Nnef\_Location service.
- 18) Nnef\_AKMA service.
- 19) Nnef\_AMInfluence service.
- 20) Nnef\_AMPolicyAuthorization service.



21) Nnef\_TimeSynchronization and Nnef\_ASTI services.

22) Nnef\_EASDeployment service.

23) Nnef\_MBSTMGI service.

24) Nnef\_MBSSession service.

25) Nnef\_DataReporting service.

26) Nnef\_DataReportingProvisioning service.

27) Nnef\_UEId service.

28) Nnef\_MSEventExposure service.

29) Nnef\_MBSUserService service.

30) Nnef\_MBSUserDataIngestSession service.

31) Nnef\_MBSGroupMsgDelivery service.

32) Nnef\_DNAIMapping service.

33) Nnef\_PDTQPolicyNegotiation service.

34) Nnef\_MemberUESelectionAssistance service.

37) Nnef\_UEAddress service.

38) Nnef\_ECSAddress service.

39) Nnef\_UAVFlightAssistance service.

40) Nnef\_RetrieveInfoUAVFlight service.

41) Nnef\_ImsSessionManagement service.

42) Nnef\_ImsEventExposure service.

43) Nnef\_ImsParameterProvision service.

44) Nnef\_AIoT service.

45) Nnef\_VFLTraining.

46) Nnef\_VFLInference.

47) Nnef\_VFLNFDDiscovery service.

NOTE 1: For the Nnef\_PFDManagement service, only the Nnef\_PFDManagement\_Create/Update/Delete service operations are applicable for the NEF Northbound interface.

NOTE 2: For the Nnef\_NIDD service, NF consumer other than the AF does not use the NEF Northbound interface.

NOTE 3: For the Nnef\_NIDDConfiguration service, the Nnef\_NIDDConfiguration\_Trigger service operation is only applicable for the NEF Northbound interface.

NOTE 4: The Nnef\_APISupportCapability service is only applicable in the MonitoringEvent API when the monitoring type is set to "API\_SUPPORT\_CAPABILITY".

NOTE 5: The Nnef\_MSEventExposure service maps to the Nnef\_EventExposure service and is applicable for the case where the event consumer AF in the Application Service Provider is deployed outside the trusted domain, as described in 3GPP TS 26.531 [59], and the subscribed event is set to "MS\_QOE\_METRICS", "MS\_CONSUMPTION", "MS\_NET\_ASSIST\_INVOCATION", "MS\_DYN\_POLICY\_INVOCATION", or "MS\_ACCESS\_ACTIVITY".

NOTE 6: The stage 2 Nnef\_AF\_Request\_for\_QoS API is defined by reusing the Nnef\_AFsessionWithQoS API together with the support of the "GMEC" feature.

## 4.2 Reference model

The NEF Northbound interface resides between the NEF and the AF as depicted in figure 4.2.1. The overall NEF architecture is depicted in 3GPP TS 23.502 [2]. An AF can get services from multiple NEFs, and an NEF can provide services to multiple AFs.

NOTE: The AF can be provided by a third party.

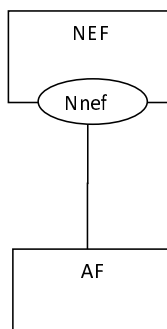


**Figure 4.2-1: Reference Architecture for the Nnef Service; SBI representation**

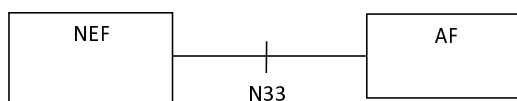


**Figure 4.2-2: Reference Architecture for the Nnef Service; reference point representation**

## 4.3 Functional elements

### 4.3.1 NEF

The Network Exposure Function (NEF) is a functional element that supports the related stage 2 functional requirements defined in the technical specifications listed in clause 1 and that are implemented via the procedures specified in clause 4.4. A specific NEF instance may support one or more of these functionalities, and consequently, an individual NEF may support one, several or all of the APIs specified for capability exposure.

In addition, the NEF shall also:

- securely expose network capabilities and events provided by 3GPP NFs to AF;
- provide means for the AF to securely provide information to 3GPP network and may authenticate, authorize and assist in throttling the AF;
- be able to translate the information received from the AF to the one sent to internal 3GPP NFs, and vice versa; and
- support to expose information (collected from other 3GPP NFs) to the AF.

NOTE: The NEF can access the UDR located in the same PLMN as the NEF.

### 4.3.2 AF

The Application Function (AF) may interact with the 3GPP Core Network via the NEF in order to access network capabilities.

## 4.4 Procedures over NEF Northbound Interface

### 4.4.1 Introduction

All procedures that operate across the NEF Northbound interface, as specified in 3GPP TS 23.502 [2], in 3GPP TS 23.247 [53] for MBS specific aspects, in 3GPP TS 23.256 [77] for UAS specific aspects, in 3GPP TS 23.369 [81] for AIoT specific aspects and in 3GPP TS 23.288 [29] for VFL specific aspects, are specified in the following clauses.

### 4.4.2 Procedures for Monitoring

The procedures and provisions for event monitoring defined in clause 4.4.2 of 3GPP TS 29.122 [4] shall be applicable in 5GS with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF;
- description of the HSS applies to the UDM, and the NEF shall interact with the UDM by using Nudm\_EventExposure service as defined in 3GPP TS 29.503 [17];
- description of the MME/SGSN applies to the AMF, the NEF shall resolve a location area to the involved AMF(s) either by local configuration or via the NRF and the NEF shall interact with the AMF by using the Namf\_EventExposure service as defined in 3GPP TS 29.518 [18];
- description about the PCRF is not applicable;
- description about the change of IMSI-IMEI(SV) association monitoring event applies to the change of SUPI-PEI association monitoring event, the new PEI within the "pei" attribute may be included within the MonitoringEventReport data type if the "enNB2" feature is supported;
- when the "monitoringType" sets to "LOCATION\_REPORTING" within the MonitoringEventSubscription data type as defined in clause 5.3.2.1.2 of 3GPP TS 29.122 [4] during the monitoring event subscription, only "CGI\_ECGI", "TA\_RA", "GEO\_AREA" and "CIVIC\_ADDR" within the Accuracy data type, as defined in clause 5.3.2.4.7 of 3GPP TS 29.122 [4], are applicable for 5G event monitoring using the MonitoringEvent API;
- after validation of the AF request, the NEF may determine a monitoring expiry time, based on operator policy and take into account the monitoring expire time if included in the request; and the NEF may provide an expiry time (determined by the NEF, UDM or AMF) to the AF even the AF does not provided before;
- if the "Loss\_of\_connectivity\_notification" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, values 0-5 are not applicable for the lossOfConnectReason attribute within MonitoringEventReport data type, the lossOfConnectReason attribute shall be set to 6 if the UE is deregistered, 7 if the maximum detection timer expires, 8 if the UE is purged or 9 if the UE's Unavailability Period Duration is available and the "Loss\_of\_connectivity\_notification\_5G" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported;
- the AF may include a periodic reporting time indicated by the "repPeriod" attribute within the MonitoringEventSubscription data type, which is only applicable for the "Location\_notification", "eLCS", "Number\_of\_UEs\_in\_an\_area\_notification\_5G", "NSAC" and "Energy" features in the NEF;
- if the "locationType" attribute sets to "LAST\_KNOWN\_LOCATION", the "maximumNumberOfReports" attribute shall set to 1 as a One-time Monitoring Request;
- description about the PDN connectivity status event apply to the PDU session status event, the description of the MME/SGSN applies to the SMF during the reporting of monitoring event procedure, the NEF receives the event notification via Nsmf\_EventExposure service as defined in 3GPP TS 29.508 [26] and;

- if the "EnPduSesRatType" feature is supported, the current RAT type shall be provided if available, for the "PDN\_CONNECTIVITY\_STATUS" event when reporting the establishment or release of the PDU session, or the new RAT Type shall be provided when the RAT Type is changed for the PDU Session.
- if the "Session\_Management\_Enhancement" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, the "dnn" and/or "snssai" may be provided in MonitoringEventSubscription data type for monitoring type provided "PDN\_CONNECTIVITY\_STATUS" or "DOWNLINK\_DATA\_DELIVERY\_STATUS";
- when sending the UDM/AMF/SMF event report to the AF, the NEF may store the event data in the report in the UDR as part of the data for exposure as specified in 3GPP TS 29.519 [23] by using Nudr\_DataRepository service as specified in 3GPP TS 29.504 [20];
- if the "Downlink\_data\_delivery\_status\_5G" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support the downlink data delivery status notification;
  - 1) the AF shall send an HTTP POST message to the NEF to the resource "Monitoring Event Subscriptions" as defined in clause 5.3.3.2 of 3GPP TS 29.122 [4] for creating a subscription or send an HTTP PUT/PATCH message to the NEF to the resource "Individual Monitoring Event Subscription" defined in clause 5.3.3.3 of 3GPP TS 29.122 [4] for updating the subscription as follows:
    - A) within the MonitoringEventSubscription data structure (or the requested modifications to the resource representation in case the HTTP PATCH method is used and the "Subscription\_Patch" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported), the AF may additionally include packet filter descriptor(s) within the "dddTraDescriptors" attribute and the list of monitoring downlink data delivery status event(s) within the "dddStatI" attribute; and
    - B) the NEF shall subscribe the events to the appropriate UDM(s) within the network by invoking the Nudm\_EventExposure\_Subscribe service operation as defined in clause 5.5.2.2 of 3GPP TS 29.503 [17];
  - 2) if the "Partial\_group\_modification" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support partial cancellation or addition of certain UE(s) within the active group event subscription, the NEF shall map the "excludedExternalIds" and/or "excludedMsisdns" attributes to the "excludeGpsiList" attribute for the partial group cancellation, or shall map the "addedExternalIds" and/or "addedMsisdns" attributes to the "includeGpsiList" attribute within the Nudm\_EventExposure service; and
  - 3) when the NEF receives the event notification as defined in clause 4.4.2 of 3GPP TS 29.508 [26], the NEF shall send an HTTP POST message to the AF as defined in clause 4.4.2.3 of 3GPP TS 29.122 [4] with the difference that within each MonitoringEventReport data structure, the NEF shall include:
    - A) the downlink data delivery status within the "dddStatus" attribute;
    - B) the downlink data descriptor impacted by the downlink data delivery status change within the "dddTraDescriptor" attribute;
    - C) the estimated buffering time within the "maxWaitTime" attribute if the downlink data delivery status is set to "BUFFERED"; and
    - D) if the "Availability\_after\_DD\_N\_failure\_notification\_enhancement" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, the AF shall send an HTTP POST message to the NEF to the resource "Monitoring Event Subscriptions" as defined in clause 5.3.3.2 of 3GPP TS 29.122 [4] for creating an subscription or send an HTTP PUT/PATCH message to the NEF to the resource "Individual Monitoring Event Subscription" as defined in clause 5.3.3.3 of 3GPP TS 29.122 [4] for updating the subscription with the difference that within the MonitoringEventSubscription data structure (or the requested modifications to the resource representation in case the HTTP PATCH method is used and the "Subscription\_Patch" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported), the AF shall include packet filter descriptions within the "dddTraDescriptors" attribute;
- if the "eLCS" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, the AF may send an HTTP POST message to the NEF to the resource "Monitoring Event Subscriptions" as defined in clause 5.3.3.2 of 3GPP TS 29.122 [4] for creating an subscription or send an HTTP PUT/PATCH message to the NEF to the resource "Individual Monitoring Event Subscription" defined in clause 5.3.3.3 of 3GPP TS 29.122 [4] for updating the subscription as follows:
  - 1) within the MonitoringEventSubscription data structure (or the requested modifications to the resource representation in case the HTTP PATCH method is used and the "Subscription\_Patch" feature defined in

clause 5.3.4 of 3GPP TS 29.122 [4] is supported), the AF may additionally include location QoS requirement within the "locQoS" attribute, the service identifier within the "svcId" attribute, Location deferred requested event type within the "ldrType" attribute, the validity start time and the validity end time within the "locTimeWindow" attribute, the maximum age of location estimate within the "maxAgeOfLocEst" attribute, the requesting target UE velocity within the "velocityRequested" attribute, the linear distance within the "linearDistance" attribute, the reporting target UE location estimate indication within the "reportingLocEstInd" attribute, the sampling interval within the "samplingInterval" attribute, the maximum reporting expire interval within the "maxRptExpireIntvl" attribute, the supported GAD shapes within the "supportedGADShapes" attribute, the Code word within the "codeword" attribute, and other attributes as defined in clause 5.3.2.3.2 of 3GPP TS 29.122 [4] for location information subscription; The MonitoringEventSubscription data structure (or the requested modifications to the resource representation in case the HTTP PATCH method is used and the "Subscription\_Patch" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported) may also include the "locationArea5G" attribute containing only the "geographicAreas" attribute and the "accuracy" attribute set to the value "GEO\_AREA". The "accuracy" attribute and "locQoS" attribute are mutually exclusive. If the "MULTIQOS" feature is also supported, Multiple QoS Class is supported in the "lcsQosClass" attribute within the "locQoS" attribute for deferred MT-LR. If the "eLCS\_en" feature is also supported, the AF may include the "upLocRepIndAf" attribute to indicate whether or not location reporting over user plane is required, and may also include the "upLocRepAddrAf" attribute to convey the AF's addressing information for location reporting over user plane. If the "Ranging\_SL" feature as defined in clause 5.3.4 of 3GPP TS 29.122 [4] is also supported, the AF may additionally include the ranging and sidelink positioning result(s) type within the "reqRangSlRes" attribute, the list of the related UE(s) for the ranging and sidelink positioning and the corresponding information within the "relatedUEs" attribute within the MonitoringEventSubscription data structure (or the requested modifications to the resource representation in case the HTTP PATCH method is used and the "Subscription\_Patch" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported);

- 2) if the NEF identifies the location request precision higher than cell level location accuracy is required based on the "locQoS" attribute received, the NEF shall interact with the appropriate GMLC within the network by invoking the Ngmlc\_Location\_ProvideLocation service operation as defined in clause 6.1 of 3GPP TS 29.515 [35];
- 3) if the location request precision is lower than or equal to cell level, based on implementation, the NEF may interact with the GMLC by invoking the Ngmlc\_Location\_ProvideLocation service operation as defined in clause 6.1 of 3GPP TS 29.515 [35]; or retrieve the UE location privacy information from the UDM by using Nudm\_SDM service as described in clause 5.2 of 3GPP TS 29.503 [17] and if the privacy setting is verified, the NEF shall interact with the UDM for the serving AMF address by invoking the Nudm\_UECM service as described in clause 5.3 of 3GPP TS 29.503 [17]. After receiving the serving AMF address from the UDM, the NEF shall interact with the AMF by invoking the Namf\_EventExposure\_Subscribe service operation as defined in clause 5.3 of 3GPP TS 29.518 [18]; or may interact with UDM by using Nudm\_EventExposure service as defined in clause 5.5 of 3GPP TS 29.503 [17] and the NEF receives the location event notification from the AMF via Namf\_EventExposure service as defined in in clause 5.5 of 3GPP TS 29.518 [18];
- 4) based on the received AF information and local authorization policy, the NEF shall derive the LCS client type with a suitable enumeration value for the AF location request, to be provided as the "externalClientType" attribute when invoking the Ngmlc\_Location\_ProvideLocation service operation as defined in clause 6.1 of 3GPP TS 29.515 [35];
- 5) upon receipt of successful location response from the GMLC or the AMF or the UDM, the NEF shall create or update the "Individual Monitoring Event Subscription" resource and then send an HTTP POST or PUT/PATCH response to the AF as defined in clause 4.4.2.2 of 3GPP TS 29.122 [4]. Upon receipt of the location Report from the GMLC or the AMF, the NEF shall determine the monitoring event subscription associated with the corresponding Monitoring Event Report as defined in clause 4.4.2.3 of 3GPP TS 29.122 [4]; and
- 6) in order to delete a previous active configured monitoring event subscription at the NEF:
  - the AF shall send either:
    - an HTTP DELETE request message to the NEF targeting the corresponding "Individual Monitoring Event Subscription" resource which is received in the response to the request that has created the monitoring events subscription resource; or

- an HTTP PUT/PATCH request to the NEF targeting the corresponding "Individual Monitoring Event Subscription" resource to remove the subscription to concerned event(s) from the list of subscribed event(s) together with the related information, as defined in clauses 5.3.3.3.2 and 5.3.3.3.3 of 3GPP TS 29.122 [4];
- the NEF shall interact with the GMLC, the AMF or the UDM to remove the corresponding events reporting; and
- upon reception of the successful response from the GMLC, the AMF or the UDM, the NEF shall delete or update accordingly the corresponding "Individual Monitoring Event Subscription" resource and send an HTTP response to the AF with either an HTTP "204 No Content" status code, or an HTTP "200 OK" status code including the monitoring event report if received (in case of resource deletion) or the updated representation of the resource (in case of resource update);
- based on local regulations' requirements and operator policies, user consent management specified in Annex V of 3GPP TS 33.501 [6] may be required for EDGE applications to access the Nnef\_EventExposure API for UE's location retrieval. When it is the case and the NEF is used by the Edge Enabler Layer entities to access 3GPP 5GC services, the NEF acts as the consent enforcement entity, as specified in clause 5.1.3 of 3GPP TS 33.558 [56];
- when user consent management shall be carried out for EDGE applications, then:
  - 1) if the AF (e.g. Edge Enabler Server) does not support the "UserConsentRevocation" feature or does not indicate its support for this feature in the HTTP POST request to create a new "Individual Monitoring Event Subscription" resource with the "monitoringType" attribute set to "LOCATION\_REPORTING", the NEF shall reject the request and respond to the AF with an HTTP "403 Forbidden" status code with the response body including a ProblemDetails data structure containing the "CONSENT\_REVOCATION\_NOT\_SUPPORTED" application error within the "cause" attribute;
  - 2) if the AF indicates its support for the "UserConsentRevocation" feature in the HTTP POST request to create a new "Individual Monitoring Event Subscription" resource with the "monitoringType" attribute set to "LOCATION\_REPORTING", the NEF shall check user consent for the targeted UE(s) by retrieving the user consent subscription data via the Nudm\_SDM service API of the UDM as specified in clause 5.2.2.2.24 of 3GPP TS 29.503 [17], subscribe to user consent revocation notifications only for those UE(s) for which user consent is granted also using the Nudm\_SDM service API of the UDM and accept the request for the creation of the event monitoring subscription only for the UE(s) for which user consent is granted;
  - 3) if user consent is not granted for all the targeted UE(s), the NEF shall reject the request and respond to the AF with an HTTP "403 Forbidden" status code with the response body including a ProblemDetails data structure including the "USER\_CONSENT\_NOT\_GRANTED" application error within the "cause" attribute;
  - 4) the AF shall provide within the HTTP POST request to create a new event monitoring subscription the URI via which it desires to receive user consent revocation notifications within the "revocationNotifUri" attribute. The AF may update this URI in subsequent HTTP PUT/PATCH requests to update/modify the corresponding "Individual Monitoring Event Subscription" resource;
- 5) when becoming aware of user consent revocation for one or several UE(s), the NEF shall:
  - A) stop processing the data related to the concerned UE(s);
  - B) send a user consent revocation notification to the AF by sending an HTTP POST request with the request body including the ConsentRevocNotif data structure that shall contain the user consent revocation information (e.g. UE(s) for which user consent was revoked, etc.);
  - C) remove the concerned UE(s) from the corresponding "Individual Monitoring Event Subscription" resource and from the related subscriptions at the GMLC, if any; and
  - D) unsubscribe from user consent revocation notifications for the concerned UE(s) at the UDM;
- 6) at the reception of the user consent revocation notification from the NEF, the AF shall take the necessary actions to stop processing the data related to the UE(s) for which user consent was revoked; and
- 7) if user consent is revoked for all the UE(s), the AF shall delete the corresponding "Individual Monitoring Event Subscription" resource as specified above in this clause;

- if the "NSAC" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support network slice status reporting:
  - 1) the AF shall send an HTTP POST request to the NEF targeting the "Monitoring Event Subscriptions" resource to create a subscription, as defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4], or send an HTTP PUT/PATCH request targeting the NEF to the "Individual Monitoring Event Subscription" resource to update an existing subscription, as defined in clauses 5.3.3.3.3.2 and 5.3.3.3.3.3 of 3GPP TS 29.122 [4], as follows:
    - A) within the MonitoringEventSubscription data structure (or the requested modifications to the MonitoringEventSubscription data structure in case the HTTP PATCH method is used):
      - a) either the concerned network slice identified by the "sncsai" attribute, in the case of a trusted AF, or the AF service identifier within the "afServiceId" attribute, in the case of an untrusted AF, shall be provided;
      - b) the value of the "monitoringType" attribute shall be set to either "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS";
      - c) the "maximumNumberOfReports" attribute set to a value of 1 shall be provided, if one-time reporting of the current network slice status information is requested;
      - d) the "immediateRep" attribute shall be set to "true", if immediate reporting of the current network slice status information is requested or one-time reporting of the current network slice status information is requested;
      - e) if one-time reporting is not requested, either a targeted reporting threshold within the "tgtNsThreshold" attribute (if threshold-based reporting is requested) or a reporting periodicity within the "repPeriod" attribute (if periodic reporting is requested) shall be provided;
      - f) if periodic reporting or one-time reporting is requested, the "nsRepFormat" attribute shall be provided to indicate the requested reporting format (i.e. numerical or percentage); and
    - 2) if needed, the NEF shall then further interact with the concerned NSACF(s) to create or update the associated subscription(s) to notifications by invoking the Nnsacf\_SliceEventExposure\_Subscribe service operation, as specified in 3GPP TS 29.536 [47];
    - 3) if an AF service identifier was provided by the AF (case of an untrusted AF), the NEF shall translate it to the corresponding S-NSSAI prior to sending the request(s) to the concerned NSACF(s);

NOTE 1: There can be a single or multiple NSACF(s) deployed in a network as specified in clause 5.15.11 of 3GPP TS 23.501 [3]. Whether the NEF needs to interact with one or multiple NSACF(s) to establish and manage network slice status reporting depends on the deployed NSAC architecture option (cf. clause 4.15.3.2.10 of 3GPP TS 23.502 [2] and clause 5.15.11 of 3GPP TS 23.501 [3]).

NOTE 2: If multiple NSACFs need to be contacted by the NEF to establish and manage network slice status reporting for the requested S-NSSAI, the NEF can set the event reporting type to periodic in its request(s) to these NSACFs, irrespective of the requested reporting type by the AF (i.e., threshold based reporting or periodic reporting).

- 4) after receiving a successful response from the concerned NSACF(s), the NEF shall:
  - A) for the HTTP POST request, respond to the AF as defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4] with either:
    - a) an HTTP "201 Created" status code with the response body containing the created "Individual Monitoring Event Subscription" resource within the MonitoringEventSubscription data structure. The NEF shall include the current network slice status information received from the NSACF(s) within the "monitoringEventReport" attribute, if available and the "immediateRep" attribute was provided and set to "true" in the corresponding request; or
    - b) an HTTP "200 OK" status code with the response body containing the current network slice status information received from the NSACF(s) within the MonitoringEventReport data structure, if the corresponding request is a one-time reporting request with the "immediateRep" attribute set to "true";
  - B) for the HTTP PUT/PATCH request, respond to the AF with either:

- an HTTP "200 OK" status code, as defined in clause 5.3.3.3.2 of 3GPP TS 29.122 [4], and the response body including the MonitoringEventSubscription data structure containing a representation of the updated "Individual Monitoring Event Subscription" resource. The NEF shall include the current network slice status information received from the NSACF(s) within the "monitoringEventReport" attribute, if available and the "immediateRep" attribute was provided and set to "true" in the request; or
- an HTTP "204 No Content" status code;

NOTE 3: When the "maximumNumberOfReports" attribute is provided and set to a value of 1 and the "immediateRep" attribute is provided and set to "true", the "Individual Monitoring Event Subscription" is immediately terminated after returning the current network slice status information in the HTTP POST response body.

NOTE 4: When the "maximumNumberOfReports" attribute is either not present or present and set to a value above 1 and/or the "immediateRep" attribute is either not present or present and set to "false", the above steps 2 and 3 may occur after step 4, i.e., the NEF may acknowledge/respond to the request and create/update the "Individual Monitoring Event Subscription" resource accordingly before interacting with the the concerned NSACF(s).

NOTE 5: After sending a subscription creation request for network slice status reporting with a particular reporting format (e.g., percentage) for periodic reporting, an AF cannot send a subsequent subscription creation request for the same network slice with a different reporting format (e.g., numerical) for periodic reporting.

- 5) when the NEF receives event report(s) from the NSACF(s) as defined in 3GPP TS 29.536 [47], the NEF shall notify the AF via an HTTP POST request message (as defined in clause 5.3.3A.2.3 of 3GPP TS 29.122 [4]) as follows:

A) within the MonitoringEventReport data structure of the MonitoringNotification data structure:

- a) the value of the "monitoringType" attribute shall be set to "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS" (i.e., the same value received in the HTTP POST or PUT/PATCH request that created or updated the subscription);
- b) the AF service identifier to which the notification is related, within the "afServiceId" attribute, if it was provided by the AF in the corresponding subscription request; and
- c) the current network slice status information within the "nSStatusInfo" attribute shall be provided, wherein:
  - i) if the event reporting is threshold based (i.e., the "tgtNsThreshold" was provided within the MonitoringEventSubscription data type), the "nSStatusInfo" attribute shall contain a confirmation for reaching the targeted threshold value, i.e., by sending the current number of registered UEs, or if "eNSAC" feature is also supported, the current number of UEs with at least one PDU session/PDN connection, or the current number of established PDU Sessions, for the network slice identified by the "snssai" attribute provided during the corresponding subscription creation/update; and
  - ii) if the event reporting is periodical (i.e., the "repPeriod" was provided within the MonitoringEventSubscription data type), the "nSStatusInfo" attribute shall provide the current network slice status information, i.e., the current number of registered UEs, or if "eNSAC" feature is also supported, the current number of UEs with at least one PDU session/PDN connection, or the current number of established PDU Sessions, for the network slice identified by the "snssai" attribute provided during the corresponding subscription creation/update;

NOTE 6: The handling of threshold-based notifications is described in clause 4.15.3.2.10 of 3GPP TS 23.502 [2].

NOTE 7: If the NEF interacts with multiple NSACFs for the requested S-NSSAI, the NEF performs the aggregation of the received network slice status reports from all these NSACFs and determines based on that whether a notification towards the subscribing AF needs to be sent or not (i.e., the reporting conditions to trigger a notification towards the AF are fulfilled or not).

and



6) in order to unsubscribe from network slice status reporting:

A) the AF shall either:

- a) send an HTTP DELETE request to the NEF targeting the corresponding "Individual Monitoring Event Subscription" resource, as defined in clause 5.3.3.3.3.5 of 3GPP TS 29.122 [4]; or
- b) send an HTTP PUT/PATCH request to the NEF targeting the corresponding "Individual Monitoring Event Subscription" resource to remove the subscription to network slice status reporting related event(s) from the list of subscribed events together with the related information, as defined in clauses 5.3.3.3.3.2 and 5.3.3.3.3.3 of 3GPP TS 29.122 [4];

and

B) if needed, the NEF shall interact with the concerned NSACF(s) to delete the associated subscription(s) to notifications by invoking the Nnsacf\_SliceEventExposure\_Unsubscribe service operation as specified in 3GPP TS 29.536 [47];

- if the "enNB1\_5G" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, then:
  - the AF may require immediate reporting for the subscribed event(s) by providing the "immediateRep" attribute set to "true" within the MonitoringEventSubscription data structure in the corresponding subscription creation/update request; and
  - if there are available report(s) for the subscribed event(s) at the NEF, the corresponding subscription creation/update response shall contain these available report(s) within the "monitoringEventReport" attribute, and/or if the "enNB" feature is supported, the "addnMonEventReports" attribute, of the MonitoringEventSubscription data structure;
- if the "UEId\_retrieval" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support AF specific UE ID retrieval:
  - 1) the AF may request AF specific UE ID retrieval for an individual UE, by providing the UE's IP address in the "ueIpAddr" attribute or the UE's MAC address in the "ueMacAddr" attribute within the MonitoringEventSubscription data type;
  - 2) the AF may also provide the DNN, within the "dnn" attribute, and/or the S-NSSAI, within the "snssai" attribute, in the MonitoringEventSubscription data type;
  - 3) upon reception of the corresponding subscription request message from the AF, the NEF shall check whether the AF is authorized to perform this operation or not:
    - if the AF's request for AF specific UE ID retrieval is not authorized, the NEF shall respond to the AF with a "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "REQUEST\_NOT\_AUTHORIZED" application error indicating AF authorisation failure; and
    - if the AF request is for AF specific UE ID retrieval authorized by the NEF, then if the DNN and/or S-NSSAI information is not available in the request, the NEF shall determine the corresponding DNN and/or S-NSSAI information based on the received requesting AF Identifier, and if provided, the MTC Provider Information;
  - 4) the NEF shall then interact with the BSF using the UE address and IP domain (if the UE IPv4 address is provided), DNN and/or S-NSSAI to retrieve the session binding information of the UE by invoking the Nbsf\_Management\_Discovery service operation as described in 3GPP TS 29.521 [9];
  - 5) if the NEF receives an error response from the BSF, the NEF shall respond to the AF with a proper error status code. If the NEF received from the BSF an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error. If no SUPI matching the provided UE information is returned by the BSF, the NEF shall respond to the AF with a "404 Not Found" status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_NOT\_FOUND" application error to indicate that the requested UE address is not found;

- 6) upon success and a SUPI is returned by the BSF, the NEF shall then interact with the UDM to retrieve the AF specific UE Identifier using the received SUPI and at least one of the Application Port ID, MTC Provider Information or AF Identifier information by invoking Nudm\_SDM\_Get service as described in clause 5.2.2.2 of 3GPP TS 29.503 [17];
- 7) upon success, the UDM responds to the NEF with an AF specific UE Identifier represented as an External Identifier for the UE which is uniquely associated with the MTC provider Information and/or AF Identifier. The NEF shall then respond to the AF with the received information, i.e. the AF specific UE Identifier represented as an External Identifier that was received from the UDM;
- 8) if the NEF receives an error response from the UDM, the NEF shall respond to the AF with a proper error status code. If the NEF received from the UDM an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error. If the UDM indicates that the requested UE Identifier is not available in the subscription data, the NEF shall respond to the AF with a "404 Not Found" error status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_ID\_NOT\_AVAILABLE" application error to indicate that the AF specific UE ID is not available;

NOTE 8: The case where the UE's IP address provided by the AF to the NEF corresponds to an IP address that has been NATed (Network and Port Address Translation) is not supported in this release of the specification.

- if the "GMEC" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support group status change event reporting (e.g., the group member list is updated to add new group member(s) or remove existing group member(s)):
  - the AF shall send an HTTP POST request to the NEF targeting the "Monitoring Event Subscriptions" collection resource defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4] to request the creation of a subscription with the request body including the MonitoringEventSubscription data structure that shall contain:
    - the external group identifier, to identify the targeted group (e.g. 5G VN group), within the "externalGroupId" attribute; and
    - the "monitoringType" attribute set to "GROUP\_MEMBER\_LIST\_CHANGE" to indicate that the AF requests to be notified of the Group Members List changes event reporting;
  - the AF may also update/modify an existing subscription to add group status change reporting event(s) to the list of monitored event(s) or update/modify its properties by sending an HTTP PUT/PATCH request to the NEF targeting the corresponding "Individual Monitoring Event Subscription" resource, as defined in clause 5.3.3.3.2/5.3.3.3.3 of 3GPP TS 29.122 [4], including the above-mentioned attributes when relevant;
  - the NEF shall then further interact with the UDM to create or update the associated subscription(s) to notifications by invoking the relevant service operations of the Nudm\_EventExposure API as specified in 3GPP TS 29.503 [17];
  - upon reception of a successful response from the UDM, the NEF shall respond to the AF as defined in clause 5.3.3.2.3.4, 5.3.3.3.2 or 5.3.3.3.3 of 3GPP TS 29.122 [4];
  - when the NEF receives group status List change event report(s) via notification(s) from the UDM as defined in 3GPP TS 29.503 [17], the NEF shall in turn notify the AF by sending an HTTP POST request message as defined in clause 5.3.3A.2.3 of 3GPP TS 29.122 [4] as follows:
    - within an array element of the "monitoringEventReports" attribute (encoded via the MonitoringEventReport data structure) of the MonitoringNotification data type:
      - the "monitoringType" attribute shall be set to "GROUP\_MEMBER\_LIST\_CHANGE" (i.e., the same value received during the HTTP POST or PUT/PATCH request that created or updated/modified the subscription); and
      - the information on the change(s) to the group members list shall be provided within the "groupMembListChanges" attribute;

and

- in order to unsubscribe from group status change event(s) reporting:
  - if the AF subscribed to other monitoring event(s) in addition to the group status change event(s) reporting, the AF shall update/modify the corresponding subscription to remove the group status change event(s) reporting from the list of the subscribed monitoring event(s);
  - if the AF subscribed only to group status change reporting event(s) or the AF desires to unsubscribe from all the monitoring event(s) that it has subscribed to via this monitoring event subscription, then:
    - the AF shall send an HTTP DELETE (or PUT/PATCH) request message to the NEF targeting the corresponding "Individual Monitoring Event Subscription" resource, as defined in clause 5.3.3.3 of 3GPP TS 29.122 [4], to request the deletion (or update) of the related existing "Individual Monitoring Event Subscription" resource;
    - the NEF shall then interact with the UDM to request the deletion of the associated subscription(s) by invoking the relevant service operation of the Nudm\_EventExposure API as specified in 3GPP TS 29.503 [17]; and
    - upon reception of a successful response from the UDM, the NEF shall delete (or update accordingly) the targeted subscription and respond to the AF as defined in clause 5.3.3.3 of 3GPP TS 29.122 [4];
- if the "AppDetection\_5G" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support application traffic detection (e.g., start/stop of application traffic) monitoring event(s) reporting:
  - the AF shall send either:
    - an HTTP POST request to the NEF targeting the "Monitoring Event Subscriptions" resource to request the creation of a subscription as defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4]; or
    - an HTTP PUT/PATCH request to the NEF targeting an existing "Individual Monitoring Event Subscription" resource to request the update of an existing subscription as defined in clause 5.3.3.3.2 or 5.3.3.3.3 of 3GPP TS 29.122 [4];
  - the MonitoringEventSubscription data structure (or the requested modifications to the MonitoringEventSubscription data structure when HTTP PATCH is used) shall include the targeted application traffic, i.e., any UE application traffic associated with the S-NSSAI, provided within the "snssai" attribute, and the DNN provided within the "dnn" attribute, for the application(s) identified by the "appIds" attribute;
  - the monitoring type of the MonitoringEventSubscription data structure shall be set to the "APPLICATION\_START" or "APPLICATION\_STOP";
  - upon reception of the subscription request message from the AF, the NEF shall check whether the AF is authorized to perform this operation or not:
    - if the AF is not authorized, the NEF shall respond to the AF with an HTTP "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "REQUEST\_NOT\_AUTHORIZED" application error; or
    - if the AF is authorized, the NEF shall subscribe to the requested application traffic detection event(s) reporting at the concerned PCF(s) (locally configured at the NEF for the authorized DNN/S-NSSAI) using the Npcf\_EventExposure\_Subscribe service operation as defined in clause 4.2.2.2 of 3GPP TS 29.523 [22];

and

- when the NEF receives an event notification from the PCF(s) via the Npcf\_EventExposure\_Notify service operation as defined in clause 4.2.4 of 3GPP TS 29.523 [22] indicating that the subscribed event(s) has(ve) been detected, the NEF shall send a corresponding notification to the AF by sending an HTTP POST request message to the AF with each of the corresponding MonitoringEventReport data structure(s) (provided within the "monitoringEventReports" attribute of the MonitoringNotification data structure) containing:
  - the reported event (i.e., "APPLICATION\_START" or "APPLICATION\_STOP") within the "monitoringType" attribute;

- the identifier of the detected application within the "appId" attribute, if the "appIds" attribute within the corresponding subscription resource contains more than one array element (i.e., more than one application identifier); and
  - the PDU session information related to the detected application within the "pduSessInfo" attribute, if available;
- if the "DataTransfer" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support AF request for Session inactivity time, Traffic volume and UL/DL data rate events monitoring event notification, the AF shall send an HTTP POST request to the NEF targeting the "Monitoring Event Subscriptions" resource (defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4]) to request the creation of a subscription or send an HTTP PUT/PATCH message to the NEF to the "Individual Monitoring Event Subscription" resource as defined in clause 5.3.3.3 of 3GPP TS 29.122 [4] for updating the subscription as follows:
    - 1) targeting list of UE(s) in the MonitoringEventSubscription data type setting the monitoring type as "SESSION\_INACTIVITY\_TIME", "TRAFFIC\_VOLUME" and/or "UL\_DL\_DATA\_RATE"; and
    - 2) upon reception of the corresponding subscription request message from the AF, the NEF shall check whether the AF is authorized to perform this operation or not;

and

- if the "Energy" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, in order to support Energy consumption information related event(s) reporting:
  - 1) the AF shall send an HTTP POST request to the NEF targeting the "Monitoring Event Subscriptions" resource to create a subscription, as defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4], or send an HTTP PUT/PATCH request to the NEF targeting to an existing "Individual Monitoring Event Subscription" resource to update an existing subscription, as defined in clauses 5.3.3.3.2 and 5.3.3.3.3 of 3GPP TS 29.122 [4], as follows:
    - A) within the MonitoringEventSubscription data structure (or the requested modifications to the MonitoringEventSubscription data structure in case the HTTP PATCH method is used):
      - a) the value of the "monitoringType" attribute shall be set to either "UE\_ENERGY", "PDU\_SESSION\_ENERGY", "UE\_SNSSAI\_ENERGY" or "SERVICE\_DATA\_ENERGY";
      - b) the identifier of the target UE within the "externalId" attribute shall be provided;
      - c) if the value of the "monitoringType" attribute is set to "PDU\_SESSION\_ENERGY" or "SERVICE\_FLOW\_ENERGY", then either the "snssai" attribute containing the target network slice, the "dnn" attribute containing the target DNN, or both shall be provided;
      - d) if the value of the "monitoringType" attribute is set to "SERVICE\_FLOW\_ENERGY", then either the "appIds" attribute containing the identifier(s) of the target application(s) or the "flowDescs" attribute containing the target service data flow description information shall be provided;
      - e) if the value of the "monitoringType" attribute is set to "UE\_SNSSAI\_ENERGY", then the "snssai" attribute containing the target network slice shall be provided;
      - f) if immediate reporting of the current Energy Consumption Information is required, the "immediateRep" attribute shall be provided and set to "true";
      - g) the reporting time window within the "repTimePeriod" attribute may be provided;
      - h) if one-time reporting of the current network slice status information is requested, the "maximumNumberOfReports" attribute shall be provided and set to a value of 1, and the "repTimePeriod" attribute shall be provided; and
      - i) if one-time reporting is not requested, then either:
        - i) the energy threshold(s) within the "enrgRepThres" attribute shall be provided, if threshold-based reporting is requested; or
        - ii) the reporting periodicity within the "repPeriod" attribute shall be provided, if periodic reporting is requested;

- 2) the NEF shall then further interact with the EIF to create or update the associated subscription(s) to notifications by invoking the Nneif\_EventExposure\_Subscribe service operation, as specified in 3GPP TS 29.566 [82];
  - 3) after receiving a successful response from the EIF, the NEF shall:
    - A) for the HTTP POST request, respond to the AF as defined in clause 5.3.3.2.3.4 of 3GPP TS 29.122 [4] with either;
      - a) an HTTP "201 Created" status code with the response body containing the created "Individual Monitoring Event Subscription" resource within the MonitoringEventSubscription data structure. The NEF shall include the current Energy Consumption Information report received from the EIF within the "monitoringEventReport" attribute, if available and the "immediateRep" attribute was provided and set to "true" in the corresponding request; or
      - b) an HTTP "200 OK" status code with the response body containing the current Energy Consumption Information report received from the EIF within the MonitoringEventReport or MonitoringEventReports data structure, if the corresponding request is a one-time reporting request with the "immediateRep" attribute set to "true";
    - B) for the HTTP PUT/PATCH request, respond to the AF with either:
      - an HTTP "200 OK" status code, as defined in clause 5.3.3.3.2 of 3GPP TS 29.122 [4], and the response body including the MonitoringEventSubscription data structure containing a representation of the updated "Individual Monitoring Event Subscription" resource. The NEF shall include the current Energy Consumption Information report received from the EIF within the "monitoringEventReport" attribute, if available and the "immediateRep" attribute was provided and set to "true" in the request; or
      - an HTTP "204 No Content" status code;
  - 4) when the NEF receives event report(s) from the EIF as defined in 3GPP TS 29.566 [82], the NEF shall notify the AF via an HTTP POST request message (as defined in clause 5.3.3A.2.3 of 3GPP TS 29.122 [4]) as follows:
    - A) within the MonitoringNotification data structure, the "monitoringEventReports" attribute containing one or several instance(s) of the MonitoringEventReport data structure each one containing:
      - a) the value of the "monitoringType" attribute shall be set to "UE\_ENERGY", "PDU\_SESSION\_ENERGY", "UE\_SNSSAI\_ENERGY" or "SERVICE\_DATA\_ENERGY" (i.e., the same value received in the HTTP POST or PUT/PATCH request that created or updated the subscription); and
      - b) the Energy Consumption Information report within the "energyInfoData" attribute shall be provided;
- and
- 5) in order to unsubscribe from Energy consumption information related event(s) reporting:
    - A) the AF shall either:
      - a) send an HTTP DELETE request to the NEF targeting the corresponding "Individual Monitoring Event Subscription" resource, as defined in clause 5.3.3.3.5 of 3GPP TS 29.122 [4]; or
      - b) send an HTTP PUT/PATCH request to the NEF targeting the corresponding "Individual Monitoring Event Subscription" resource to remove the subscription to Energy consumption information related event(s) from the list of subscribed events together with the related information, as defined in clauses 5.3.3.3.2 and 5.3.3.3.3 of 3GPP TS 29.122 [4];
- and
- B) if needed, the NEF shall interact with the concerned EIF to delete the associated subscription(s) to notifications by invoking the Neif\_EventExposure\_Unsubscribe service operation as specified in 3GPP TS 29.566 [82].

NOTE 9: When the "enNB" feature defined in clause 5.3.4 of 3GPP TS 29.122 [4] is supported, the above provisions related to the "monitoringType" attribute apply also to the "addnMonTypes" attribute, and the monitoring type(s) to be subscribed can be provided via the "monitoringType" attribute, and if there are more than one monitoring type to be subscribed, the "addnMonTypes" attribute as well.

NOTE 10: In the above provisions, subscribing to a monitoring event can be done either by creating a new "Individual Monitoring Event Subscription" resource or updating an existing "Individual Monitoring Event Subscription" resource (e.g., add the monitoring event to the list of subscribed monitoring events, replace the existing monitoring event with this new monitoring event). Similarly, unsubscribing from a monitoring event can be done either by deleting the corresponding "Individual Monitoring Event Subscription" or updating the corresponding existing "Individual Monitoring Event Subscription" (e.g., remove the monitoring event from the list of subscribed monitoring events).

### 4.4.3 Procedures for Device Triggering

The procedures for device triggering as described in clause 4.4.6 of 3GPP TS 29.122 [4] shall be applicable in 5G with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF;
- description of the HSS applies to the UDM;
- the NEF shall interact with the UDM by using the Nudm\_SubscriberDataManagement service and the Nudm\_UEContextManagement service as defined in 3GPP TS 29.503 [17]; and
- the NEF acts as MTC-IWF.

### 4.4.4 Procedures for resource management of Background Data Transfer

The procedures for resource management of Background Data Transfer (BDT) in 5GS are described in clause 4.4.3 of 3GPP TS 29.122 [4] with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF;
- If the feature Group\_Id is supported, an external group identifier may be included in the HTTP POST or PUT request message by the NEF. If the external group Id is sent from the AF to the NEF, the NEF shall interact with the UDM by using Nudm\_SubscriberDataManagement service as defined in 3GPP TS 29.503 [17] to translate the external group identifier into the corresponding internal group identifier;
- description of the PCRF applies to the PCF;
- the NEF shall interact with the PCF by using Npcf\_BDTPolicyControl service as defined in 3GPP TS 29.554 [19];

NOTE: When the AF sends a PUT request to the NEF to update BDT negotiation data different from selecting a transfer policy and/or toggling BDT warning notifications, the NEF can delete the existing resource and create a new one with the required values at the PCF using the Npcf\_BDTPolicyControl service. When the AF contacts NEF to select a transfer policy and/or to enable/disable BDT warning notifications, the NEF will initiate a PATCH request for BDT negotiation data on Npcf\_BDTPolicyControl service.

- if the "BdtNotification\_5G" feature is supported, the AF may include a notification URI within the "notificationDestination" attribute in the Bdt data type during the background data transfer policy negotiation. In addition, the AF may request to enable the BDT warning notification by setting the "warnNotifEnabled" attribute to true. When the NEF receives the BDT warning notification from the PCF as defined in clause 4.2.4.2 of 3GPP TS 29.554 [19] and the "warnNotifEnabled" attribute was set to true, the NEF shall send an HTTP POST message including the ExNotification data structure to the AF identified by the notification destination URI received during the background data transfer policy negotiation. The AF shall respond with an HTTP response to confirm the received notification. The AF may select one policy from the candidate of BDT policies if provided in the notification by using the HTTP PATCH message as described in clause 5.4.3.3.3.3 of 3GPP TS 29.122 [4].

If the selected policy is set to value "0" within the "selectedPolicy" attribute in the HTTP PATCH message, it implies no transfer policy is selected by the AF. The AF may also request to disable/enable the BDT warning notification by including the "warnNotifEnabled" attribute in the HTTP PATCH message;

- the AF may include a traffic descriptor of background data within the "trafficDes" attribute in the Bdt data type during the background data transfer policy negotiation;
- if the "AspId\_5G" feature is supported, the AF may include an ASP Identifier within the "aspId" attribute in the Bdt data type. If the "aspId" attribute is included, the NEF shall not map the AF Identifier to ASP Identifier; and
- if the "Energy" feature is supported, the AF may include an indication on whether the AF is interested in transferring data in time windows that consume lower energy within the "energyInd" attribute.

#### 4.4.5 Procedures for CP Parameters Provisioning

The procedures for CP parameters provisioning as described in clause 4.4.9 of 3GPP TS 29.122 [4] shall be applicable in 5G with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF;
- description of the HSS applies to the UDM;
- the NEF shall interact with the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17];
- if the ExpectedUMT\_5G feature as defined in clause 5.10.4 of 3GPP TS 29.122 [4] is supported, the expected UE moving trajectory within the "expectedUmts" attribute shall also be included in the HTTP POST/PUT request. In addition, if the ExpectedUmtTime\_5G feature as defined in clause 5.10.4 of 3GPP TS 29.122 [4] is supported, the start time and duration may be provided in the "expectedUmts" attribute to indicate when the UE arrives at a location and how long the UE stays in the location and the periodicity in the "expectedUmtDays" attribute may be provided to indicate the effective days within a week. In addition, if the "ExpectedUmtTime\_Add" feature defined in clause 5.10.4 of 3GPP TS 29.122 [4] is supported, the additional day(s) of the week may be provided within the "expectedUmtDaysAdd" attribute to indicate the additional day(s) if the "expectedUmtDays" attribute is also provided;
- if the "AppExpUeBehaviour" feature as defined in clause 5.10.4 of 3GPP TS 29.122 [4] is supported, the Application-Specific Expected UE Behaviour parameters within the "appExpUeBehvs" attribute may also be included in the HTTP POST/PUT request; and
- if the "UEId\_retrieval" feature defined in clause 5.10.4 of 3GPP TS 29.122 [4] is supported, in order to support the AF specific UE ID retrieval:
  - 1) the AF may request AF specific UE ID retrieval for an individual UE, by providing the UE's IP address in the "ueIpAddr" attribute or the UE's MAC address in the "ueMacAddr" attribute within the CpInfo data type;
  - 2) the AF may also provide the DNN, within the "dnn" attribute, and/or the S-NSSAI, within the "snssai" attribute, within the CpInfo data type;
  - 3) upon reception of the corresponding request message from the AF:
    - if the AF's request for AF specific UE ID retrieval is not authorized, the NEF shall respond to the AF with a "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "REQUEST\_NOT\_AUTHORIZED" application error indicating AF authorisation failure; and
    - if the AF's request for AF specific UE ID retrieval is authorized by the NEF, then if the DNN and/or S-NSSAI information is not available in the request, the NEF shall determine the corresponding DNN and/or S-NSSAI information based on the received requesting AF Identifier, and if provided, the MTC Provider Information;
  - 4) the NEF shall interact using the the BSF with UE address and IP domain (if the UE IPv4 address is provided), DNN and/or S-NSSAI to retrieve the session binding information of the UE by invoking the Nbsf\_Management\_Discovery service operation as described in 3GPP TS 29.521 [9];

- 5) if the NEF receives an error response from the BSF, the NEF shall respond to the AF with a proper error status code. If the NEF received from the BSF an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error. If no SUPI matching the provided UE information is returned by the BSF, the NEF shall respond to the AF with a "404 Not Found" status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_NOT\_FOUND" application error to indicate that the requested UE address is not found;
- 6) upon success and a SUPI is returned by the BSF, the NEF shall interact with the UDM to retrieve the AF specific UE Identifier using the received SUPI and at least one of the Application Port ID, MTC Provider Information or AF Identifier information by invoking Nudm\_SDM\_Get service as described in clause 5.2.2.2 of 3GPP TS 29.503 [17];
- 7) upon success, the UDM responds to the NEF with the AF specific UE Identifier represented as an External Identifier for the UE which is uniquely associated with the MTC provider Information and/or AF Identifier. The NEF shall then respond to the AF with the received information, i.e. the AF specific UE Identifier represented as an External Identifier that was received from the UDM;
- 8) if the NEF receives an error response from the UDM, the NEF shall respond to the AF with a proper error status code. If the NEF received from the UDM an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error. If the UDM indicates that the requested UE Identifier is not available in the subscription data, the NEF shall respond to the AF with a "404 Not Found" error status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_ID\_NOT\_AVAILABLE" application error to indicate that the AF specific UE ID is not available.

NOTE 1: The case where UE's IP address provided by the AF to the NEF corresponds to an IP address that has been NATed (Network and Port Address Translation) is not supported in this release of the specification.

NOTE 2: When multiple AF parameter provisioning requests with different values of the same Expected UE Behavior parameters are received from different AFs, the network behavior is unspecified.

#### 4.4.6 Procedures for PFD Management

The procedures for PFD management as described in clause 4.4.10 of 3GPP TS 29.122 [4] shall be applicable for 5GS with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF; and
- the NEF (PFDF) shall interact with the UDR for PFD management by using Nudr\_DataRepository service as defined in 3GPP TS 29.504 [20]. The PFDF is functionality within the NEF.
- The NEF (PFDF) may interact with the NWDAF to retrieve the PFD Determination analytics to assist the determination of PFDs for known application identifiers by using Nnwdaf\_EventsSubscription service as defined in 3GPP TS 29.520 [27]. The PFD information for which the source NF type is equal to "NWDAF" shall not be exposed to the AF unless based on local configuration and with related SLA between the operator and the ASP.
- If the PFDs are provisioned to at least one of the subscribed SMFs (but not all) within the allowed delay, the NEF (PFDF) may notify the AF about the failed PFD provisioning with the HTTP POST message by including the PfdReport data structure in the body of the message. In addition, the NEF may include the location area(s) of the user plane(s) which are unable to enforce the provisioned PFD(s) within the "locationArea" attribute of the PFD report(s). If the PFDs are provisioned to none of the subscribed SMFs within the allowed delay, the NEF (PFDF) shall notify the AF about the failed PFD provisioning with the HTTP POST message using appropriate failure code as defined in Table 5.11.2.2.3-1 of 3GPP TS 29.122 [4].

NOTE 1: Unsuccessful PFDs provisioning to the subscribed SMFs within the allowed delay means that the PFDs are not provisioned successfully to the UPFs served by the failed SMFs.

NOTE 2: The NEF maps the 3GPP network area(s) to the geographic area(s), civic address(es) or DNAI(s) if the 3GPP network area(s) is not allowed to be exposed to the 3rd party according to the operator policy.



## 4.4.7 Procedures for Traffic Influence

### 4.4.7.1 General

In order to create a resource for the Traffic Influence to provide the information of application function influence on traffic routing, N6-LAN service function chaining(s) and/or handling of payload headers, the AF shall send an HTTP POST message to the NEF to the resource "Traffic Influence Subscription", with the request body including the TrafficInfluSub data structure as specified in clause 5.4.3.3.2.

If the feature "CommonEASDNAI" is supported, the AF may include the "tfcCorreInfo" attribute within the "TrafficInfluSub" data type. Within the "TrafficCorrelationInfo" data type, AF may include the "COMMON\_DNAI" within the "corrType" attribute to indicate that the traffic of the set of UEs associated with the same traffic correlation Id accessing the application identified by an Application Identifier or traffic filtering information should target the EAS(es) corresponding to a common DNAI from the list of DNAI(s) or include the "COMMON\_EAS" within the "corrType" attribute to indicate that the traffic of the set of UEs associated with the same traffic correlation Id accessing the application identified by an Application Identifier or traffic filtering information should target a common EAS. In the case of common EAS within the "TrafficCorrelationInfo" data type, the AF shall additionally include the common EAS address(es) within the "comEasIpv4Addr" attribute and/or "comEasIpv6Addr" attribute and/or the FQDN range corresponding to the application within the "fqdnRange" attribute. When the NEF receives traffic correlation notification from the SMF, if the NEF determines that there is currently no common EAS IP address and/or common DNAI available for the set of UEs identified by the Traffic Correlation ID or it determines that the common EAS or common DNAI needs to be re-selected, it selects a common DNAI and/or common EAS using the list of DNAI(s), EAS IP address and number of PDU sessions each SMF is serving for the set of UEs received in traffic correlation notification from the SMF. Then the NEF shall update the traffic influence data in UDR with the 5GC determined common EAS/DNAI for the set of UEs by invoking the Nudr\_DataRepository service as described in 3GPP TS 29.504 [20] and 3GPP TS 29.519 [23] and then responds by acknowledging the notification to the SMF.

NOTE 1: Common EAS selection means the common DNAI is selected.

NOTE 2: The "candDnaiInd" attribute within the "TrafficInfluSub" data type can be set to "true" to report the candidate DNAI information only when the UP path management event defined in "dnaiChgType" attribute contains "EARLY" or "EARLY\_LATE".

If the feature "HeaderHandling" is supported, the AF may include the "hHndlgControInfo" attribute within the TrafficInfluSub data type.

In order to update an existing traffic influence subscription, the AF shall send an HTTP PUT message to the resource "Individual Traffic Influence Subscription", with the request body including the TrafficInfluSub data structure as specified in clause 5.4.3.3.2 requesting to update the traffic influence parameters.

In order to modify an existing traffic influence subscription, the AF shall send an HTTP PATCH message to the resource "Individual Traffic Influence Subscription", with the request body including the TrafficInfluSubPatch data structure as specified in clause 5.4.3.3.3 requesting to modify the traffic influence parameters.

In order to delete an existing traffic influence subscription, the AF shall send an HTTP DELETE message to the NEF to the resource "Individual Traffic Influence Subscription".

Upon receipt of the HTTP request from the AF, if the AF is authorized, the NEF shall perform the mapping as described in 3GPP TS 23.501 [3], and then perform as described in clause 4.4.7.2 if the request is identified by UE address or perform as described in clause 4.4.7.3 if the request is not identified by UE address.

If the EDGEAPP feature is supported and the "subscribedEvents" attribute is provided in the received HTTP POST request, and immediate reporting was requested by the AF, then user plane path management report(s) shall be included in the HTTP POST response within the "eventReports" attribute, if available. They may also be included in the HTTP PUT/PATCH response, if available.

NOTE 3: The EAS IP Replacement information and the information indicating the EAS rediscovery are not provided simultaneously.

#### 4.4.7.2 AF request identified by UE address

Upon receipt of the above AF request which is for an individual UE identified by IP or Ethernet address, if the NEF supports HR-SBO scenarios, it may determine whether the PDU session is in HR-SBO mode as described in clause 4.4.7.5.

If the NEF deduces that the PDU session is not working in HR-SBO mode, the procedure in this clause applies. Otherwise, the procedure described in clause 4.4.7.5 shall be performed instead.

The NEF may interact with the BSF to retrieve the related PCF information by invoking the `Nbsf_Management_Discovery` service operation as described in 3GPP TS 29.521 [9]. If the NEF receives an error response from the BSF, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

After receiving a successful response from the BSF, the NEF shall interact with the PCF by invoking the `Npcf_PolicyAuthorization` service as described in 3GPP TS 29.514 [7]. After receiving a successful response from the PCF, the NEF shall:

- for the HTTP POST request, create a resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, addressed by a URI that contains the AF Identifier and an NEF-created subscription identifier, and shall respond to the AF with a "201 Created" status code, including a Location header field containing the URI for the created resource, with the response body including a representation of the created "Individual Traffic Influence Subscription" resource within the `TrafficInfluSub` data structure. The AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this traffic influence subscription;
- for the HTTP PUT or PATCH request, update a resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, and shall responds to the AF with a "200 OK" status code with the "TrafficInfluSub" data structure as response body containing the representation of the modified "Individual Traffic Influence Subscription", or an HTTP "204 No Content" response; and
- for the HTTP DELETE request, remove all properties of the resource and delete the corresponding active resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, then shall responds to the AF with a "204 No Content" status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

If the NEF receives a response with an error code from the PCF, the NEF shall not create, update or delete the resource and shall respond to the AF with a proper error status code.

#### 4.4.7.3 AF request not identified by UE address

For AF request not identified by UE address, it may target an individual UE, one or more groups of UEs or any UE.

If HR-SBO scenarios are supported by the NEF, it may determine whether the PDU session is in HR-SBO mode as described in clause 4.4.7.5.

If the NEF deduces that the PDU session is not working in HR-SBO mode, the procedure in this clause applies. Otherwise, the procedure described in clause 4.4.7.5 shall be performed instead.

For an individual UE identified by GPSI, or one or more groups of UEs identified by External Group Identifier, the NEF shall interact with the UDM by invoking the `Nudm_SubscriberDataManagement` service as described in 3GPP TS 29.503 [17] to retrieve the SUPI or Internal Group Identifier.

When the feature `FinerGranUEs` is supported, the NEF may map the External Subscriber Category(ies) and any UE indicator, or External Subscriber Category(ies) and External Group Identifier(s) to Internal Group Identifier(s) or Internal Group Identifier(s) and Subscriber Category(ies).

NOTE: As a user can be associated with multiple Subscriber Category(ies), some values of Subscriber Category(ies) can correspond to an SLA between an application provider represented by an AF and the 5GC operator. The combination of application identifier and External Subscriber Category can also be used to refer to this SLA.

The NEF shall interact with the UDR to store the traffic influence parameters received from the AF, updated as required and mapped as applicable by invoking the Nudr\_DataRepository service as described in 3GPP TS 29.504 [20] and 3GPP TS 29.519 [23]. If the NEF receives an error response from the UDR, the NEF shall not create, update or delete the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

After receiving a successful response from the UDR, the NEF shall:

- for the HTTP POST request, create a resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, addressed by a URI that contains the AF Identifier and an NEF-created subscription identifier, and shall respond to the AF with a "201 Created" status code, including a Location header field containing the URI for the created resource with the response body including a representation of the created "Individual Traffic Influence Subscription" resource within the TrafficInfluSub data structure. The AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this traffic influence subscription;
- for the HTTP PUT or PATCH request, update a resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, and shall responds to the AF with a "200 OK" status code with the "TrafficInfluSub" data structure as response body containing the representation of the modified "Individual Traffic Influence Subscription", or an HTTP "204 No Content" response; and
- for the HTTP DELETE request, delete the corresponding active resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, and shall responds to the AF with a "204 No Content" status code.

#### 4.4.7.4 Handling of Event Notifications

##### 4.4.7.4.1 Handling of UP path management event notification

If the NEF receives a UP path management event notification from the SMF indicating that the subscribed UP path change event has been detected as defined in 3GPP TS 29.508 [26], then the NEF shall provide a notification by sending an HTTP POST message that shall include the EventNotification data type at least with the subscribed event (e.g. UP Path has changed) to the AF identified by the notification destination received during creation or modification of the Individual Traffic Influence Subscription resource and, optionally, by the AF Transaction Identifier received during the creation of the Individual Traffic Influence Subscription resource. The NEF may include in the EventNotification data type further information as defined in clause 5.4.3.3.4. If a URI for AF acknowledgement within the "ackUri" attribute is provided by the SMF in the event notification as defined in 3GPP TS 29.508 [26], the NEF shall also provide a URI for AF acknowledgement within the "afAckUri" attribute in the EventNotification data.

Upon receipt of the event notification, the AF shall respond with a "204 No Content" status code to confirm the received event notification.

Afterwards, if a URI for AF acknowledgement within the "afAckUri" attribute is received during the UP path management event notification, the AF may determine that an application layer relocation is needed, and may then send an HTTP POST request as acknowledgement for the UP path management event notification to inform the NEF about the result of application layer relocation. If the application layer is ready and/or the application relocation is completed, within the payload of the HTTP POST request, the AF shall include the AfAckInfo data type with the "afStatus" attribute set to "SUCCESS" and may provide within the AfResultInfo data the N6 traffic routing information associated to the target DNAI as "trafficRoute" attribute and, if the "ULBuffering" feature is supported, an indication that buffering of uplink traffic to the target DNAI is needed as "upBuffInd" attribute and, if the "EASIPreplacement" feature is supported, EAS IP replacement information as "easIpReplaceInfos" attribute; otherwise, the AF shall indicate the failure by including the AfAckInfo data type in the payload with the "afStatus" attribute sets to the corresponding failure cause. The NEF Northbound interface transaction identifier generated by the AF shall also be provided as the "afTransId" attribute within the AfAckInfo data if the AF has previously provided it.

Upon receipt of the AF acknowledgement, the NEF shall respond with a "204 No Content" status code to confirm the received acknowledgement, and forward the AF acknowledgement to the SMF as described in 3GPP TS 29.508 [26].

#### 4.4.7.4.2 Handling of Traffic routing requirements enforcement outcome event notification

If the "TraffRouteReqOutcome" feature is supported and the NEF receives an event notification from the SMF indicating that the subscribed "TRAFF\_ROUTE\_REQ\_OUTCOME" event was detected, then the NEF shall send a notification to the AF by sending an HTTP POST request message that shall include the EventNotification data type as defined in clause 5.4.3.3.4.

Upon reception of the event notification, the AF shall respond with an HTTP "204 No Content" status code to confirm the successful reception of the event notification.

#### 4.4.7.4.3 Handling of Simultaneous Connectivity failure event notification

If the "SimConnFailure" feature is supported and the NEF receives an event notification from the SMF indicating that the subscribed "SIM\_CONN\_FAIL" event was detected, then the NEF shall send a notification to the AF by sending an HTTP POST request message that shall include the EventNotification data type as defined in clause 5.4.3.3.4.

Upon reception of the event notification, the AF shall respond with an HTTP "204 No Content" status code to confirm the successful reception of the event notification.

#### 4.4.7.5 Processing AF requests to influence traffic routing for HR-SBO session

If HR-SBO scenarios are supported by the NEF, upon receiving the AF request, it shall determine whether the PDU Session is working in HR-SBO mode based on the availability of the information provided by the AF as follows:

If the AF supports the "HR-SBO" feature and includes within the TrafficInfluSub data type the "plmnId", "dnn" and "snssai" attributes indicating the HPLMN ID, HPLMN DNN and HPLMN S-NSSAI of the UE, the NEF shall determine that the PDU session is working in HR-SBO mode when the PLMN of the UE (derived from the "plmnId", "dnn" and "snssai" received attributes) is not the PLMN that the NEF belongs to.

NOTE 1: The DNN can be unique for a PLMN (see 3GPP TS 23.003 [55]) and can be mapped to a HPLMN.

If the NEF did not receive any of the "plmnId", "dnn" and "snssai" attributes, the NEF shall deduce if the PDU session is working in HR-SBO mode and obtain the related information to be stored in the V-UDR based on the target UE information as follows:

1. If the "gpsi" attribute is received and the HPLMN of the UE is part of it, the NEF derives the HPLMN of the UE (and thus whether HR-SBO applies) from the received GPSI. The NEF shall contact the NEF of the HPLMN as described in 3GPP TS 23.502 [2], clause 4.3.6.5.5 in order to obtain the SUPI, and the DNN and S-NSSAI of the HPLMN.

NOTE 2: If the GPSI is in the form of External Identifier (see 3GPP TS 23.003 [55]) the NEF can determine the HPLMN of UE based on Domain Identifier in the GPSI.

2. If the "anyUeInd" attribute is received, the NEF determines based on configuration if the PDU Session is working in HR-SBO mode.
3. If the UE address is received as part of "ipv6Addr" or "ipv4Addr" attribute and it corresponds to a private IP address, the NEF determines whether HR-SBO applies based on configuration, e.g., to compare whether the received private IP address is within the configured separate private IP address ranges for HR-SBO PDU Sessions or based on interaction with the UPF by invoking the Nupf\_GetUEPrivateIPAddrAndIdentifiers service as described in 3GPP TS 23.502 [2], clause 4.3.6.1, according to local policies.
4. If the UE address is received as part of "ipv6Addr" or "ipv4Addr" attribute and it corresponds to a public IP address that belongs to an IP address range not owned by the VPLMN, the NEF shall determine that HR-SBO applies.
5. If the UE address is received as part of "ipv4Addr" attribute and it corresponds to a public IP address NATed by the PLMN that the NEF belongs to, the NEF shall deduce the PDU session is working in HR-SBO by interacting with the UPF using the Nupf\_GetUEPrivateIPAddrAndIdentifiers\_Get request service operation as described in 3GPP TS 23.502 [2], clause 4.3.6.5.3.

NOTE 3: In this release, the HPLMN allows HR-SBO for a PDU session only if the UE IP address of the PDU Session has not been allocated in a range that may overlap with other PDU sessions to the same DNN and S-NSSAI of that HPLMN.

NOTE 4: It is assumed that the NEF is configured with the NATed IP range of its own PLMN. It is assumed that the NEF is configured based on HR-SBO roaming agreements of Public IP address ranges with an HPLMN ID.

NOTE 5: This procedure is not supported if the AF request targets includes "externalGroupId", "externalGroupIds" or "extSubscCats" attributes within the TrafficInfluSub data type.

The NEF shall derive the information to be stored in the UDR considering the information received from the AF, the H-PLMN derivation (e.g. from GPSI, DNN) and the information obtained from the V-UPF (e.g. SUPI, IP address, DNN, S-NSSAI) or H-NEF (e.g. DNN, S-NSSAI, SUPI) when applicable according to the scenarios described above.

After having derived the information as described above, the NEF shall interact with the UDR to store the traffic influence parameters as described in 3GPP TS 29.504 [20] and 3GPP TS 29.519 [23].

If the NEF receives an error response from the UDR, the NEF shall not create, update or delete the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

After receiving a successful response from the UDR, the NEF shall:

- for the HTTP POST request, create a resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, addressed by a URI that contains the AF Identifier and an NEF-created subscription identifier, and shall respond to the AF with a 201 Created status code, including a Location header field containing the URI for the created resource. The AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this traffic influence subscription;
- for the HTTP PUT or PATCH request, update a resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, and shall respond to the AF with a 200 OK status code with the "TrafficInfluSub" data structure as response body containing the representation of the modified "Individual Traffic Influence Subscription", or an HTTP "204 No Content" response; and
- for the HTTP DELETE request, delete the corresponding active resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, and shall responds to the AF with a 204 No Content status code.

#### 4.4.7.6 Handling of payload headers event notification

If the NEF receives an event notification related to handling of Payload Headers from the UPF as specified in 3GPP TS 29.564 [61] indicating that the header handling action on payload headers was performed, then the NEF shall provide a event notification by sending an HTTP POST message that shall include the HeaderHandlingReport data type as defined in clause 5.4.3.3.9 to the AF identified by the Notification URI and Notification Identifier received during creation or modification of the Individual Traffic Influence Subscription resource in the "notificationDestination" attribute received within the TrafficInfluSub data type or TrafficInfluSubPatch data type and in the "afTransId" attribute received within the TrafficInfluSub data type.

Upon receipt of the event notification, the AF shall respond with a "204 No Content" status code to confirm the received UPF event notification.

#### 4.4.8 Procedures for changing the chargeable party at session set up or during the session

The procedures for changing the chargeable party at session set up or during the session in 5GS shall reuse the procedures and provisions defined in clause 4.4.4 of 3GPP TS 29.122 [4] with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF;
- description of the PCRF applies to the PCF;
- in the HTTP POST request, the AF may include the AF session subscribed "dnn" attribute and/or "snssai" attribute;

- if the EthChgParty\_5G feature defined in clause 5.5.4 of 3GPP TS 29.122 [4] is supported and the request is for an Ethernet UE:
  - in the HTTP POST request:
    - the AF shall include the UE MAC address within the "macAddr" attribute instead of the UE IP address; and
    - instead of the IP Flow description:
      - if the AppId feature defined in clause 5.5.4 of 3GPP TS 29.122 [4] is not supported, the AF shall include the Ethernet Flow description within the "ethFlowInfo" attribute;
      - otherwise, the AF shall include either the External Application Identifier, within the "exterAppId" attribute, or the Ethernet Flow description, within the "ethFlowInfo" attribute;
- and
- in the HTTP PATCH request, the AF may update the Ethernet Flow description, within the "ethFlowInfo" attribute, or the External Application Identifier, within the "exterAppId" attribute;
- the NEF may interact with the BSF by using the Nbsf\_Management\_Discovery service (as defined in 3GPP TS 29.521 [9]) to retrieve the PCF addressing information;
- the NEF shall interact with the PCF by using the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7]; and
- if the ToSTC\_5G feature defined in clause 5.5.4 of 3GPP TS 29.122 [4] is supported:
  - in the HTTP POST request, the AF may include the "tosTC" attribute within the "flowInfo" attribute; and
  - in the HTTP PATCH request, the AF may include the "tosTC" attribute within the "flowInfo" attribute.

## 4.4.9 Procedures for AF required QoS

### 4.4.9.1 General

The following procedures are used for AF required QoS in 5GS:

- Setting up an AF session with required QoS in 5GS for target UE identified by UE address (i.e. IP address or Mac address) or setting up a Multi-member AF session with required QoS in 5GS for target list of UEs identified by the list of UE addresses as described in clause 4.4.9.2.
- AF required QoS in 5GS for target UE not identified by UE address as described in clause 4.4.9.3.

### 4.4.9.2 Procedures for AF setting up an AF session with required QoS for target UE identified by UE address or for target list of UEs identified by list of UE addresses

#### 4.4.9.2.0 General

The provisions and procedures for setting up an AF session with required QoS in 5GS targeting a UE identified by its UE address (IP address or Mac address) or setting up a Multi-member AF session with required QoS in 5GS for target list of UEs identified by the list of UE addresses are described in clause 4.4.13 of 3GPP TS 29.122 [4] with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF;
- description of the PCRF applies to the PCF;

- the NEF may interact with NRF to retrieve the BSF address of the serving UE IP address (es) as defined in 3GPP TS 29.510 [57];
- the NEF may interact with BSF by using Nbsf\_Management\_Discovery service as defined in 3GPP TS 29.521 [9] to retrieve the PCF address;
- the NEF shall interact with the PCF by using Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7];
- when the "ListUE\_5G" feature is supported, in case the NEF receives a list of UE addresses, the NEF shall interact with the NRF/BSF/PCF with above procedures for each UE address individually. The NEF may consolidate the outcome of the individual request for AF session with required QoS corresponding to each UE's IP address and consolidates them into a single response before forwarding it to the AF based on a locally configured consolidated outcome timer.

NOTE: The consolidation of the outcome of the individual requests and the locally configured timer are implementation dependant, e.g., the consolidated outcome timer is locally configured in NEF whose default value is zero.

- in the HTTP POST request, the AF may include a "dnn" attribute and/or a "snssai" attribute; and in the HTTP PUT request, the AF shall keep the same value(s) of the "dnn" attribute and/or the "snssai" attribute as set in the HTTP POST request if provided;
- description about the INDICATION\_OF\_SUCCESSFUL\_RESOURCES\_ALLOCATION event and INDICATION\_OF\_FAILED\_RESOURCES\_ALLOCATION event apply to the SUCCESSFUL\_RESOURCES\_ALLOCATION event and FAILED\_RESOURCES\_ALLOCATION event respectively; In addition, description about the INDICATION\_OF\_RELEASE\_OF\_BEARER, INDICATION\_OF\_LOSS\_OF\_BEARER and INDICATION\_OF\_RECOVERY\_OF\_BEARER events are not applicable in this specification.
- if the EthAsSessionQoS\_5G feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported and the request is for Ethernet UE:
  - in the HTTP POST/PUT request, the AF shall include the UE MAC address within the "macAddr" attribute instead of the UE IP address. If the AppId feature is not supported, the AF shall include the Ethernet Flow description within the "ethFlowInfo" attribute instead of the IP Flow description; otherwise, the AF shall include either the External Application Identifier within the "exterAppId" attribute or the Ethernet Flow description within the "ethFlowInfo" attribute;
  - in the HTTP PATCH request, the AF may update the Ethernet Flow description within the "ethFlowInfo" attribute or the External Application Identifier within the "exterAppId" attribute.

If the "ExtErrors" feature is supported, the NEF may send the following error responses based on failed request responses received from the 5GC (TSCTSF, as specified in 3GPP TS 29.565 [50], or PCF, as specified in 3GPP TS 29.514 [7]):

- a. if the NEF receives the indication that the 5GC failed in executing session binding, the NEF shall reject the HTTP POST request with an HTTP "500 Internal Server Error" response including the "cause" attribute set to "PDU\_SESSION\_NOT\_AVAILABLE";
- b. if the service information provided in the body of the HTTP POST/PUT/PATCH request is rejected by the 5GC (e.g. the subscribed guaranteed bandwidth for a particular user is exceeded or the authorized data rate in that slice for a UE is exceeded), the NEF shall indicate in an HTTP "403 Forbidden" response message the cause for the rejection including the "cause" attribute set to "REQUESTED\_SERVICE\_NOT\_AUTHORIZED";
- c. if the service information provided in the body of the HTTP POST/PUT/PATCH request is rejected due to a temporary condition in the network, the NEF may include in the "403 Forbidden" response the "cause" attribute set to "REQUESTED\_SERVICE\_TEMPORARILY\_NOT\_AUTHORIZED", as received. The NEF may also provide a received retry interval within the "Retry-After" HTTP header field. When the AF receives the retry interval within the "Retry-After" HTTP header field, the AF shall not send the same service information to the NEF again (for the same application session context) until the retry interval has elapsed. The "Retry-After" HTTP header is described in 3GPP TS 29.122 [4];

The NEF may additionally provide the acceptable QoS parameters within the attribute "acceptableServInfo" included in the "ProblemDetailsAsSessionQos" data structure returned in the rejection response message.

d. when the request to provision sponsored data connectivity information provided in the body of the HTTP POST/PUT/PATCH request is rejected, the NEF shall reject the request with the received status and error cause, as follows:

1. HTTP "403 Forbidden" response message with the "cause" attribute set to "UNAUTHORIZED\_SPONSORED\_DATA\_CONNECTIVITY"; or
2. HTTP "403 Forbidden" response message with the "cause" attribute set to "REQUESTED\_SERVICE\_NOT\_AUTHORIZED".

If the "TrafficCharChange" feature is supported, and if the service information provided in the body of the HTTP POST/PUT/PATCH request is rejected by the 5GC due to the 5GC identified that the UE does not support reflective QoS, the NEF shall indicate in an HTTP "403 Forbidden" response message the cause for the rejection including the "cause" attribute set to "REFLECTIVE\_QOS\_NOT\_SUPPORTED\_IN\_UE".

If the "MpxMedia" feature is supported, and if the service information provided in the body of the HTTP POST/PUT/PATCH request is rejected by the 5GC due to the 5GC identified that the UE does not support (S)RTP Multiplexed Media Identification, the NEF shall indicate in an HTTP "403 Forbidden" response message the cause for the rejection including the "cause" attribute set to "MPX\_MEDIA\_NOT\_SUPPORTED\_IN\_UE".

#### 4.4.9.2.1 Procedure for QoS handling and QoS monitoring for list of UEs

If the "ListUE\_5G" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported;

- in order to support the QoS handling and QoS monitoring for the list of UEs from AF, the AF may include:
  - a the list of UE address(es) within the "listUeAddrs" attribute instead of the UE IP/MAC address; and
  - b. the list of UE addresses subject for Consolidated Data Rate monitoring within the "listUeConsDtRt" attribute;

NOTE 1: If the "listUeConsDtRt" attribute is provided, it is a subset of "listUeAddrs" attribute.

In order to support the QoS Monitoring for UL and/or DL data rate for the list of UEs, the AF shall include the required consolidated data rate monitoring information for the list of UEs within the "qosMonDatRate" attribute. The subscribed event is "QOS\_MONITORING". The AF shall include within the "qosMonDatRate" attribute:

- a) the requested consolidated data rate parameter(s) to be measured (i.e., DL and/or UL data rate) within the "reqQosMonParams" attribute;
- b) one or more report frequency(ies) within the "repFreqs" attribute;
- c) when the "repFreqs" attribute is set to the value "EVENT\_TRIGGERED":
  - the data rate threshold for downlink within the "consDataRateThrDL" attribute; and/or
  - the data rate threshold for uplink within the "consDataRateThrUL" attribute;
- d) when the "repFreqs" attribute is set to the value "PERIODIC", the periodic time for reporting within the "repPeriod" attribute; and
- e) when the "repFreqs" attribute is set to the value "EVENT\_TRIGGERED", the minimum waiting time between subsequent reports within the "waitTime" attribute.

If the NEF recognizes, based on configuration, that the IP address(es) received within the "listUeAddrs" attribute are different from the IP address(es) assigned by 5GC (i.e. the UE(s) are behind a NAT in UPFs), the NEF shall invoke the UEId API as defined in clause 4.4.32 for each UE IP address with port number in order to identify the corresponding IP address (and IP domain, if necessary) that has been assigned by the 5GC. The NEF then uses the respective corresponding IP address (and IP domain, if necessary) in the following steps instead of the UE IP address provided by the AF.

If the NEF authorizes the AF request, the NEF subscribes to data rate QoS Monitoring for each UE in the list to the PCFs by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7]. The NEF shall always set its notification URI as the Target of Reporting and set "directNotifInd" to "true" in the request to PCFs to ensure that



QoS Monitoring reports can be sent by the UPF directly to the NEF regardless of whether the "directNotifInd" attribute was set to "true" in the request from the AF.

When the NEF receives the notification about data rate for the list of UEs from the UPFs, the NEF shall aggregate the QoS Monitoring reports for data rate for those UEs identified by the "listUeConsDtRt" attribute or "listUeAddrs" attribute and notify the AF with the "aggrDataRateRpts" attribute that may include:

- the uplink data rate within the "ulAggrDataRate" attribute; and/or
- the downlink data rate within the "dlAggrDataRate" attribute.

NOTE 2: If the "consDataRateThrDI" and/or "consDataRateThrUI" attributes are provided, the QoS parameter(s) to be measured indicates the Guaranteed Bitrate needs to be provided.

#### 4.4.9.2.2 Subscriptions to QoS handling and QoS Monitoring

If the "AlternativeQoS\_5G" feature is supported, the AF may include an ordered list of QoS references within the "altQosReferences" attribute and, if the "DisableUENotification\_5G" feature is also supported, an indication that the UE does not need to be informed about changes related to Alternative QoS Profiles within the "disUeNotif" attribute.

When the NEF interfaces directly with the PCF, the NEF shall transfer them to the PCF in the Npcf\_PolicyAuthorization service and subscribe to PCF event "QOS\_NOTIF" in the Npcf\_PolicyAuthorization service. When the NEF receives the notification of PCF event "QOS\_NOTIF", it shall notify the AF with:

- "QOS\_GUARANTEED" event or with "QOS\_NOT\_GUARANTEED" event, if the "ExtQoS\_19" feature is supported, "QOS\_NOT\_GUARANTEED\_DL" event or "QOS\_NOT\_GUARANTEED\_UL" event, and the currently applied QoS reference if received, and to indicate whether the QoS targets for the indicated SDFs are not guaranteed or guaranteed again in the corresponding direction.

When the NEF receives the notification of PCF event "SUCCESSFUL\_RESOURCES\_ALLOCATION", it shall notify the AF the event together with the currently applied QoS reference if received.

If the feature "AltQoSProfilesSupportReport" is supported, when the NEF receives the indication from the PCF or the TSCTSF about the support of alternative QoS profiles, the NEF shall notify the AF forwarding the received indication within the "altQosNotSuppInd" attribute.

NOTE 1: Based on the operator configuration, the QoS reference identifiers received from the AF can be the same or different as the QoS reference identifiers known at the PCF. The NEF can perform a mapping for the QoS reference identifier.

If the "AltQosWithIndParams\_5G" feature is supported, the AF may include:

- an ordered list of alternative service requirements that include individual QoS parameter sets within the "altQosReqs" attribute and, if the "DisableUENotification\_5G" feature is also supported, an indication that the UE does not need to be informed about changes related to Alternative QoS Profiles within the "disUeNotif" attribute. Within the AlternativeServiceRequirementsData data structure, the AF shall include:
  - a reference to the alternative individual QoS related parameter(s) included in this set within the "altQosParamSetRef" attribute; and
  - at least one of the following:
    - The guaranteed bandwidth in uplink within the "gbrUI" attribute and the guaranteed bandwidth in downlink within the "gbrDI" attribute;
    - The requested packet delay budget within the "pdb" attribute;
    - The requested packet error rate within the "per" attribute if the "ExtQoS\_5G" feature is supported;

If the "QoSMonitoring\_5G" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, in order to support the QoS Monitoring for packet delay, the AF shall include "qosMonInfo" attribute. The AF shall also include the "directNotifInd" attribute set to true if the "ExposureToEAS" feature is supported and the direct notification is required. Within the QosMonitoringInformation data structure, the AF shall include:

1. one or more requested QoS Monitoring Parameter(s) (i.e., UL, DL and/or RTT delay) within the "reqQosMonParams"; and
2. one or more report frequency within the "repFreqs" attribute; and
3. when the "repFreqs" attribute includes the value "PERIODIC", the periodic time for reporting and, if the feature "PacketDelayFailureReport" is supported, the maximum period with no QoS measurement results reported within the "repPeriod" attribute; and
4. when the "repFreqs" attribute includes the value "EVENT\_TRIGGERED":
  - a. delay threshold(s) as follows:
    - the delay threshold for downlink with the "repThreshDL" attribute;
    - the delay threshold for uplink with the "repThreshUL" attribute; and/or
    - the delay threshold for round trip with the "repThreshRp" attribute;
  - b. the minimum waiting time between subsequent reports within the "waitTime" attribute; and
  - c. if the feature "PacketDelayFailureReport", the maximum period with no QoS measurement results reported within the "repPeriod" attribute.

If the "EnQoSMon" feature is supported and QoS monitoring control is for packet delay and/or congestion and/or data rate and/or if the "EnQoSMon\_v2" feature is supported and QoS monitoring control is for available bitrate, and if the "MultiMedia" feature is supported, the request is not for multiple flows (i.e., the "multiModDatFlows" attribute is not included), the AF shall include:

- the "qosMonInfo" attribute to request QoS monitoring for packet delay as described for the "QoSMonitoring\_5G" feature, the "qosMonConReq" attribute to request QoS monitoring for congestion and/or the "qosMonDatRate" attribute to request QoS monitoring for data rate;

NOTE 2: When the feature "MultiMedia" is supported and the request is for multiple flows (i.e., the "multiModDatFlows" attribute is included) the subscription for QoS monitoring can only be indicated within the corresponding "multiModDatFlows" entry.

- if direct notification is required for the QoS measurement(s) provided in the "qosMonInfo", "qosMonConReq", "qosMonDatRate" and "avlBitRateMon" attribute(s), the "directNotifInd" attribute set to true;
- within each of the provided QosMonitoringInformation data structure(s):
  1. one or more requested QoS Monitoring Parameter(s) for the concerned QoS monitoring parameter within the "reqQosMonParams" attribute;
  2. one or more report frequency within the "repFreqs" attribute, if applicable;

NOTE 3: If the "reqQosMonParams" attribute indicates congestion measurement(s), the "repFreqs" attribute can only indicate "EVENT\_TRIGGERED".

3. when the "repFreqs" attribute includes the value "PERIODIC", the periodic time for reporting and the maximum period with no QoS measurement results reported within the "repPeriod" attribute; and
4. when the "repFreqs" attribute includes the value "EVENT\_TRIGGERED":
  - a. for QoS monitoring for data rate:
    - the data rate threshold for downlink within the "repThreshDatRateDL" attribute; and/or
    - the data rate threshold for uplink within the "repThreshDatRateUL" attribute;
  - b. for QoS monitoring for congestion information:
    - the congestion threshold for downlink with the "conThreshDL" attribute; and/or
    - the congestion threshold for uplink with the "conThreshUL" attribute;

- c. for QoS monitoring for available bitrate:
    - a list of thresholds for uplink available bitrate reporting with the "avlBitrateUlThrs" attribute; and/or
    - a list of thresholds for downlink available bitrate reporting with the "avlBitrateDlThrs" attribute;
  - d. the minimum waiting time between subsequent reports within the "waitTime" attribute; and
  - e. the maximum period with no QoS measurement results reported within the "repPeriod" attribute.
- if the QoS monitoring control is for data rate, the AF may include the averaging window within the "avrgWndw" attribute.

If the "EnQoSMon" feature is supported and QoS Monitoring control is for packet delay variation at AF session level:

- the AF shall include the required Packet Delay Variation monitoring information within "pdvMon" attribute. The subscribed event is "PACK\_DELAY\_VAR" contained in the "events" attribute within the AsSessionWithQoSSubscription data type. The AF shall include within the "pdvMon" attribute:
  - a) the requested Packet Delay Variation parameter(s) to be measured (i.e. DL, UL and/or round trip packet delay variation) within the "reqQosMonParams" attribute;
  - b) one or more report frequency within the "repFreqs" attribute;
  - c) when the "repFreqs" attribute is set to the value "EVENT\_TRIGGERED":
    - the Packet Delay Variation threshold for downlink with the "repThreshDl" attribute;
    - the Packet Delay Variation threshold for uplink with the "repThreshUl" attribute; and/or
    - the Packet Delay Variation threshold for round trip with the "repThreshRp" attribute;
  - d) when the "repFreqs" attribute is set to the value "PERIODIC", the periodic time for reporting within the "repPeriod" attribute; and
  - e) when the "repFreqs" attribute is set to the value "EVENT\_TRIGGERED", the minimum waiting time between subsequent reports within the "waitTime" attribute;

NOTE 4: The direct notification "directNotifInd" attribute is not applicable for "pdvMon" attribute because the PDV monitoring calculation and notification is performed by the PCF. In case "directNotifInd" attribute is provided for packet delay, data rate, and/or congestion information along with PDV monitoring, the PDV monitoring follows the specified PCF notification mechanism and other QoS monitorings request follows the direct notification mechanism, if feasible.

When the NEF receives the notification about Packet Delay Variation event notification from the PCF as defined in clause 4.2.5.26 of 3GPP TS 29.514 [7], the NEF shall notify the AF with "PACK\_DELAY\_VAR" event and include the received monitored Packet Delay Variation information within the "pdvMonReports" attribute, it may include:

- a) the uplink packet delay variation measurement(s) within the "ulPdv" attribute;
- b) the downlink packet delay variation measurement(s) within the "dlPdv" attribute;
- c) the round trip packet delay variation measurement(s) within the "rtPdv" attribute;

NOTE 5: QoS Monitoring for the round-trip delay over two QoS flows requires the support of the "MultiMedia" feature and is subscribed at single-modal data flow(s) level. The "RT\_DELAY\_TWO\_QOS\_FLOWS" event cannot be provided within the "events" attribute.

If the NEF authorizes the AF request, the NEF may create a QoS monitoring notification correlation identifier for the AF transaction during the creation of the AF resource and may provision it together with the received QoS monitoring parameters to the PCF by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7] or, if the "TSC\_5G" feature is supported, to the TSCTSF by invoking the Ntsctsf\_QoSandTSCAssistance service as defined in 3GPP TS 29.565 [50].

If the NEF receives from the PCF the indication that direct notification is not possible for the requested QoS monitoring parameters as specified in 3GPP TS 29.514 [7], the NEF shall include in the response to the AF request the "servAuthInfo" attribute with the value "DIRECT\_NOTIF\_NOT\_POSSIBLE".

When the NEF receives the event notification for the AF transaction as defined in clause 4.2.2 of 3GPP TS 29.508 [26] or clause 4.2.5.14 of 3GPP TS 29.514 [7] or, if the "TSC\_5G" feature is supported, clause 5.3.2.5.7 of 3GPP TS 29.565 [50], or when the AF requested direct notification, as defined in clause 5.2.2.3 of 3GPP TS 29.564 [61], the NEF shall include one or more QoS monitoring reports with the delay measurement within the "qosMonReports", the data rate measurements within the "qosMonDatRateReps" and/or the congestion measurements within "qosMonConInfoReps" attribute. Within the QosMonitoringReport data structure, the NEF shall include the received monitored QoS information.

- for packet delay measurements, within "qosMonReports":
  - a. the uplink packet delays within the "ulDelays" attribute; and/or
  - b. the downlink packet delays within the "dlDelays" attribute; and/or
  - c. the round trip packet delays within the "rtDelays" attribute;

NOTE 6: The PCF, the SMF, the UPF or the TSCTSF report one UL, DL and/or round-trip packet delay measurement for each periodic and/or event-triggered report as described in 3GPP TS 29.514 [7], 3GPP TS 29.508 [26], 3GPP TS 29.564 [61] and 3GPP TS 29.565 [50], i.e, the NEF can include only one element within the "ulDelays", "dlDelays", and/or "rtDelays" array(s), each one with the received report from the PCF, SMF, UPF or the TSCTSF for the UL, DL and/or round trip delay(s).

- for congestion information measurements, within the "qosMonConInfoReps":
  - a. the uplink congestion information measurement within the "ulConInfo" attribute; and/or
  - b. the downlink congestion information measurement within the "dlConInfo" attribute;
- for data rate measurements, within "qosMonDatRateReps":
  - a. one data rate measurement for the UL within the "ulDataRate" attribute; and/or
  - b. one data rate measurement for the DL within the "dlDataRate" attribute; or
- if the feature "PacketDelayFailureReport" is supported, the packet delay measurement failure indicator within the "pdmf" attribute.

If the "MultiMedia" feature is supported, when the NEF receives the event notification for the AF transaction as defined in clause 4.2.2 of 3GPP TS 29.508 [26] or clause 4.2.5.14 of 3GPP TS 29.514 [7], or when the AF requested direct notification, as defined in clause 5.2.2.3 of 3GPP TS 29.564 [61], the NEF shall include the affected single-modal identification number and the corresponding flows within the "multiModFlows" attribute.

If the "QoSMonCapRepo" feature defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported:

- the AF may subscribe to the "QOS\_MON\_CAP\_REPO" event, and if the "QOS\_MON\_CAP\_REPO" event is subscribed, the AF shall include the monitoring type within the "qosMonCapRepoTypes" attribute;
- if the NEF authorizes the AF request, the NEF shall subscribe to the corresponding event at the PCF by invoking the Npcf\_PolicyAuthorization service API as defined in 3GPP TS 29.514 [7] or at the TSCTSF by invoking the Ntsctsf\_QoSandTSCAssistance service API as defined in 3GPP TS 29.565 [50].

When the NEF receives the QoS Monitoring Capability Report event notification as defined in 3GPP TS 29.514 [7] or 3GPP TS 29.565 [50], the NEF shall notify the AF including in the "qosMonCapRepos" attribute the received information.

NOTE 7: In current release of specification, the QoS Monitoring Capability report support only Packet delay, congestion and available bit rate and each can be active or not active independently.

#### 4.4.9.2.3 Provisioning of TSCAI input Information and QoS related data

If the "TSC\_5G" feature is supported, when the NEF interfaces with the TSCTSF, the NEF shall transfer the received alternative QoS references to the TSCTSF in the Ntsctsf\_QoSandTSCAssistance service and subscribe with TSCTSF to "QOS\_GUARANTEED" and "QOS\_NOT\_GUARANTEED" events. When the NEF receives the event notification from the TSCTSF, the NEF shall notify the AF with "QOS\_GUARANTEED" event or with "QOS\_NOT\_GUARANTEED" event and the currently applied QoS reference if received. When the NEF receives the

notification of TSCTSF event "SUCCESSFUL\_RESOURCES\_ALLOCATION", it shall notify the AF the event together with the currently applied QoS reference if received.

If the "TSC\_5G" feature is supported, the AF may include:

- the TSC QoS requirement within the "tscQosReq" attribute. Within the TscQosRequirement data structure, the AF may include:
- the input information to construct the TSC Assistance Container within the "tscaiInputUI" attribute and/or "tscaiInputDI" attribute, and the (g)PTP domain that the AF is located in within the "tscaiTimeDom" attribute;

NOTE 1: For the adjustment of burst sending time and adjustment of periodicity within the "periodicityRange" attribute in the UL direction within the "tscaiInputUI" attribute, it is expected that the AF interacts with the application in the UE or devices behind the UE based on application layer signaling.

- the capability for BAT adaptation within the "capBatAdaptation" attribute, if the "EnTSCAC" feature is also supported. The capability for BAT adaptation and the burst arrival time window ("burstArrivalTimeWnd" attribute within the "tscaiInputUI" attribute and/or "tscaiInputDI" attribute of the "tscQosReq" attribute) are mutually exclusive; and
- if individual QoS parameters instead of QoS reference is provided, may include:
  - requested GBR within the "reqGbrDI" attribute and/or "reqGbrUI" attribute;
  - requested MBR within the "reqMbrDI" attribute and/or "reqMbrUI" attribute;
  - the maximum burst size within the "maxTscBurstSize" attribute;
  - the priority within the "priority" attribute;
  - the requested 5GS delay within the "req5Gdelay" attribute; and
  - the requested packet error rate within the "reqPer" attribute, if the "ExtQoS\_5G" feature is also supported.

If the NEF authorizes the AF request, the NEF may provision the received QoS requirements to the TSCTSF by invoking the Ntsctsf\_QoSAndTSCAssistance\_Create/Update request as defined in 3GPP TS 29.565 [50]. The NEF determines whether to invoke the TSCTSF or to directly contact the PCF based on operator configuration. This determination may consider the AF identifier, whether the "tscaiInputUI" and/or "tscaiInputDI" attributes within the "tscQosReq" attribute were received in the subscription request, whether the "qosReference" attribute or individual QoS parameters within the "tscQosReq" attribute were received in the subscription request, and SLA between operator and application provider. A TSCTSF address may be locally configured in the NEF or the NEF uses the DNN/S-NSSAI (which may be provided in the request or determined based on the AF identifier) to discover the TSCTSF from the NRF. If the NEF directly contacts the PCF while the NEF determined to invoke the TSCTSF when authorizing the update request, the NEF shall reject the request message by sending an HTTP response to the AF with a status code set to 403 Forbidden and may include the "INVALID\_SESSION\_UPDATE" error in the "cause" attribute of the "ProblemDetails" structure and indicate which parameters can not be served in current session in the "invalidParams" attribute of the "ProblemDetails" structure.

NOTE 2: The NEF can determine whether the TSCTSF needs to be involved based on the DNN/S-NSSAI for the AF session according to the SLA.

If the "EnTSCAC" feature is supported and the NEF receives the BAT offset information from the TSCTSF about the BAT offset and the optionally adjusted periodicity, the NEF shall send an Event Notification to the AF with the "event" attribute set to BAT\_OFFSET\_INFO and including the "ranBatOffsetNotif" attribute and optionally the "adjPeriod" attribute within the "batOffsetInfo" attribute.

If the NEF authorizes the AF request, and if the "TSC\_5G" feature is supported, the NEF may provision the received QoS requirements and subscribe with the TSCTSF to "QOS\_GUARANTEED" and "QOS\_NOT\_GUARANTEED" events by invoking the Ntsctsf\_QoSAndTSCAssistance\_Create request as defined in 3GPP TS 29.565 [50]. The NEF determines whether to invoke the TSCTSF or to directly contact the PCF based on operator configuration. This determination may consider the AF identifier, whether the "tscaiInputUI" and/or "tscaiInputDI" attributes within the "tscQosReq" attribute were received in the subscription request, whether the "qosReference" attribute or individual QoS parameters within the "altQosReqs" attribute were received in the subscription request, and SLA between operator and application provider. A TSCTSF address may be locally configured in the NEF or the NEF uses the DNN/S-NSSAI (which may be provided in the request or determined based on the AF identifier) to discover the TSCTSF from the

NRF. When the NEF receives the notification of TSCTSF "QOS\_GUARANTEED" event or "QOS\_NOT\_GUARANTEED" event, it shall notify the AF with "QOS\_GUARANTEED" event or "QOS\_NOT\_GUARANTEED" event with the currently applied individual QoS parameter set within the "appliedQosRef" attribute if received. When the NEF receives the notification of the TSCTSF event "SUCCESSFUL\_RESOURCES\_ALLOCATION", it shall notify the AF the event together with the currently applied individual QoS parameter set within the "appliedQosRef" attribute if received. If the NEF directly contacts the PCF while the NEF determined to invoke the TSCTSF when authorizing the update request, the NEF shall reject the request message by sending an HTTP response to the AF with a status code set to 403 Forbidden and may include the "INVALID\_SESSION\_UPDATE" error in the "cause" attribute of the "ProblemDetails" structure and indicate which parameters can not be served in current session in the "invalidParams" attribute of the "ProblemDetails" structure.

NOTE 3: The NEF can determine whether the TSCTSF needs to be involved based on the DNN/S-NSSAI for the AF session according to the SLA.

When the NEF interfaces directly with the PCF, the NEF shall transfer the received QoS requirements to the PCF in the Npcf\_PolicyAuthorization service and subscribe to PCF event "QOS\_NOTIF" in the Npcf\_PolicyAuthorization service. When the NEF receives the notification of PCF event "QOS\_NOTIF", it shall notify the AF with "QOS\_GUARANTEED" event or with the "QOS\_NOT\_GUARANTEED" event and the currently applied QoS reference if received. When the NEF receives the notification of PCF event "SUCCESSFUL\_RESOURCES\_ALLOCATION", it shall notify the AF the event together with the currently applied QoS reference if received.

If the feature "AltQoSProfilesSupportReport" is supported, when the NEF receives the indication from the PCF or the TSCTSF about the support of alternative QoS profiles, the NEF shall notify the AF forwarding the received indication within the "altQosNotSuppInd" attribute.

#### 4.4.9.2.4 Subscription to the access type change and plmn change

If the "enNB\_5G" feature defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported:

- the AF may additionally subscribe to the "ACCESS\_TYPE\_CHANGE" and/or "PLMN\_CHG" event(s); and
- if the NEF authorizes the AF request, the NEF shall subscribe to the corresponding event(s) at the PCF by invoking the Npcf\_PolicyAuthorization service API as defined in 3GPP TS 29.514 [7].

#### 4.4.9.2.5 Provisioning of ToS traffic class

If the ToSTC\_5G feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported:

- in the HTTP POST request, the AF may include the "tosTC" attribute within the "flowInfo" attribute of the AsSessionWithQoSSubscription data type; and
- in the HTTP PATCH request, the AF may include the "tosTC" attribute within the "flowInfo" attribute of the AsSessionWithQoSSubscriptionPatch data type.

#### 4.4.9.2.6 Provisioning of multi-modal services

If the "MultiMedia" feature is supported, the AF may include:

- the multi-modal Service ID within the "multiModalId" attribute; and/or
- the multi-modal data flow(s) information of the multi-modal service in the "multiModDatFlows" attribute. The AF shall include for each single-modal data flow(s) of the multi-modal service:
  1. the single-modal data identification number within the "medCompN" attribute;
  2. the IP data flow(s) description for the single-modal data flow within the "flowInfos" attribute; and
  3. the parameters that describe the requested QoS for the single-modal data flow, as follows:
    - a. the single-modal data flow type within the "medType" attribute, if applicable;
    - b. either a reference to a pre-defined QoS information for the single-modal data flow within the "qosReference" attribute, or individual QoS parameters within the corresponding attributes;

- c. if individual QoS parameters are provided, an ordered list of alternative service requirements for the single-modal data flow within the "altSerReqsData" attribute, if applicable;
- d. if a reference to pre-defined QoS information is provided, an ordered list of QoS references for the single-modal data flow within the "altSerReqs" attribute, if applicable;
- e. if the "RTLatency" feature is supported:
  - an indication that the a service data flow needs to meet the Round-Trip (RT) latency requirement within the "rTLatencyInd" attribute, or the indication that two service data flows together with the identification of the two service data flows need to meet the RT latency requirement within the "rTLatencyIndCorreId" attribute;
  - the RT latency requirement (i.e., PDB) of the service data flow(s) either explicitly within the "pdb" attribute or implicitly (to be derived by the PCF) in the "qosReference" attribute;
- f. if the "PDUSetHandling" feature is supported, PDU Set QoS related information for the single-modal data flow within the "pduSetQosDI" and/or "pduSetQosUI" attribute(s), if applicable, and the Protocol Description related information within the "protoDescDI" and/or "protoDescUI" attribute(s), if applicable;

NOTE 1: For multi-modal communication services related to multiple UEs, multiple UE-specific AF requests are used, and the AF provided information to NEF is the same as single UE case. Multiple UE-specific AF requests can include the same multimodal Service ID within the "multiModalId" attribute. For the single UE case, the AF can provide the multiple single-modal data flows of the multi-modal communication service via single or multiple AF requests.

- g. if the "EnQoSMon" feature is supported and the subscription to QoS Monitoring is for one or more service data flow(s), the subscription information which is applicable to the QoS monitoring events within the "evSubsc" attribute as specified in 3GPP TS 29.514 [7];
- h. if the "L4S" feature is supported, the Low Latency, Low Loss and Scalable Throughput (L4S) Support indication within the "l4sInd" attribute. In this case, the AF shall also subscribe to notifications of ECN marking for L4S support information not available in 5GS within the "evSubsc" attribute as specified in 3GPP TS 29.514 [7];

NOTE 2: When both, "EnQoSMon" and "L4S" features are supported, for each data flow of the multi-modal service, the AF can include either the indication of L4S support within the "l4sInd" attribute or the request for congestion measurements within the "evSubsc" attribute as specified in 3GPP TS 29.514 [7], but the request cannot include both attributes simultaneously. The Individual AS Session with Required QoS Subscription resource cannot contain for a single-modal data flow(s) simultaneously both, the indication of L4S support and the subscription to congestion monitoring.

- i. if the "PowerSaving" feature is supported, the time period between the start of the two data bursts in Uplink and/or Downlink direction within the "periodUI" and "periodDI" attributes respectively, and the Downlink Protocol Description related information within the "protoDescDI" attribute;
- j. if the "TrafficCharChange" feature is supported, the indicator for supporting Data Burst Size marking within the "datBurstSizeInd" attribute, the Expedited Data Transfer Indication within the "expTranInd", the indicator for supporting Time to Next Burst within the "timetoNextBurstInd" attribute and/or the DL Protocol Description within the "protoDescDI" attribute, if applicable; and
- k. if the "OnPathN6MediaInfo" feature is supported, the on-path N6 signaling information within the "onPathN6SigInfo" attribute, and the DL Protocol Description within the "protoDescDI" attribute, if applicable.

If the NEF authorizes the AF request, the NEF shall provision the received multi-modal service ID and the single-modal data flow(s) information to the PCF by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7]. If the multi-modal service information contains per flow subscription to events, the NEF, per flow, shall provide a notification URI and may provide a notification correlation identifier together with the received event(s) parameters by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7].

If the NEF receives from the PCF the indication that direct notification is not possible for the requested QoS monitoring parameters as specified in 3GPP TS 29.514 [7], the NEF shall include in the response to the AF request the "servAuthInfo" attribute with the value "DIRECT\_NOTIF\_NOT\_POSSIBLE".

When the NEF receives the QoS monitoring event notification for the AF transaction as defined in clause 4.2.5.14 of 3GPP TS 29.514 [7], the NEF shall identify the affected AF flow identifiers based on the flow identifiers received from the PCF. When the NEF receives the QoS monitoring event notification for the AF transaction as defined in clause 4.2.2 of 3GPP TS 29.508 [26] or when the AF requested direct notification, as defined in clause 5.2.2.3 of 3GPP TS 29.564 [61], the NEF may identify the affected AF flow identifiers based on the notification correlation identifier and/or target notification URI of the received notification.

NOTE 3: When the NEF receives QoS monitoring reports from the SMF or UPF, the NEF could determine the affected flows of a QoS monitoring report based on the per flow combination of notification URI and notification correlation ID value(s) provided to the PCF during per flow subscription with the PCF.

When the NEF receives the ECN marking for L4S availability event notification from the PCF as specified in 3GPP TS 29.514 [7], the NEF shall notify the AF with the corresponding "L4S\_NOT\_AVAILABLE" or "L4S\_AVAILABLE" event, which corresponds to the "L4S\_SUPP" event in the subscription within the "events" attribute of "evSubsc" attribute included in the AsSessionMediaComponent or AsSessionMediaComponentRm data type.

If the "MultiMedia" feature is supported, when the NEF receives the event notification for the AF transaction as defined in clause 4.2.2 of 3GPP TS 29.508 [26] or clause 4.2.5.14 of 3GPP TS 29.514 [7], or as defined in clause 5.2.2.3 of 3GPP TS 29.564 [61] if the AF requested direct notification, the NEF shall include the affected single-modal identification number and the corresponding flows within the "multiModFlows" attribute.

#### 4.4.9.2.7 Provisioning of Round-Trip latency requirements

If the "RTLatency" feature is supported, the AF may include:

- the indication that the service data flow needs to meet the Round-Trip (RT) latency requirement within the "rTLatencyInd" attribute; and
- the RT latency requirement of the service data flow either explicitly within the "pdb" attribute or implicitly (to be derived by the PCF) in the "qosReference" attribute.

NOTE: The single direction latency requirement between the UE and the PSA UPF can be either explicitly included within the "pdb" attribute or can be derived from the "qosReference" attribute. The twice of the single direction latency is used as the Uplink-Downlink Round Trip latency of the indicated service.

If the NEF authorizes the AF request, the NEF shall transfer the received RT latency requirement to the PCF via the Npcf\_PolicyAuthorization service.

#### 4.4.9.2.8 Subscription to the report of L4S support information

If the "L4S" feature is supported, the AF may include:

- the Low Latency, Low Loss and Scalable Throughput (L4S) Support within the "l4sInd" attribute. In this case, the AF shall also subscribe to notifications of ECN marking for L4S support information not available in 5GS and available again by including the "L4S\_NOT\_AVAILABLE" and "L4S\_AVAILABLE" events in the "events" attribute. When the NEF receives the ECN marking for L4S availability event notification from the PCF as specified in 3GPP TS 29.514 [7], the NEF shall notify the AF with the corresponding "L4S\_NOT\_AVAILABLE" or "L4S\_AVAILABLE" event.

NOTE: When both, the "L4S" and "EnQoSMon" features are supported, the AF request can include either the indication of L4S support within the "l4sInd" attribute or the request for congestion measurements within the "qosMonConReq" attribute, but the request cannot include both attributes simultaneously. The Individual AS Session with Required QoS Subscription resource cannot contain simultaneously both, the indication of L4S support and the subscription to congestion monitoring.

#### 4.4.9.2.9 Provisioning of PDU Set handling

If "PDUSetHandling" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, the AF may include:

- the protocol description within the "protoDescDI" and/or "protoDescUI" attribute(s) for the UPF to identify the PDU Set Information and/or identify the last PDU of a data burst in the DL traffic and/or for the UE to identify PDU Set information. The protocol description indicates transport protocol (e.g., RTP, SRTP), transport protocol



header extensions (e.g., RTP Header Extension for PDU Set Marking in the DL as defined in 3GPP TS 26.522 [74]), payload type and format (e.g., H.264, H.265) used by the service data flow for the DL and/or the UL. In case of the multi-modal data flow(s), each flow may have the respective "protoDescDL" and/or "protoDescUL" attribute(s); and

- the PDU Set QoS parameters, "pduSetQosDL" and/or "pduSetQosUL" attribute(s).

If the "ExtQoS\_v2" feature is supported, and the PSDB (UL and/or DL) and PSER (UL and/or DL) in "pduSetQosDL" and/or "pduSetQosUL" attribute(s) within AsSessionWithQoSSubscription or AsSessionMediaComponent data types are provided, the AF shall also provide the PSDB (UL and/or DL) and PSER (UL and/or DL) in the Alternative QoS Parameter set(s) by including the "pduSetQosDL", "pduSetQosUL", "averWindow", "maxDataBurstVol" and/or "extMaxDataBurstVol" attribute(s) within the "altSerReqsData" attribute; otherwise, the corresponding Alternative QoS Parameter set(s) shall not contain the PSDB and PSER in the respective direction(s).

If the NEF receives the AF request with PDU Set QoS parameters within the "pduSetQosDL" and/or "pduSetQosUL" attribute(s) and protocol description information within the "protoDescDL" and/or "protoDescUL" attribute(s), the NEF shall forward the attributes to PCF to support the PDU Set QoS configuration by invoking the Npcf\_PolicyAuthorization\_Create/Update service operation(s).

#### 4.4.9.2.10 Provisioning of traffic information for UE power saving management

If the "PowerSaving" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, the AF may include:

- the Uplink and/or Downlink Periodicity information which indicates the time period between the start of the two data bursts in Uplink and/or Downlink direction within the "periodUL" and "periodDL" attributes respectively; and
- the protocol description within the "protoDescDL" attribute, to assist the UPF to identify the End of Burst. In case of the multi-modal data flow(s), each flow may have the respective "protoDescDL" attribute.

If the NEF receives the AF request with the "periodUL", "periodDL" and/or "protoDescDL" attributes, the NEF shall forward the attributes to the PCF to support the UE Power Saving management.

#### 4.4.9.2.11 Provisioning of the QoS timing information

If the "QoSTiming\_5G" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, NEF shall forward the following attributes to support the QoS Timing information:

- "qosDuration" attribute to indicate the QoS duration to transfer data traffic (e.g., AI/ML traffic); and
- "qosInactInt" attribute for data traffic (e.g., AI/ML traffic) QoS inactivity interval.

If the NEF authorizes the AF request, the NEF shall provision the received QoS timing parameters to the PCF by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7].

#### 4.4.9.2.12 Provisioning of Dynamic ChangingTraffic Characteristics

If the "TrafficCharChange" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, the AF may include:

- the indicator for supporting Data Burst Size marking within the "datBurstSizeInd" attribute; and
- the DL Protocol Description in the "protoDescDL" attribute.

If the "TrafficCharChange" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, this procedure is used by the AF to indicate that the TTNB is marked in the header of the protocol identified by the DL Protocol Description.

The AF may include:

- the TTNB Indication in the "timetoNextBurstInd" attribute; and
- the DL Protocol Description in the "protoDescDL" attribute.

If the "TrafficCharChange" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported and the expedited data transfer with reflective QoS is requested, the AF may provide:

- the two media flows that contains the same SDF filter associated with different QoS requirements. One flow with Expedited Data Transfer Indication within the "expTranInd" attribute set to true and the other flow with Expedited Data Transfer Indication within the "expTranInd" attribute set to false; and/or
- the DL Protocol Description in the "protoDescDI" attribute.

If the NEF authorizes the AF request, the NEF shall provision the received indicator(s) and Protocol Description information to the PCF by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7].

#### 4.4.9.2.13 Provisioning of the Multiplexed Media Identification Information

If the "MpxMedia" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, the AF may include:

- the Multiplexed Media Identification Information for the Uplink and/or Downlink IP flows to uniquely identify each flow of the multiplexed media within the "mpxMediaUIInfos" and/or "mpxMediaDIInfos" attributes, respectively.

If the NEF authorizes the AF request, the NEF shall provision the received information to the PCF by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7].

If the NEF receives from the PCF the indication that the AF requested differentiated QoS for multiplexed media flows is not supported in the UE as specified in 3GPP TS 29.514 [7], the NEF shall include in the response to the AF request the "servAuthInfo" attribute with the value "MPX\_MEDIA\_NOT\_SUPPORTED\_IN\_UE".

#### 4.4.9.2.14 Provisioning of Media Related Information deliver

If the "OnPathN6MediaInfo" feature as defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported, the AF may include:

- the on-path Signaling information to deliver media related information within the "onPathN6SigInfo" attribute;
- the UDP Option in the "protoDescDI" attribute when the "onPathN6Method" within "onPathN6SigInfo" indicates method "CONNECT\_UDP"; or
- the MoQ indication in the "protoDescDI" attribute and the "onPathN6SigInfo" attribute shall not be present.

If the NEF authorizes the AF request, the NEF shall provision the received indicator to the PCF by invoking the Npcf\_PolicyAuthorization service as defined in 3GPP TS 29.514 [7].

#### 4.4.9.2.15 Subscription to the Data Rate Limitation information reporting

If the "RateLimitReport" feature defined in clause 5.14.4 of 3GPP TS 29.122 [4] is supported:

- the AF may subscribe to the "RATE\_LIMIT\_INFO\_REPO" event by including either the "evSubsc" attribute within the EventsSubscReqData data type, as specified in 3GPP TS 29.514 [7], or the "events" attribute within the UserPlaneEvent data type, as defined in 3GPP TS 29.122 [4]; and
- if the NEF authorizes the AF request, the NEF shall subscribe to the "RATE\_LIMIT\_INFO\_REPO" event at the PCF by invoking the Npcf\_PolicyAuthorization service API as defined in 3GPP TS 29.514 [7].

#### 4.4.9.3 Procedures for AF requested QoS for a target UE or group of UE(s) not identified by UE address(es)

When the "GMEC" feature is supported and the AF requested QoS is targeting a UE or group of UE(s) not identified by UE address(es) as defined in clause 4.15.6.14 of 3GPP TS 23.502 [2], the provisions and procedures of clause 4.4.9.2 shall apply with the following differences:

- Either the "gpsi" attribute or the "extGroupId" attribute shall be used to identify the target UE or group of UE(s) within the "Individual AS Session with Required QoS Subscription" resource representation.
- After the successful authorization of the request at the NEF, the NEF may further perform service specific authorization as defined in clause 4.15.6.10 of 3GPP TS 23.502 [2] and 3GPP TS 29.503 [63].

- At the reception of requests from the AF, the NEF shall either invoke the relevant TSCTSF service, as defined in 3GPP TS 29.565 [50], in order to fulfil the request, or when it determines to not invoke the TSCTSF, invoke the Nudr\_DataRepository service as defined in 3GPP TS 29.504 [20] and 3GPP TS 29.519 [23] to store the received AF requested QoS information for the target UE or group of UE(s) identified by the SUPI or Internal Group ID (derived respectively from the received GPSI or External Group ID) as Application Data in the UDR.
- No direct interactions between the NEF and the PCF shall take place.
- The NEF may receive notification(s) on the subscribed event(s) from the TSCTSF (in case the NEF decided to invoke the TSCTSF at the reception of the corresponding AF required QoS requests) or from the PCF (in case the NEF decided to not invoke the TSCTSF, but rather invoked the Nudr\_DataRepository service at the reception of the corresponding AF required QoS request). In the latter case, the PCF notifies the NEF on the subscribed event(s) using the Npcf\_PolicyAuthorization\_Notify service operation, as specified in 3GPP TS 29.514 [7].

#### 4.4.10 Procedures for MSISDN-less Mobile Originated SMS

The procedures are used by the NEF to send the MSISDN-less MO-SMS to the AF in 5GS are described in clause 4.4.14 of 3GPP TS 29.122 [4] with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF;
- the NEF shall interact with UDM by using Nudm\_SubscriberDataManagement service (as defined in 3GPP TS 29.503 [17]) to retrieve the external identifier; and
- the NEF may receive an MSISDN-less MO-SMS via SM11 including a destination SME address (long/short code of the AF) upon the SMS-SC invoking Nnef\_SMSService.

#### 4.4.11 Procedures for Network Configuration Parameters Provisioning

The procedures for network configuration parameters provisioning as described in clause 4.4.12 of 3GPP TS 29.122 [4] shall be applicable in 5GS with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF;
- description of the HSS applies to the UDM;
- the NEF shall interact with the UDM by using Nudm\_ParameterProvision service as specified in 3GPP TS 29.503 [17];
- if the "UEId\_retrieval" feature defined in clause 5.13.4 of 3GPP TS 29.122 [4] is supported, in order to support the AF specific UE ID retrieval:
  - 1) the AF may request AF specific UE ID retrieval for an individual UE, by providing the UE's IP address in the "ueIpAddr" attribute or the UE's MAC address in the "ueMacAddr" attribute within the NpConfiguration data type;
  - 2) the AF may also provide the DNN, within the "dnn" attribute, and/or the S-NSSAI, within the "snssai" attribute, within the NpConfiguration data type;
  - 3) upon reception of the corresponding request message from the AF:
    - if the AF's request for AF specific UE ID retrieval is not authorized, the NEF shall respond to the AF with a "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "REQUEST\_NOT\_AUTHORIZED" application error indicating AF authorisation failure; and
    - if the AF's request for AF specific UE ID retrieval is authorized by the NEF, then if the DNN and/or S-NSSAI information is not available in the request, the NEF shall determine the corresponding DNN

and/or S-NSSAI information based on the received requesting AF Identifier, and if provided, the MTC Provider Information;

- 4) the NEF shall then interact with the BSF with the UE address and IP domain (if the UE IPv4 address is provided), DNN and/or S-NSSAI to retrieve the session binding information of the UE by invoking the Nbsf\_Management\_Discovery service operation as described in 3GPP TS 29.521 [9];
- 5) if the NEF receives an error response from the BSF, the NEF shall respond to the AF with a proper error status code. If the NEF received from the BSF an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error. If no SUPI matching the provided UE information is returned by the BSF, the NEF shall respond to the AF with a "404 Not Found" status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_NOT\_FOUND" application error to indicate that the requested UE address is not found;
- 6) upon success and a SUPI is returned by the BSF, the NEF shall interact with the UDM to retrieve the AF specific UE Identifier using the received SUPI and at least one of the Application Port ID, MTC Provider Information or AF Identifier information by invoking Nudm\_SDM\_Get service as described in clause 5.2.2.2 of 3GPP TS 29.503 [17];
- 7) upon success, the UDM responds to the NEF with an AF specific UE Identifier represented as an External Identifier for the UE which is uniquely associated with the MTC provider Information and/or AF Identifier. The NEF shall then respond to the AF with the received information, i.e. the AF specific UE Identifier represented as an External Identifier that was received from the UDM; and
- 8) if the NEF receives an error response from the UDM, the NEF shall respond to the AF with a proper error status code. If the NEF received from the UDM an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error. If the UDM indicates that the requested UE Identifier is not available in the subscription data, the NEF shall respond to the AF with a "404 Not Found" error status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_ID\_NOT\_AVAILABLE" application error to indicate that the AF specific UE ID is not available;

NOTE: The case where UE IP address provided by the AF to the NEF corresponds to an IP address that has been NATed (Network and Port Address Translation) is not supported in this release.

and

- if the MPSforMessaging feature defined in clause 5.13.4 of 3GPP TS 29.122 [4] is supported, in order to provision the MPS for Messaging parameters for an individual UE:
  - 1) the HTTP POST request message shall include the MPS for Messaging indication information via the "mpsforMsgInd" attribute for the UE identified by either the MSISDN within the "msisdn" attribute or the external identifier within the "externalId" attribute within the NpConfiguration data type. The body of the HTTP PATCH message shall include the attribute "mpsforMsgInd" within the NpConfigurationPatch data type as defined in clause 5.13.2.1.3 of 3GPP TS 29.122 [4];
  - 2) the AF may also provide the DNN, within the "dnn" attribute, and/or the S-NSSAI, within the "snssai" attribute, within the NpConfiguration data type; and
  - 3) upon reception of the corresponding request message from the AF:
    - if the AF is authorized by the NEF to provision the MPS for Messaging Parameter, the NEF shall interact with the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17] to store the MPS for Messaging indication parameter in the UE's subscription data. If the request is accepted by the UDM and the UDM informs the NEF with a successful response, the NEF shall the respond to the AF as defined in clause 4.4.12.2 of 3GPP TS 29.122 [4].

## 4.4.12 Procedures for Non-IP data delivery

### 4.4.12.1 General

The procedures are used by the NEF to send/receive the non-IP data to/from the AF. It comprises NIDD configuration and NIDD delivery.

The NIDD configuration may be triggered by the NEF or the AF. If it is triggered by the NEF, the NiddConfigurationTrigger API described in clause 5.5 is used and the procedure is described in clause 4.4.12.2.

### 4.4.12.2 NIDD configuration Triggered by the NEF

If the NEF receives a NIDD connection establishment request from the SMF and if there is no NIDD configuration for the UE, the NEF may send a NIDD configuration trigger to the AF. The NEF determines the destination URI by local configuration. The NEF shall send to the determined destination URL an HTTP POST request that shall include a NiddConfigurationTrigger data type with:

- the NEF identifier,
- the AF identifier, and
- GPSI as UE identity.

The AF shall acknowledge the HTTP POST request with an HTTP 200 OK response. Then the AF may start NIDD configuration procedure as described in clause 4.4.12.3.

### 4.4.12.3 NIDD configuration triggered by the AF and NIDD delivery

The procedures for NIDD configuration triggered by the AF and NIDD delivery are described in clause 4.4.5 of 3GPP TS 29.122 [4] with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF;
- description of the MME/SGSN applies to the SMF;
- for the connection establishment, the interaction between the NEF and the SMF shall use Nnef\_SMContext service as specified in 3GPP TS 29.541 [24];
- for MO NIDD, the interaction between the SMF and the NEF shall use Nnef\_SMContext service as specified in 3GPP TS 29.541 [24]; and
- for MT NIDD, the interaction between the SMF and the NEF shall use Nsmf\_NIDD service as specified in 3GPP TS 29.542 [25].

## 4.4.13 Procedures for RACS Parameter Provisioning

The procedures for RACS parameter provisioning as described in clause 4.4.15 of 3GPP TS 29.122 [4] shall be applicable in 5G with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF.

## 4.4.14 Procedures for analytics information exposure

### 4.4.14.1 Subscription/unsubscription to notification of analytics information

The procedures are used by the AF to subscribe/unsubscribe to retrieve analytics information via NEF, and are used by the NEF to notify the AF about the requested analytics information as described in 3GPP TS 23.288 [29].

In order to subscribe to retrieve analytics information, the AF shall send an HTTP POST message to the NEF to the resource "Analytics Exposure Subscriptions", the HTTP POST request message body shall include the AnalyticsExposureSubsc data structure that shall include:

- the URI where to receive the requested notifications as "notifUri" attribute;
- the Notification Correlation Identifier assigned by the AF for the requested notifications as "notifId" attribute; and
- a description of the subscribed events as "analyEventsSubs" attribute that shall include for each event:
  - 1) an event identifier as "analyEvent" attribute.

The AnalyticsExposureSubsc data structure may include:

- event reporting requirement information as "analyRepInfo" attribute, which applies for all events in a subscription and may contain the following attributes:
  - 1) event notification method (periodic, one time, on event detection) as "notifMethod" attribute;
  - 2) maximum Number of Reports as "maxReportNbr" attribute;
  - 3) monitoring Duration as "monDur" attribute;
  - 4) repetition period for periodic reporting as "repPeriod" attribute;
  - 5) immediate reporting indication as "immRep" attribute;
  - 6) sampling ratio as "sampRatio" attribute;
  - 7) group reporting guard time as "grpRepTime" attribute;
  - 8) partitioning criteria for partitioning the impacted UEs before performing sampling as "partitionCriteria" attribute if the "EneNA" feature is supported; and
  - 9) a notification flag (used for muting and retrieving notifications) as "notifFlag" attribute if the "EneNA" feature is supported.

Each AnalyticsEventSubsc data structure may include:

- event specific filters via the "analyEventFilter" attribute; and
- the indication of the UEs to which the subscription applies via "tgtUe" attribute, which if provided shall include one of the following attributes:
  - 1) identification of an individual UE via a "gpsi" attribute;
  - 2) identification of a group of UE(s) via a "exterGroupId" attribute; or
  - 3) identification of any UE via the "anyUeInd" attribute.

Upon receipt of the HTTP POST request from the AF, if the AF is authorized, the NEF shall interact with the UDM by using Nudm\_SubscriberDataManagement service as defined in 3GPP TS 29.503 [17] to translate the GPSI or external group identifier into the corresponding SUPI or internal group identifier. If the NEF receives an error response from the UDM, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF receives from the UDM an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable. After receiving a successful response from the UDM, the NEF may perform further mappings and translations (e.g. map application identifiers to DNN and S-NSSAI information, or translate attributes of data type NetworkAreaInfo to attributes of data type LocationArea5G) and it shall interact with the NWDAF to subscribe to the subscription to the analytics information by using the NnwdafeventsSubscription service as defined in 3GPP TS 29.520 [27]. If the NEF receives an error response from the NWDAF, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

In order to update an existing analytics exposure subscription, the AF shall send an HTTP PUT message to the NEF to the resource "Individual Analytics Exposure Subscription" requesting to change the subscription.

In order to delete an existing analytics exposure subscription, the AF shall send an HTTP DELETE message to the NEF to the resource "Individual Analytics Exposure Subscription".

Upon receipt of the HTTP PUT or DELETE request from the AF, if the AF is authorized, the NEF may perform further mappings and translations (e.g. map application identifiers to DNN and S-NSSAI information, or translate attributes of data type LocationArea5G to attributes of data type NetworkAreaInfo as required by the data model) and it shall interact with the NWDAF to modify or cancel the subscription to the analytics information by using the Nnwdaf\_EventsSubscription service as defined in 3GPP TS 29.520 [27]. If the NEF receives an error response from the NWDAF, the NEF shall not update or delete the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

After receiving a successful response from the NWDAF, the NEF shall:

- for the HTTP POST request, create a resource "Individual Analytics Exposure Subscription" which represents the analytics exposure subscription, addressed by a URI that contains the AF Identifier and an NEF-created subscription identifier, and shall respond to the AF with a 201 Created status code, including a Location header field containing the URI for the created resource. The AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this analytics exposure subscription. If not all the requested analytics events in the subscription are accepted, then the NEF may include the "failEventReports" attribute indicating the event(s) for which the subscription failed and the associated reason(s);
- for the HTTP PUT request, update a resource "Individual Analytics Exposure Subscription" which represents the analytics exposure subscription, and shall respond to the AF with a 200 OK or 204 No Content status code. When responding with a 200 OK status code, if not all the requested analytics events in the subscription are modified successfully, then the NEF may include the "failEventReports" attribute indicating the event(s) for which the modification failed and the associated reason(s); and
- for the HTTP DELETE request, remove all properties of the resource and delete the corresponding active resource "Individual Analytics Exposure Subscription" which represents the analytics exposure subscription, then shall respond to the AF with a 204 No Content status code.

If the immediate reporting indication in the "immRep" attribute within the "analyRepInfo" attribute sets to true during the HTTP POST or PUT request, the NEF shall also include the reports of the events subscribed, if available, in the HTTP POST or PUT response to the AF.

If the NEF receives an analytics information notification from the NWDAF indicating that the subscribed analytics event has been detected, the NEF may perform further mappings and translations (e.g. translate attributes of data type NetworkAreaInfo to attributes of data type LocationArea5G as required by the data model), it may determine based on local configuration to hide from the Untrusted AF network internal information (e.g. DNN, S-NSSAI) which was included in the NWDAF notification, and it shall provide a notification by sending HTTP POST message that include the AnalyticsEventNotification data structure at least with the detected analytics event to the AF identified by the notification URI together with the notification correlation identifier received during creation/modification of the Individual Analytics Exposure Subscription. Upon receipt of the analytics event notification, the AF shall respond with a "204 No Content" status code to confirm the received notification.

When the "notifFlag" attribute is included during the creation of a subscription (HTTP POST request) and set to "DEACTIVATE", the NEF shall mute the event notification and store the available events until the AF requests to retrieve them by setting the "notifFlag" attribute to "RETRIEVAL" or until a muting exception occurs (e.g. full buffer).

When the "notifFlag" attribute is included during the update of a subscription (HTTP PUT request) and set to "DEACTIVATE", the NEF shall mute the event notification and store the available events until the AF requests to retrieve them by setting the "notifFlag" attribute to "RETRIEVAL" or until a muting exception occurs (e.g. full buffer); if the "notifFlag" attribute is set to the value "RETRIEVAL", the NEF shall send the stored events to the AF, mute the event notification again and store available events; if the "notifFlag" attribute is set to the value "ACTIVATE" and the event notifications are muted (due to a previously received "DECATIVATE" value), the NWDAF shall unmute the event notification, i.e. start sending again notifications for available events.

#### 4.4.14.2 Fetch analytics information

The procedures are used by the AF to fetch analytics information via NEF.

In order to fetch analytics information, the AF shall send an HTTP POST request message to the NEF targeting the custom operation URI "{apiRoot}/3gpp-analyticsexposure/v1/{afId}/fetch", the HTTP POST request message body shall include the AnalyticsRequest data structure that shall include:

- the identification of the analytics events, encoded within the "analyEvent" attribute;

and may include:

- the description of the analytics reporting information, encoded within the "analyRep" attribute;
- an event filter, encoded within the "analyEventFilter" attribute.
- the indication of the UEs to which the analytics request applies via either:
  - a) the identification of an individual UE via the "gpsi" attribute;
  - b) the identification of a group of UE(s) via the "exterGroupId" attribute; or
  - c) the identification of any UE via the "anyUeInd" attribute.

Upon the reception of an HTTP POST request, if the AF is authorized, the NEF shall interact with the UDM by using Nudm\_SubscriberDataManagement service as defined in 3GPP TS 29.503 [17] to translate the GPSI or external group identifier into the corresponding SUPI or internal group identifier. If the NEF receives an error response from the UDM, the NEF shall respond to the AF with a proper error status code. If the NEF receives from the UDM an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable. After receiving a successful response from the UDM, the NEF may perform further mappings and translations (e.g. map application identifiers to DNN and S-NSSAI information, or translate attributes of data type NetworkAreaInfo to attributes of data type LocationArea5G) and it shall interact with the NWDAF by using Nnwdaf\_AnalyticsInfo service as defined in 3GPP TS 29.520 [27]. If the NEF receives an error response from the NWDAF, the NEF shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable. If a successful response including analytics information is received from the NWDAF, the NEF shall translate the network internal information to external information (e.g. SUPI to GPSI, Internal Group ID to External Group ID, attributes of data type NetworkAreaInfo to attributes of data type LocationArea5G), it may determine based on local configuration to hide from the Untrusted AF network internal information (e.g. DNN, S-NSSAI) which was included in the NWDAF response, and it shall send an HTTP POST response to the AF by including analytics information within the AnalyticsData data structure.

#### 4.4.15 Procedures for 5G LAN Parameter Provisioning

##### 4.4.15.1 General

The procedures are used by the AF to provision 5G LAN type service related parameters to the NEF. The following procedures support:

- Management of 5G Virtual Network group membership;
- Management of 5G Virtual Network group data; and/or
- Management of 5G Virtual Network group parameters provisioning.

##### 4.4.15.2 Creation of a new subscription for 5G LAN parameter provisioning

In order to create a new subscription to provision 5G LAN related parameters, the AF shall initiate an HTTP POST request to the NEF for the "5GLAN Parameters Provision Subscriptions" resource. The body of the HTTP POST message shall include the 5GLanParametersProvision data type that shall contain the 5G LAN service related parameters to be provisioned within the "5gLanParams" attribute.



When the "GMEC" feature is supported, the AF may also provision the 5G VN group related parameters (e.g., LPI parameters, ECS Address information, Network Parameter Configuration).

Upon receipt of the corresponding HTTP POST message, if the AF is authorized by the NEF to provision the parameters, the NEF shall interact with the UDM to create a subscription at the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17]. If the request is accepted by the UDM and the UDM informs the NEF with a successful response, the NEF shall create a new subscription and assign a subscription identifier for the "Individual 5GLAN Parameters Provision Subscription" resource. Then the NEF shall send a HTTP "201 Created" response with 5GLanParametersProvision data structure as response body and a Location header field containing the URI of the created individual subscription resource.

#### 4.4.15.3 Modification of an existing subscription for 5G LAN parameter provisioning

To modify an existing subscription to provision 5G LAN parameters, the AF shall initiate an HTTP PUT/PATCH request to the NEF for the "Individual 5GLAN Parameters Provision Subscription" resource. The body of the HTTP PUT message shall include the 5GLanParametersProvision data type as defined in clause 5.7.2.3.2. The body of the HTTP PATCH message shall include the 5GLanParametersProvisionPatch data as defined in clause 5.7.2.3.5. The External Group Identifier, DNN, S-NSSAI and PDU session type(s) within the "5gLanParams" attribute shall not be updated/modified. The User Plane Security Policy within the "5gLanParams" attribute shall not be updated/modified after initially provisioned by the AF.

When the "GMEC" feature is supported, the AF may also update/modify the 5G VN group related parameters (e.g., LPI parameters, ECS Address information, Network Parameter Configuration) within the "5gLanParams" attribute.

Upon reception of the corresponding HTTP PUT/PATCH message, if the AF is authorized by the NEF to provision the parameters, the NEF shall interact with the UDM to modify an existing subscription at the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17]. If the modification request is accepted by the UDM and the UDM informs the NEF with a successful response, the NEF shall update the existing subscription for the "Individual 5GLAN Parameters Provision Subscription" resource. Then the NEF shall send a HTTP response including "200 OK" status code with 5GLanParametersProvision data structure or "204 No Content" status code.

#### 4.4.15.4 Deletion of an existing subscription for 5G LAN parameter provisioning

To delete an existing subscription to 5GLAN provision parameters, the AF shall initiate an HTTP DELETE request to the NEF for the "Individual 5GLAN Parameters Provision Subscription" resource.

Upon receipt of the corresponding HTTP DELETE message, if the AF is authorized, the NEF shall interact with the UDM to delete an existing parameters provision subscription at the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17]. If the request is accepted by the UDM and informs the NEF with a successful response, the NEF shall delete the existing subscription for the "Individual 5GLAN Parameters Provision Subscription" resource. Then the NEF shall send a HTTP "204 No Content" response.

#### 4.4.15.5 5G LAN parameter provisioning event notification

If the "GMEC" feature is supported and a previously subscribed AF shall be notified on 5G LAN parameters provisioning event(s) (e.g., when Network Parameters Configuration information is provisioned), the NEF shall initiate an HTTP POST request to the AF targeting the notification URI provided during the creation of the corresponding "Individual 5GLAN Parameters Provision Subscription" resource within the "notifUri" attribute.

Upon successful reception and processing of the HTTP POST request message, the AF shall acknowledge the successful reception of the notification by responding with an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions and respond to the NEF with an appropriate error status code as specified in clause 5.7.4.

#### 4.4.16 Procedures for applying BDT policy

In order to create a resource for the applying a previously negotiated Background Data Transfer Policy to a UE or a Group of UEs, the AF shall send an HTTP POST message to the NEF to the resource "Applied BDT Policy Subscriptions". The body of the HTTP POST message shall contain the external Group Identifier or external Identifier, and the Background Data Transfer Reference ID for a previously negotiated policy of a background data transfer.

Upon receipt of the HTTP POST request from the AF, if the AF is authorized, the NEF shall interact with the UDM by invoking the Nudm\_SubscriberDataManagement service as described in 3GPP TS 29.503 [17] to retrieve the SUPI or Internal Group Identifier.

In order to update an existing applied BDT policy subscription, the AF shall send an HTTP PATCH message to the resource "Individual Applied BDT Policy Subscription" requesting to change the applied BDT policy. The AF shall include in the body of the HTTP PATCH request the new Background Data Transfer Reference ID.

In order to delete an existing applied BDT policy subscription, the AF shall send an HTTP DELETE message to the NEF to the resource "Individual Applied BDT Policy Subscription".

The NEF shall interact with the UDR by invoking the Nudr\_DataRepository service as described in 3GPP TS 29.504 [20], if the NEF receives an error response from the UDR, the NEF shall not create, update or delete the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

After receiving a successful response from the UDR, the NEF shall:

- for the HTTP POST request, create a resource "Individual Applied BDT Policy Subscription" addressed by a URI that contains the AF Identifier and an NEF-created subscription identifier, and shall respond to the AF with a "201 Created" status code, including a Location header field containing the URI of the created resource. The AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this resource;
- for the HTTP PATCH request, update a resource "Individual Applied BDT Policy Subscription" which represents the applied BDT policy subscription, and shall respond to the AF with a "200 OK" or "204 No Content" status code; and
- for the HTTP DELETE request, delete the corresponding active resource "Individual Applied BDT Policy Subscription", and shall respond to the AF with a "204 No Content" status code.

#### 4.4.17 Procedures for Enhanced Coverage Restriction Control

The procedures for network configuration parameters provisioning as described in clause 4.4.11 of 3GPP TS 29.122 [4] shall be applicable in 5GS with the following differences:

- description of the SCS/AS applies to the AF;
- description of the SCEF applies to the NEF;
- description of the HSS applies to the UDM; and
- upon receipt of HTTP POST request from the AF to query the current status of enhanced coverage restriction, the NEF shall interact with the UDM by using the Nudm\_SubscriberDataManagement service as specified in 3GPP TS 29.503 [17].
- upon receipt of HTTP POST request from the AF to configure the enhanced coverage restriction, the NEF shall interact with the UDM by using the Nudm\_ParameterProvision service as specified in 3GPP TS 29.503 [17].
- if the ECR\_WB\_5G feature is supported, in order to configure the enhanced coverage restriction for WB UE, the HTTP POST request message shall include the WB mode related enhanced coverage restriction information via the "ecrDataWbs" attribute for the WB UE.

#### 4.4.18 Procedures for IPTV Configuration

The procedures are used by the AF to authorize the request and forward the request for IPTV configuration information via NEF.

In order to configure IPTV information, the AF shall send an HTTP POST message to the NEF to the resource "IPTV Configurations", the HTTP POST request message body shall include the IptvConfigData data structure that shall include:

- indication of the UEs to which the subscription applies via:

- a) identification of an individual UE via a "gpsi" attribute; or
- b) identification of a group of UE(s) via a "exterGroupId" attribute;
- an application identifier as "appId" attribute; and
- a list of Multicast Access Control as "multiAccCtrls" attribute;

and may include:

- an DNN as "dnn" attribute;
- an S-NSSAI as "snssai" attribute; and
- MTC Provider Information as "mtcProviderId" attribute.

NOTE: The NEF can check the received MTC Provider Id information and reject the IPTV configuration request upon failure checking result.

In order to update an existing individual IPTV configuration, the AF shall send an HTTP PUT or HTTP PATCH message to the NEF to the resource "Individual IPTV Configuration" requesting to change the subscription. The External Group Identifier, GPSI, DNN, S-NSSAI and Application Identifier shall remain unchanged from previous values in the HTTP PUT message.

In order to delete an existing individual IPTV configuration, the AF shall send an HTTP DELETE message to the NEF to the resource "Individual IPTV Configuration".

Upon receipt of the HTTP request from the AF, if the AF is authorized, the NEF shall interact with the UDM by invoking the Nudm\_SubscriberDataManagement service as described in 3GPP TS 29.503 [17] to retrieve the SUPI or Internal Group Identifier. Then the NEF shall interact with the UDR to create, update or delete the IPTV configuration by using the Nudr\_DataRepository service as defined in 3GPP TS 29.519 [23]. If the NEF receives an error response from the UDR, the NEF shall not create, update or delete the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

After receiving a successful response from the UDR, the NEF shall:

- for the HTTP POST request, create a resource "Individual IPTV Configuration" which represents the IPTV configuration request, addressed by a URI that contains the AF Identifier and an NEF-created configuration identifier, and shall respond to the AF with a 201 Created status code, including a Location header field containing the URI for the created resource. The AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this IPTV configuration.
- for the HTTP PUT or HTTP PATCH request, update a resource "Individual IPTV Configuration" which represents the IPTV configuration, and shall responds to the AF with a 200 OK or 204 No Content status code; and
- for the HTTP DELETE request, remove all properties of the resource and delete the corresponding active resource "Individual IPTV Configuration", then shall responds to the AF with a 204 No Content status code.

#### 4.4.19 Procedures for Location Privacy Indication Parameters Provisioning

The procedures are used by the AF to provision Location Privacy Indication parameters to the NEF. The procedures are applicable for an individual UE or a group of UEs.

In order to provision Location Privacy Indication parameters, the AF shall initiate an HTTP POST request to the NEF for the "LPI Parameters Provisionings" resource. The body of the HTTP POST message shall include the Location Privacy Indication related parameters within the LpiParametersProvision data structure.

Upon receipt of the corresponding HTTP POST message, if the AF is authorized by the NEF to provision the parameters, the NEF shall interact with the UDM to create a resource at the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17]. If the request is accepted by the UDM and the UDM informs the NEF with a successful response, the NEF shall create a new resource and assign an identifier for the "Individual LPI Parameters

Provisioning" resource. Then the NEF shall send a HTTP "201 Created" response with LpiParametersProvision data structure as response body and a Location header field containing the URI of the created individual resource.

In order to update an existing individual LPI Parameters Provisioning, the AF may send an HTTP PUT message to the resource "Individual LPI Parameters Provisioning" requesting the NEF to change all properties in the existing resource. The body of the HTTP PUT request message shall include LpiParametersProvision data type as defined in clause 5.10.2.3.2. The External Group Identifier or GPSI shall remain unchanged from previous values.

If the "PatchUpdate" feature defined in clause 5.10.3 is supported, in order to partially modify an existing LPI Parameters Provisioning resource, the AF may send an HTTP PATCH request message to the NEF on the "Individual LPI Parameters Provisioning" resource, with the request body containing the LpiParametersProvisionPatch data structure including only the attributes that shall be updated.

Upon receipt of the corresponding HTTP PUT/PATCH request message, if the AF is authorized by the NEF to provision the parameters, the NEF shall interact with the UDM to modify an existing resource at the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17]. If the modification request is accepted by the UDM and the UDM informs the NEF with a successful response, the NEF shall update the existing resource for the "Individual LPI Parameters Provisioning" resource. Then the NEF shall send a HTTP response including "200 OK" status code with LpiParametersProvision data structure or "204 No Content" status code.

To delete an existing individual LPI Parameters Provisioning, the AF shall initiate an HTTP DELETE request to the NEF for the "Individual LPI Parameters Provisioning" resource.

Upon receipt of the corresponding HTTP DELETE message, if the AF is authorized, the NEF shall interact with the UDM to delete an existing LPI Parameters Provisioning at the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17]. If the request is accepted by the UDM, the NEF shall delete the existing resource for the "Individual LPI Parameters Provisioning" resource. Then the NEF shall send a HTTP "204 No Content" response.

## 4.4.20 Procedures for service specific parameter provisioning

These procedures are used by an AF to provide service specific parameters to the 5G system via the NEF.

In order to provision service specific parameters to the 5G system, the AF shall send an HTTP POST request message to the NEF targeting the "Service Parameter Subscriptions" resource, with the request message body including the ServiceParameterData data structure that shall include:

- service description information via one of the following:
  - a) a combination of DNN and S-NSSAI within the "dnn" attribute and the "snssai" attribute respectively;
  - b) an AF Service Identifier within the "afServiceId" attribute. In this case, the NEF may translate the received AF service identifier into a DNN and S-NSSAI combination; or
  - c) an application identifier within the "appId" attribute;

NOTE 1: When the "AfGuideURSP" feature is supported, the DNN, S-NSSAI and/or Application Identifier information can be provided within the "urspGuidance" attribute. Hence, only the "afServiceId" attribute needs to be included for providing guidance for URSP determination. When the "AfGuideTNAPs" feature is supported, and the "tnaps" attribute is included, the "appId" attribute cannot be included.

- indication of the UEs to which the subscription applies via one of the following:
  - a) identification of an individual UE within the "gpsi" attribute;
  - b) an IPv4 address of the UE within the "ueIpv4" attribute;
  - c) an IPv6 address of the UE within the "ueIpv6" attribute;
  - d) a MAC address of the UE within the "ueMac" attribute;
  - e) an identification of a group of UE(s) within the "externalGroupId" attribute;

NOTE 2: When the "PIN" feature is supported, the AF can use the "externalGroupId" attribute to indicate the external group identifier if more than one PEGC is present within the PIN. If the external group identifier is not used for the PIN, then AF will indicate the "gpsi" attribute in the individual request for each of the PEGC within the PIN.

- f) an identification of any UE within the "anyUeInd" attribute; or
  - g) when the "VPLMNSpecificURSP" feature is supported, the AF is interacting with the VPLMN and the request is to influence the determination of VPLMN-specific URSP rules for any inbound roamer from one or more PLMN(s), an identification of the PLMN(s) of the inbound roaming UE(s) within the "roamUeNetDescs" attribute; and
- service parameters for at least one of the following:
- 1) V2X service parameters via:
    - a) configuration parameters for V2X communications over PC5 within the "paramOverPc5" attribute; and
    - b) configuration parameters for V2X communications over Uu within the "paramOverUu" attribute;
  - 2) if the "ProSe", "ProSe\_Ph2" and/or "ProSe\_Ph3" feature(s) is/are supported, 5G ProSe service parameters via:
    - a) configuration parameters for 5G ProSe direct discovery within the "paramForProSeDd" attribute;
    - b) configuration parameters for 5G ProSe direct communication within the "paramForProSeDc" attribute;
    - c) configuration parameters for 5G ProSe UE-to-network relay, including configuration parameters for 5G ProSe UE-to-network relay UE within the "paramForProSeU2NRelUe" attribute and configuration parameters for 5G ProSe remote UE within the "ParamForProSeRemUe" attribute;
    - d) configuration parameters for 5G ProSe UE-to-UE relay, including configuration parameters for 5G ProSe UE-to-UE relay UE within the "paramForProSeU2URelUe" attribute and configuration parameters for 5G ProSe end UE within the "ParamForProSeEndUe" attribute, only if the "ProSe\_Ph2" feature is supported;
    - e) configuration parameters for 5G ProSe multi-hop UE-to-Network Relay, including configuration parameters for 5G ProSe UE-to-Network Relay UE within the "multiHopU2NRelUe" attribute, configuration parameters for 5G ProSe Remote UE within the "multiHopU2NRemUe" attribute and configuration parameters for 5G ProSe Intermediate UE-to-Network Relay within the "multiHopU2NInterUe" attribute, only if the "ProSe\_Ph3" feature is supported; and
    - f) configuration parameters for 5G ProSe Layer-3 multi-hop UE-to-UE Relay, including configuration parameters for 5G ProSe Layer-3 UE-to-UE Relay UE within the "multiHopU2URelUe" attribute and configuration parameters for 5G ProSe Layer-3 End UE within the "multiHopU2UEndUe" attribute, only if the "ProSe\_Ph3" feature is supported;
  - 3) if the "AfGuideURSP" feature is supported, URSP service parameters via:
    - a) contents for the AF guidance on URSP within the "urspGuidance" attribute, which shall include one or more URSP rule requests. Each URSP rule request may include:
      - 1. a traffic descriptor within the "trafficDesc" attribute and:
        - if the "PIN" feature is supported and the provided URSP request applies to a PIN scenario, the traffic descriptor shall correspond to a PIN Identifier within the "pinId" attribute (within the "trafficDesc" attribute) applicable for the PEGC;
      - 2. a relative precedence within the "relatPrecedence" attribute; and/or
      - 3. one or more route selection parameter sets within the "routeSelParamSets" attribute. Each route selection parameter set may include:
        - a precedence value within the "precedence" attribute;
        - a DNN within the "dnn" attribute;

- an S-NSSAI within the "snssai" attribute;
- a spatial validity condition within the "spatialValidityAreas" and/or "spatialValidityTais" attributes;
- if the "PduSessTypeChange" feature is also supported and the PDU Session type needs to be changed, the requested PDU Session type within the "pduSessType" attribute; and
- if the request contains only one route selection parameter set, each one of the optional "dnn", "snssai", "precedence", "spatialValidityAreas" and "spatialValidityTais" attributes that are missing from the request may be complemented by the NEF based on local configuration for the provided AF service identifier, and it is up to the NEF to transform the information of the "spatialValidityAreas" attribute into a list of TAIs;

NOTE 3: If the "PIN" feature is supported and the provided URSP request applies to a PIN scenario, the DNN and S-NSSAI need to be included.

and

- b) when the "VPLMNSpecificURSP" feature is supported, the "vpsUrspGuidance" attribute, where each URSP rule may contain the parameters of bullet a) above, and in addition, the description of the VPLMN(s) where the URSP rule applies within the "visitedNetDescs" attribute;

NOTE 4: The "visitedNetDescs" attribute within "vpsUrspGuidance" needs to be present, otherwise the provided guidance will never be applied.

- 4) if the "A2X" feature is supported, A2X service parameters via:
  - a) configuration parameters for A2X communications over PC5 within the "a2xParamsPc5" attribute; and
  - b) configuration parameters for A2X communications over Uu within the "a2xParamsUu" attribute;
- 5) if the "AfGuideTNAPs" feature is supported, TNAP ID(s) service parameters via:
  - a) a list of the TNAP ID(s) collocated with the 5G-RG(s) of a specific user within the "tnaps" attribute;

NOTE 5: When the "AfGuideTNAPs" feature is supported and the AF provides the "tnaps" attribute, the service specific parameter provisioning procedure is used for the provisioning of UE location related information to be applied for SM Policy Control.

- 6) if the "Ranging\_SL" feature is supported, the Ranging and sidelink positioning service parameters including:
  - a) configuration parameters for ranging and sidelink positioning within the "paramForRangingSlPos" attribute;

and

- 7) if the "Non3gppDevice" feature is supported, service parameters for non-3gpp devices via:
  - a) the Non-3GPP device information within the "non3gppDevInfos" attribute; and
  - b) when the information of bullet 7) a) above is provided, then no other service parameters shall be provisioned in the same request;

and may include:

- if the "AfNotifications" feature is supported:
  - a) subscription to event notification of the outcome related to invocation of service parameter provisioning within the "subNotifEvents" attribute; and
  - b) the notification URI to be used for this reporting within the "notificationDestination" attribute.

In order to update an existing service parameter subscription, the AF shall send an HTTP PUT/PATCH request message to the NEF targeting the corresponding "Individual Service Parameter Subscription" resource. When the HTTP PUT method is used, the AF should not update attributes that do not exist in the ServiceParameterDataPatch data type, i.e. such attributes should remain unchanged compared to the initial values provided in the HTTP POST request message.

In order to delete an existing service parameter subscription, the AF shall send an HTTP DELETE request message to the NEF targetting the corresponding "Individual Service Parameter Subscription" resource.

In non-roaming scenarios or roaming scenarios when the AF interacts with the HPLMN, upon reception of the HTTP request from the AF, and if the AF is authorized, the NEF shall interact with the UDM by invoking the Nudm\_SubscriberDataManagement service as described in 3GPP TS 29.503 [17] to retrieve the SUPI or Internal Group Identifier.

The NEF may, based on local configuration, complement missing service parameters. Additionally, based on operator's local policy, the NEF may support service specific authorization as described in clause 4.15.6.10 of 3GPP TS 23.502 [2]. Then, the NEF shall interact with the UDR to create, update or delete the associated service parameters by using the Nudr\_DataRepository service as defined in 3GPP TS 29.519 [23]. If information related to the "AfNotifications" feature is received from the AF, the NEF shall also include the required information (e.g., "policDelivNotifUri" and "policDelivNotifCorreId" attributes defined in 3GPP TS 29.519 [23]) in the UDR data creation request if the NEF supports the "DeliveryOutcome" feature (as described in 3GPP TS 29.504 [4]).

NOTE 6: If the service parameters that are being created, updated, or deleted contain non-3GPP device information, then the "Non-3GPP device information" Application Data is targetted at the UDR; otherwise the "Service Parameter Data" Application Data is targetted.

If the NEF receives an error response from the UDR or UDM, the NEF shall not create, update or delete the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

After receiving a successful response from the UDR, the NEF shall:

- for an HTTP POST request:
  - create a new "Individual Service Parameter Subscription" resource which represents the Service Parameter provisioning request, addressed by a URI that contains the AF Identifier and a NEF-created subscription identifier, and shall respond to the AF with an HTTP "201 Created" status code, with the response body including a representation of the created resource within the ServiceParameterData data structure, and an HTTP Location header field containing the URI for the created resource;
  - the AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this Service Parameter Subscription;
- for an HTTP PUT/PATCH request, update the targeted "Individual Service Parameter Subscription" resource which represents the service parameter provisioning request, and respond to the AF with either an HTTP "200 OK" with the response body containing a representation of the updated resource within the ServiceParameterData data structure, or an HTTP "204 No Content" status code; and
- for an HTTP DELETE request, remove all the properties of the resource and delete the corresponding active "Individual Service Parameter Subscription" resource, then respond to the AF with an HTTP "204 No Content" status code.

When the NEF receives the Service Specific Authorization Update information from the UDM via the Nudm\_ServiceSpecificAuthorization\_UpdateNotify service operation defined in 3GPP TS 29.503 [17], if the authorization is revoked, the NEF shall provide a notification to inform the AF by sending an HTTP POST request message that includes one or more AfNotification data structure(s). Upon reception of the notification, the AF shall respond with an HTTP "204 No Content" status code to confirm the received notification.

When the NEF receives the notification of the outcome of invocation related to the AF provisioned service parameters from the PCF via the Npcf\_EventExposure\_Notify service operation defined in 3GPP TS 29.523 [22], the NEF shall determine the corresponding service parameter subscription and provide a notification to AF by sending an HTTP POST request message that includes the AfNotification data structure. Upon reception of the notification, the AF shall respond with an HTTP "204 No Content" status code to confirm the received notification.

In the roaming scenarios, when the AF interacts with the VPLMN, the interaction of the V-NEF with the UDM does not apply. The V-NEF stores in the V-UDR the service parameter information provided by the AF and receives from the V-PCF the notification of the outcome of the provisioning of the AF requested service parameters. When the "VPLMNSpecificURSP" feature is supported, the V-NEF may derive the PLMN ID and set the "plmnId" attribute of the EventInfo data structure based on the SUPI that was received by the V-PCF, as described in 3GPP TS 29.523 [22].

## 4.4.21 Procedures for ACS configuration parameter provisioning

The procedures are used by the AF to provide ACS configuration information to 5G system via NEF.

In order to provision the ACS configuration information, the AF shall send an HTTP POST message to the NEF to the resource "ACS Configuration Subscriptions", the HTTP POST message shall include AcsConfigurationData data structure as request body. The AcsConfigurationData data structure shall include:

- the URL of the ACS or the address of the ACS within the "acsInfo" attribute; and
- indication of the UEs to which the subscription applies via:
  - a) identification of an individual UE via a "gpsi" attribute; or
  - b) identification of a group of UE(s) via a "exterGroupId" attribute.

In order to update an existing ACS configuration subscription, the AF shall send an HTTP PUT message to the NEF to the resource "Individual ACS Configuration Subscription" requesting to change the subscription. The body of the HTTP PUT request message shall include AcsConfigurationData data type. The External Group Identifier or GPSI shall remain unchanged from previous values.

If the "PatchUpdate" feature defined in clause 5.12.3 is supported, in order to partially modify an existing ACS Configuration subscription, the AF shall send an HTTP PATCH request message to the NEF on the "Individual ACS Configuration Subscription" resource, with the request body containing the AcsConfigurationDataPatch data structure including only the attributes that shall be modified.

In order to delete an existing ACS configuration subscription, the AF shall send an HTTP DELETE message to the NEF to the resource "Individual ACS configuration Subscription".

Upon receipt of the corresponding HTTP message, if the AF is authorized by the NEF to provision the parameters, the NEF shall interact with the UDM to create a subscription at the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17].

After receiving a successful response from the UDM, the NEF shall,

- for the HTTP POST request, create a resource "Individual ACS Configuration Subscription" which represents the ACS configuration parameter provisioning request, addressed by a URI that contains the AF Identifier and an NEF-created configuration identifier, and shall respond to the AF with a 201 Created status code, including a Location header field containing the URI for the created resource. The AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this ACS Configuration Subscription.
- for the HTTP PUT/PATCH request, update/modify the concerned "Individual ACS Configuration Subscription" resource which represents the ACS configuration, and shall responds to the AF with an HTTP "200 OK" or an HTTP "204 No Content" status code.
- for the HTTP DELETE request, remove all properties of the resource and delete the corresponding active resource "Individual ACS Configuration Subscription", then shall responds to the AF with a 204 No Content status code.

## 4.4.22 Procedures for Mobile Originated Location Request

### 4.4.22.1 General

The procedure is used by NEF to transfer the updated UE location information to AF. The following procedure support:

- Notify the AF of the updated UE location information as described in clause 6.2 of 3GPP TS 23.273 [36];

### 4.4.22.2 Location Update Notification triggered by UE

In order to notify the AF of the updated UE location information received from GMLC, the NEF shall initiate an HTTP POST request to the AF. The body of the HTTP POST message shall include the location information related to UE MO-LR within the LocUpdateData data structure.



Upon receipt of the corresponding HTTP POST message, if the AF cannot handle the location estimate of the UE, e.g. the UE does not register to the AF, the AF shall respond to the NEF with an error code. Otherwise, the AF shall handle the location estimate according to the Service Identity if provided, and send a HTTP response including "200 OK" status code with LocUpdateDataReply data structure.

## 4.4.23 Procedures for AKMA

### 4.4.23.1 General

The procedures support:

- request AKMA application key by the AF to the AAnF via the NEF as described in clause 6.3 of 3GPP TS 33.535 [37];

### 4.4.23.2 AKMA Application Key Request

In order to retrieve the AKMA application key, the AF shall send an HTTP POST request message to the resource URI "{apiRoot}/3gpp-akma/v1/retrieve". The HTTP POST request shall include the AkmaAfKeyRequest data structure that shall contain the identification of AF and an A-KID, and if the "RoamingRestriction" feature is supported, may contain a notification URI for the AF to receive notifications on the AKMA service disablement information.

Upon receipt of the corresponding HTTP POST message from the AF, if the AF's request is authorized by the NEF, then the NEF shall interact with the AAnF to retrieve the AKMA application key by using Naanf\_AKMA service as defined in 3GPP TS 29.535 [38]. After receiving a successful response from the AAnF, the NEF shall respond to the AF with an HTTP "200 OK" status code, including a  $K_{AF}$  and the expiration time of the  $K_{AF}$ , and if "anonInd" attribute contained in AkmaAfKeyRequest data type is not set to "true" in the incoming request, optionally the GPSI (external ID) which may be translated from the SUPI received from the AAnF. The SUPI shall not be included in the response to the external AF. If the NEF receives an error response from the AAnF, the NEF shall respond to the AF with a proper error status code.

If the NEF receives a response from the AAnF with an HTTP "403 Forbidden" status code and the response message body including a ProblemDetails data structure with the "cause" attribute set to the "K\_AKMA\_NOT\_PRESENT" or "ROAMING\_AKMA\_SERVICE\_DENIED" application error, then the NEF shall relay this response to the AF.

### 4.4.23.3 AKMA Service Disablement Notification

This procedure is used by the NEF to notify a previously subscribed AF of AKMA service disablement information (see also clause 6.8 of 3GPP TS 33.535 [37]).

When AKMA related sessions have already been started (before roaming was detected), and as soon as the PLMN change is detected at the AAnF, the AAnF may execute AKMA service disablement procedure via the NEF based on the roaming policy to indicate to the AF that the AKMA service is disabled.

In order to notify an AF of AKMA service disablement, the NEF shall send an HTTP POST request message to the AF with the request body including the ServiceDisableNotif data structure.

Upon reception of this notification request, the AF shall acknowledge its successful reception by sending a response message with an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.14.7, and respond to the NEF with an appropriate error status code.

## 4.4.24 Procedures for Time Synchronization Exposure

### 4.4.24.0 General

Time synchronization exposure allows an AF to configure time synchronization in 5GS. For (g)PTP operation, the Time synchronization service allows an AF to subscribe to the UE and 5GC capabilities and availability for time synchronization service (as described in clause 4.4.24.1), to configure the (g)PTP instance in 5GS and monitor time synchronization service status as described in clause 4.4.24.2. For 5G access stratum based time distribution, the AF can influence the 5G access stratum time distribution and monitor time synchronization service status as described in

clause 4.4.24.3. The time synchronization exposure is provided by NEF that uses the service provided by TSCTSF. The AF that is part of operator's trust domain may invoke the services directly with TSCTSF.

NOTE: The AF can use either the procedure for configuring the (g)PTP instance in 5GS as described in clause 4.4.24.2 or the procedure for controlling the 5G access stratum time distribution as described in clause 4.4.24.3 for a particular UE. The procedures are not intended to be used in conjunction with each other by the AF. However, the (g)PTP instance activation, modification, and deactivation can influence the 5G access stratum time distribution for the UEs that are part of the impacted PTP instance.

#### 4.4.24.1 Subscription and unsubscription to notification of Time Synchronization Capabilities

The procedures are used by the AF to subscribe to notifications and to explicitly cancel a previous subscription to notification of capabilities of the time synchronization service for a list of UE(s), a group of UEs or any UE using a DNN/S-NSSAI combination via the NEF.

In order to subscribe to the notification of capabilities of UE and 5GC, and availability for the time synchronization service, the AF shall send an HTTP POST message to the NEF to the customized operation URI "{apiRoot}/3gpp-time-sync/v1/{afId}/subscriptions". The HTTP POST request message body shall include the TimeSyncExposureSubsc data structure that shall include:

- one of the indication of the UEs to which the time synchronization capabilities is requested via:
  - 1)identification of a list of individual UEs within a "gpsis" attribute;
  - 2)indication of any UE within the "anyUeInd" attribute if DNN and S-NSSAI are provisioned; or
  - 3)identification of a group of UE(s) via a "exterGroupId" attribute.
- subscription to event(s) notification as "subscribedEvents" attribute when the AF needs to subscribe to notifications;
- notification URI within the "subsNotifUri" attribute; and
- notification correlation Id within the "subsNotifId" attribute;

and may include:

- either the DNN within the "dnn" attribute and the "snssai" attribute or the AF Service Identifier within the "afServiceId" attribute;
- the requested event filter(s) within the "eventFilters" attribute;
- notification methods within the "notifMethod" attribute;
- maximum number of reports within the "maxReportNbr" attribute;
- expiry time within the "expiry" attribute; and
- report period within the "repPeriod" attribute.

Upon the reception of an HTTP POST request, if the AF is authorized, the NEF shall select a TSCTSF based on the local configuration or discover the TSCTSF via Nnrf\_NFDiscovery service as defined in 3GPP TS 29.510 [57] for a DNN/S-NSSAI combination, if not configured. If the DNN and the S-NSSAI is omitted in the AF request, prior the TSCTSF discovery the NEF shall determine the corresponding DNN and S-NSSAI based on the received AF Service Identifier. After the NEF obtains the TSCTSF, the NEF shall invoke the Ntsctsf\_TimeSynchronization\_CapsSubscribe request service operation as defined in clause 5.2.2.2.2 of 3GPP TS 29.565 [50] to the selected TSCTSF. If the NEF receives an error response from the TSCTSF, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

NOTE: It is assumed that there is only one TSCTSF set for a given DNN/S-NSSAI in this release of the specification.

After receiving a successful response from the TSCTSF, the NEF shall create an "Individual Time Synchronization Exposure Subscription" resource which represents the time synchronization exposure subscription request, addressed by a URI that contains the AF Identifier and a NEF-created configuration identifier, and shall respond to the AF with a 201 Created status code, including a Location header field containing the URI for the created resource. The AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this "Individual Time Synchronization Exposure Subscription".

In order to update an existing subscription, the AF shall send an HTTP PUT message to the NEF targeting the resource "Individual Time Synchronization Exposure Subscription". The body of the HTTP PUT request message shall include the TimeSyncExposureSubsc data type. Upon receipt of the corresponding HTTP PUT message, if the AF is authorized by the NEF, the NEF shall interact with the TSCTSF by invoking Ntsctsf\_TimeSynchronization\_CapsSubscribe request service operation as defined in clause 5.2.2.2.3 of 3GPP TS 29.565 [50]. After receiving a successful response from the TSCTSF, the NEF shall update a resource "Individual Time Synchronization Exposure Subscription" which represents the exposure subscription, and responds to the AF with a 200 OK with TimeSyncExposureSubsc data structure or 204 No Content status code.

If the "SupportReport" feature is supported, and the Time Synchronization Exposure Subscription creation or update is rejected by the TSCTSF because the AF is not authorized or the AF requested parameters are not allowed based on UE's Time Synchronization Subscription Data as specified in 3GPP TS 29.565 [50], the NEF shall relay the received error and include in the HTTP "403 Forbidden" error response the "cause" attribute set to the "UE\_SERVICE\_NOT\_AUTHORIZED" application error.

When the NEF receives the notification of the capabilities of the time synchronization service from the TSCTSF as defined in clause 5.2.2.4.2 of 3GPP TS 29.565 [50], the NEF shall provide a notification to AF by sending HTTP POST message that includes the TimeSyncExposureSubsNotif data structure in the request body. Upon receipt of the notification, the AF shall respond with a "204 No Content" status code to confirm the received notification.

In order to delete an existing subscription, the AF shall send an HTTP DELETE message to the NEF targeting the resource "Individual Time Synchronization Exposure Subscription". The NEF shall interact with the TSCTSF by invoking the Ntsctsf\_TimeSynchronization\_CapsUnsubscribe service operation as defined in clause 5.2.2.3.2 of 3GPP TS 29.565 [50] and delete the corresponding active "Individual Time Synchronization Exposure Subscription" resource, then respond to the AF with a 204 No Content status code.

#### 4.4.24.2 Time Synchronization Exposure Configuration

The procedures are used by the AF to activate, modify or deactivate the (g)PTP instances by performing the time synchronization configuration at the NEF.

In order to configure the time synchronization parameters, the AF shall initiate an HTTP POST request to the NEF for the "Time Synchronization Exposure Configurations" resource. The body of the HTTP POST message shall include the Time Synchronization related parameters within the TimeSyncExposureConfig data structure. To subscribe to time synchronization status reports, and if the feature "NetTimeSyncStatus" is supported, the TimeSyncExposureConfig data structure shall provide the clock quality acceptance criteria.

Upon receipt of the corresponding HTTP POST message and the request is authorized by the NEF, the NEF translates any potentially received Time Synchronization Coverage Area from an external representation (e.g. geographical area) to an internal representation (e.g. TAI list) if the "CoverageArea" feature is supported, and invokes the Ntsctsf\_TimeSynchronization\_ConfigCreate service operation with the corresponding TSCTSF as defined in 3GPP TS 29.565 [50]. After receiving a successful response from the TSCTSF, the NEF shall create a new resource and assign an identifier for the "Individual Time Synchronization Exposure Configuration" resource. Then the NEF shall send a HTTP "201 Created" response with TimeSyncExposureConfig data structure as response body and a Location header field containing the URI of the created individual resource.

In order to update an existing Individual Time Synchronization Exposure Configuration, the AF may send an HTTP PUT message to the resource "Individual Time Synchronization Exposure Configuration" requesting the NEF to change all properties in the existing resource. The body of the HTTP PUT request message shall include TimeSyncExposureConfig data type as defined in clause 5.15.4.3.6. The user plane node Id shall remain unchanged from previous values.

Upon receipt of the corresponding HTTP PUT message and the request is authorized by the NEF, the NEF shall interact with the TSCTSF to modify an existing resource at the TSCTSF by using `Ntsctsf_TimeSynchronization_ConfigUpdate` service operation as defined in 3GPP TS 29.565 [50]. If the modification request is accepted by the TSCTSF and the TSCTSF informs the NEF with a successful response, the NEF shall update the existing resource for the "Individual Time Synchronization Exposure Configuration" resource. Then the NEF shall send a HTTP response including "200 OK" status code with `TimeSyncExposureConfig` data structure or "204 No Content" status code.

If the feature "SupportReport" feature is supported, and the time synchronization service configuration creation or update is rejected by the TSCTSF because either the AF request is not authorized or the AF requested parameter(s) are not allowed based on UE's Time Synchronization Subscription Data as specified in 3GPP TS 29.565 [50], the NEF shall relay the received error and include in the HTTP "403 Forbidden" error response the "cause" attribute set to the "UE\_SERVICE\_NOT\_AUTHORIZED" application error.

When the NEF receives from the TSCTSF in the `Ntsctsf_TimeSynchronization_ConfigUpdateNotify` service operation defined in 3GPP TS 29.565 [50] the notification with the current state of time synchronization service configuration and/or, in case the feature "NetTimeSyncStatus" is supported, with the acceptable or not acceptable status of the time synchronization service, if applicable, the NEF shall provide a notification to the AF by sending HTTP POST message that include the `TimeSyncExposureConfigNotif` data structure in the request body. If the "CoverageArea" feature is supported and the NEF received the AF requested time synchronization coverage area as part of the configuration request, the NEF shall relay the report of the changes in the state of time synchronization service when the UE/DS-TT moves in and out of the authorized time synchronization coverage area as defined in 3GPP TS 29.565 [50]. Upon receipt of the notification, the AF shall respond with a "204 No Content" status code to confirm the received notification.

To delete an existing "Individual Time Synchronization Exposure Configuration", the AF shall initiate an HTTP DELETE request to the NEF for the "Individual Time Synchronization Exposure Subscription" resource.

Upon receipt of the corresponding HTTP DELETE message, if the AF is authorized, the NEF shall interact with the TSCTSF to delete an existing Individual Time Synchronization Exposure Configuration at the TSCTSF by using `Ntsctsf_TimeSynchronization_ConfigDelete` service operation as defined in 3GPP TS 29.565 [50]. If the request is accepted by the TSCTSF, the NEF shall delete the existing resource for the "Individual Time Synchronization Exposure Configuration" resource. Then the NEF shall send a HTTP "204 No Content" response.

#### 4.4.24.3 Management of 5G access stratum time distribution

The procedures are used by the AF to activate, update or delete the 5G access stratum time distribution for one UE or group of UE(s). The AF may also use this procedure to indicate a coverage area to provide the service, clock quality detail level to provide to the UE or group of UE(s) and to subscribe for time synchronization status reports.

When the "ASTIConfigReport" feature is supported, to receive notifications about changes in the 5G access stratum time distribution configuration, the AF shall also provide the notification URI within the "astiNotifUri" attribute and the notification correlation Id within the "astiNotifId" attribute.

When the "NetTimeSyncStatus" feature is supported, the AF may provide the clock quality reporting control information to manage the timing synchronization status reporting in 5GS within the clock quality detail level in the "clkQltDetLvl" attribute, and if applicable, the clock quality acceptance criteria in the "clkQltAcptCri" attribute. When the AF includes the clock quality acceptance criteria, the AF is also indicating the subscription to notification of the status of the access stratum time distribution service.

In order to configure the 5G access stratum time distribution parameters, the AF shall initiate an HTTP POST request to the NEF for the "ASTI Configurations" resource. The body of the HTTP POST message shall include the 5G access stratum time distribution parameters, and may indicate, when the feature "NetTimeSyncStatus" is supported, the clock quality detail level and, if applicable, the clock quality acceptance criteria, and when the feature "CoverageArea" is supported the time synchronization service coverage area, within the `AccessTimeDistributionData` data structure as defined in clause 5.22.4.3.2.

Upon receipt of the corresponding HTTP POST message and the request is authorized by the NEF, the NEF shall select a TSCTSF based on the local configuration or discover the TSCTSF via `Nnrf_NFDiscovery` service as defined in 3GPP TS 29.510 [57] for the GPSI or external group identifier, if not configured. After the NEF obtains the TSCTSF, the NEF translates any potentially received Time Synchronization Coverage Area from an external representation (e.g. geographical area) to an internal representation (e.g. TAI list) if the "CoverageArea" feature is supported, and invokes the `Ntsctsf_ASTI_Create` service operation with the corresponding TSCTSF, if available, as defined in 3GPP TS 29.565 [50]. After receiving a successful response from the TSCTSF, the NEF shall create a new resource and

assign an identifier for the "Individual ASTI Configuration" resource. Then the NEF shall send a HTTP "201 Created" response with AccessTimeDistributionData data structure as response body and a Location header field containing the URI of the created individual resource. If the NEF receives an error response from the TSCTSF, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

In order to update an existing Individual ASTI Configuration, the AF may send an HTTP PUT message to the resource "Individual ASTI Configuration" requesting the NEF to change all properties in the existing resource. The body of the HTTP PUT request message shall include the AccessTimeDistributionData data type.

Upon receipt of the corresponding HTTP PUT message and the request is authorized by the NEF, the NEF shall interact with the TSCTSF to modify an existing resource at the TSCTSF by using Ntsctsf\_ASTI\_Update service operation as defined in 3GPP TS 29.565 [50]. If the modification request is accepted by the TSCTSF and the TSCTSF informs the NEF with a successful response, the NEF shall update the existing resource for the "Individual ASTI Configuration" resource. Then the NEF shall send a HTTP response including "200 OK" status response with AccessTimeDistributionData data structure or "204 No Content" status code. If the NEF receives an error code from the TSCTSF, the NEF shall not update the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

If the "SupportReport" feature is supported, and the ASTI time synchronization service creation or update is rejected by the TSCTSF because the AF request or the AF requested parameter(s) are not authorized based on UE's Time Synchronization subscription data as specified in 3GPP TS 29.565 [50], the NEF shall relay the received error and include in the HTTP "403 Forbidden" error response the "cause" attribute set to the "UE\_SERVICE\_NOT\_AUTHORIZED" application error.

When the "ASTIConfigReport" feature is supported and the NEF receives the notification for the 5G access stratum time distribution status change from the TSCTSF by Ntsctsf\_ASTI\_UpdateNotify service operation defined in 3GPP TS 29.565 [50], the NEF shall provide a notification to AF by sending HTTP POST message that include the AstiConfigNotification data structure in the request body. If the "CoverageArea" feature is supported and the NEF received the AF requested time synchronization coverage area, the NEF shall relay the report of the enable/disable state of ASTI time synchronization service when the UE moves in and out of the authorized time synchronization coverage area as defined in 3GPP TS 29.565 [50]. If the "NetTimeSyncStatus" feature is supported and the NEF received the AF requested clock quality acceptance criteria, the NEF shall relay the acceptable/not acceptable status of the ASTI time synchronization service to the AF. Upon receipt of the notification, the AF shall respond with a "204 No Content" status code to confirm the received notification.

To delete an existing Individual ASTI Configuration, the AF shall initiate an HTTP DELETE request to the NEF for the "Individual ASTI Configuration" resource.

Upon receipt of the corresponding HTTP DELETE message, if the AF is authorized, the NEF shall interact with the TSCTSF to delete an existing Individual ASTI Configuration at the TSCTSF by using Ntsctsf\_ASTI\_Delete service operation as defined in 3GPP TS 29.565 [50]. If the request is accepted by the TSCTSF, the NEF shall delete the existing resource for the "Individual ASTI Configuration" resource. Then the NEF shall send a HTTP "204 No Content" response. If the NEF receives an error response from the TSCTSF, the NEF shall not delete the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

AF may request and query the status of the access stratum time distribution sending the HTTP POST request, "retrieve" custom operation, to the resource "ASTI Configurations". The body of the HTTP POST request message shall include the StatusRequestData data type as defined in clause 5.22.4.3.3.

Upon receipt of the corresponding HTTP POST message, if the AF is authorized, the NEF shall interact with the TSCTSF by using Ntsctsf\_ASTI\_Get service operation as defined in 3GPP TS 29.565 [50]. Upon receipt of response from the TSCTSF, the NEF shall send a HTTP "200 OK" response with the StatusResponseData data structure as defined in clause 5.22.4.3.4 in the payload. If the NEF receives an error response from the TSCTSF, the NEF shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

## 4.4.25 Procedures for ECS address Provisioning

The procedures are used by the AF to provision ECS address(es) to the NEF. The procedures are applicable for an individual UE, any UE or a group of UEs.

In order to create an Individual ECS Address Provision Configuration resource, the AF shall initiate an HTTP POST request to the NEF for the "ECS Address Provision Configurations" resource. The body of the HTTP POST message shall include within the EcsAddressProvision data structure the ECS address(es) via the "ecsServerAddr" attribute, may include the spatial validity condition via the "spatialValidityCond" attribute, the target UE information via the "tgtUe" attribute, if the "HR-SBO" feature is supported, the PLMN ID in which the provided information applies via the "plmnId" attribute, if the "ECSAuthMethods" feature is supported, may include the supported authentication methods via the "ecsAuthMethods" attribute and, if the "ECSSuppPlmns" feature is supported, may include the list of PLMNs and associated ECSPs for which EDN configuration information can be provided by the ECS, via the "supportedPlmns" attribute.

NOTE: The NEF can derive DNN and S-NSSAI information from the AF identifier.

Upon receipt of the corresponding HTTP POST message, if the AF is authorized by the NEF to provision the ECS address(es), the NEF shall interact with the UDM to create a resource at the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17]. If the request is accepted by the UDM and the UDM informs the NEF with a successful response, the NEF shall create a new resource and assign an identifier for the "Individual ECS Address Provision Configuration" resource. Then the NEF shall send a HTTP "201 Created" response with EcsAddressProvision data structure as response body and a Location header field containing the URI of the created individual resource.

In order to update an existing Individual ECS Address Provision Configuration, the AF shall send an HTTP PUT message to the resource "Individual ECS Address Provision Configuration" requesting the NEF to change all properties in the existing resource. The body of the HTTP PUT request message shall include the EcsAddressProvision data type. Upon receipt of the corresponding HTTP PUT message, if the AF is authorized by the NEF to provision the ECS address(es), the NEF shall interact with the UDM to modify an existing resource at the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17]. If the modification request is accepted by the UDM and the UDM informs the NEF with a successful response, the NEF shall update the existing resource for the "Individual ECS Address Provision Configuration" resource. Then the NEF shall send a HTTP response including "200 OK" status code with EcsAddressProvision data structure or "204 No Content" status code.

To delete an existing Individual ECS Address Provision Configuration, the AF shall initiate an HTTP DELETE request to the NEF for the "Individual ECS Address Provision Configuration" resource. Upon receipt of the corresponding HTTP DELETE message, if the AF is authorized, the NEF shall interact with the UDM to delete the existing resource at the UDM by using Nudm\_ParameterProvision service as defined in 3GPP TS 29.503 [17]. If the request is accepted by the UDM, the NEF shall delete the existing resource for the "Individual ECS Address Provision Configuration" resource. Then the NEF shall send a HTTP "204 No Content" response.

## 4.4.26 Procedures for AM Policy Authorization

### 4.4.26.1 General

The procedures are used by AF to send request to NEF for AM Policy Authorization, and for NEF to authorize an AF triggered AM Policy Authorization request and trigger a respective Npcf\_AMPolicyAuthorization request. This service also allows the AF to subscribe/unsubscribe the notification of event(s) for the existing AF application AM context.

The following procedures support:

- Create/Modify/Delete of AF triggered application AM context; and
- Subscribe/Unsubscribe/Notify event(s) for the existing AF application AM context.

### 4.4.26.2 Creation of a new Individual Application AM Context

In order to create a new Individual application AM context resource for a given AF, the AF shall initiate an HTTP POST request to the NEF for the "Application AM Contexts" resource. The HTTP POST request message body shall include the AppAmContextExpData data structure.

If the NEF receives AF service identifier(s) in the AF requested Network Slice Replacement requirements, it translates the AF service identifier(s) to the corresponding S-NSSAI(s).

Upon receipt of the corresponding HTTP POST message, if the AF is authorized by the NEF to request the AM policy authorization, the NEF may interact with the BSF to retrieve the related PCF information by invoking the Nbsf\_Management\_Discovery service operation as described in 3GPP TS 29.521 [9]. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable. After receiving a successful response from the BSF, the NEF shall trigger a respective Npcf\_AMPolicyAuthorization\_Create request as defined in 3GPP TS 29.534 [43]. If the request is accepted by the PCF and the PCF informs the NEF with a successful response, the NEF shall create a new "Individual application AM Context" and assign an application AM context identifier for the "Individual application AM Context" resource.

Then the NEF shall send a HTTP "201 Created" response with:

- AppAmContextExpRespData data structure as response body, including the created "Individual application AM Context" resource and, if immediate reporting was requested for the subscribed event(s), the currently available value(s), if received from the PCF; and
- a Location header field containing the URI of the created "Individual application AM Context" resource to the AF.

If the NEF receives an error response from the PCF, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.26.3 Modification of an existing individual Application AM Context

In order to modify an existing individual Application AM Context resource, the AF shall initiate an HTTP PATCH request to the NEF for the "Individual application AM Context" resource. The body of the HTTP PATCH message shall include the AppAmContextExpUpdateData data type as defined in clause 5.17.1.3.3.3.

Upon receipt of the corresponding HTTP PATCH message, if the AF is authorized by the NEF to modify the AM policy authorization request, the NEF shall interact with the PCF to modify an existing application AM context by using Npcf\_AMPolicyAuthorization\_Update request as defined in 3GPP TS 29.534 [43]. If the modification request is accepted by the PCF and the PCF informs the NEF with a successful response, the NEF shall update the existing application AM context for the "Individual application AM Context" resource. Then the NEF shall send a HTTP response including "200 OK" status code with AppAmContextExpRespData data structure (including the updated resource representation and, if immediate reporting was requested for the new subscribed event(s), the currently available value(s), if received from the PCF) or "204 No Content" status code to the AF.

If the NEF receives an error response from the PCF, the NEF shall not modify the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.26.4 Deletion of an existing individual Application AM Context

To delete an existing application AM context, the AF shall initiate an HTTP DELETE request to the NEF for the "Individual application AM Context" resource.

Upon receipt of the corresponding HTTP DELETE message, if the AF is authorized to delete the application AM context, the NEF shall interact with the PCF to delete an existing application AM context at the PCF by using Npcf\_AMPolicyAuthorization\_Delete request as defined in 3GPP TS 29.534 [43]. If the request is accepted by the PCF and informs the NEF with a successful response, the NEF shall delete the existing application AM context for the "Individual application AM Context" resource. Then the NEF shall send a HTTP "204 No Content" response to the AF.

If the NEF receives an error response from the PCF, the NEF shall take proper error handling action and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.26.5 Create or modify subscription to notification of AM policy event

In order to create or modify the subscription to notification of AM policy event(s) for the application AM context, the AF shall send an HTTP PUT message to the NEF to the sub-resource "AM Policy Events Subscription", the HTTP PUT message shall include the AmEventsSubscData data structure as request body.

Upon receipt of the HTTP request from the AF, if the AF is authorized, the NEF shall interact with the PCF to subscribe to, or modify the subscription to the AM policy event notification by using Npcf\_AMPolicyAuthorization\_Subscribe request as defined in 3GPP TS 29.534 [43]. If the request is accepted by the PCF and the PCF informs the NEF with a successful response, the NEF shall create a new AM policy event subscription sub-resource in an existing application AM context or modify an existing AM policy event subscription to the "AM Policy Events Subscription" sub-resource. Then the NEF shall send:

- for a subscription creation request, an HTTP "201 Created" response with:
  - a. AmEventsSubscRespData data structure as response body, including the created "AM Policy Events Subscription" resource and, if immediate reporting was requested for the subscribed event(s), the currently available value(s), if received from the PCF; and
  - b. a Location header field containing the URI of the created individual subscription resource to the AF; or
- for a subscription update request, an HTTP "200 OK" response code with AmEventsSubscRespData data structure with the updated "AM Policy Events Subscription" resource or HTTP "204 No Content" response code and, if immediate reporting was requested for the subscribed event(s), the currently available value(s), if received from the PCF;

as response body to the AF.

If the NEF receives an error response from the PCF, the NEF shall not create or modify the sub-resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.26.6 Unsubscription to notification of AM policy event

In order to delete existing subscribed AM policy event(s) within the existing Individual application AM context, the AF shall initiate the HTTP DELETE request message to the NEF to the "AM Policy Events Subscription" sub-resource.

Upon receipt of the corresponding HTTP DELETE message, if the AF is authorized to delete the notification of AM policy event(s), the NEF shall interact with the PCF to delete an existing subscription of notification to AM policy event(s) within the existing application AM context at the PCF by using Npcf\_AMPolicyAuthorization\_Unsubscribe request as defined in 3GPP TS 29.534 [43]. If the request is accepted by the PCF and informs the NEF with a successful response, the NEF shall delete the existing subscription to notification of AM policy event(s) within the existing application AM context for the "AM Policy Events Subscription" resource. Then the NEF shall send a HTTP "204 No Content" response to the AF.

If the NEF receives an error response from the PCF, the NEF shall take proper error handling action and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.26.7 Notification of AM policy event

If the NEF receives an AM policy event notification from the PCF indicating that the subscribed AM policy event has been detected, the NEF shall provide a notification to AF by sending HTTP POST message that include the AmEventsNotification data structure in the request body. Upon receipt of the AM policy event notification, the AF shall respond with a "204 No Content" status code to confirm the received notification to the NEF.



## 4.4.27 Procedures for AF triggered Access and Mobility Influence

### 4.4.27.1 General

The procedures are used by the AF to provision the Access and Mobility(AM) policy related request via NEF to one or multiple UEs that may have already registered or not. This service also allows the NEF to send the notification of service area coverage outcome events to the AF.

### 4.4.27.2 Create the AM Influence Subscription

In order to create a resource for the AM Influence, the AF shall send an HTTP POST request message to the NEF for the "AM Influence Subscription" resource with the request body including the AmInfluSub data structure.

If the NEF receives AF service identifier(s) within the AF requested Network Slice Replacement requirements, it translates the received AF service identifier(s) to the corresponding S-NSSAI(s).

The request may target one or multiple UE(s) that may have already registered or not. For an individual UE identified by GPSI, or a group of UEs identified by External Group Identifier, the NEF shall interact with the UDM by invoking the Nudm\_SubscriberDataManagement service as described in 3GPP TS 29.503 [17] to retrieve the SUPI or Internal Group Identifier. For all UEs, the NEF will not interact with the UDM.

The NEF shall interact with the UDR by invoking the Nudr\_DataRepository service as described in 3GPP TS 29.504 [20] and 3GPP TS 29.519 [23] to store the received AM Influence parameters as Application Data in the UDR.

After receiving a successful response from the UDR, the NEF shall create a new "Individual AM Influence Subscription" resource, which represents the AM influence subscription, addressed by a URI that contains the AF Identifier and an NEF-created subscription identifier. The NEF shall then respond to the AF with an HTTP "201 Created" status code, including a Location header field containing the URI for the created resource, and the response body including the representation of the created resource within the AmInfluSub data structure. The AF shall use the URI received in the Location header when it subsequently sends requests to the NEF targeting this AM influence subscription.

On failure or if the NEF receives an error response from the UDR, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

### 4.4.27.3 Modify the AM Influence Subscription

In order to update an existing AM influence subscription, the AF shall send an HTTP PUT or HTTP PATCH request message to the NEF for the "Individual AM Influence Subscription" resource. The NEF shall interact with the UDR by invoking the Nudr\_DataRepository service as described in 3GPP TS 29.504 [20] and 3GPP TS 29.519 [23] to update the application data in the UDR.

After receiving a successful response from the UDR, the NEF shall update the "Individual AM Influence Subscription" resource which represents the AM influence subscription, and shall respond to the AF with an HTTP "200 OK" or "204 No Content" response message.

On failure or if the NEF receives an error response from the UDR, the NEF shall not update the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

### 4.4.27.4 Delete the AM Influence Subscription

In order to delete an existing AM influence subscription, the AF shall send an HTTP DELETE request message to the NEF for the "Individual AM Influence Subscription" resource. The NEF shall interact with the UDR by invoking the Nudr\_DataRepository service as described in 3GPP TS 29.504 [20] and 3GPP TS 29.519 [23] to delete the application data in the UDR.

After receiving a successful response from the UDR, the NEF shall delete the "Individual AM Influence Subscription" resource which represents the AM influence subscription, and shall respond to the AF with an HTTP "204 No Content" response message.

On failure or if the NEF receives an error response from the UDR, the NEF shall take proper error handling actions and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.27.5 Notification of AM influence events

When the NEF receives the notification of AM influence events from the PCF as defined in 3GPP TS 29.523 [22], the NEF shall provide a notification by sending an HTTP POST message to the AF targeting the notification URI received during the creation/modification of the corresponding AM Influence Subscription, with the response body including the AmInfluEventNotif data structure.

Upon receipt of the event notification, the AF shall respond with a "204 No Content" status code to confirm the received event notification.

### 4.4.28 Procedures for Northbound EAS Deployment Information management

#### 4.4.28.1 General

The procedures are used by AF to provide, update or delete EAS Deployment Information to NEF, and for NEF to authorize the AF provisioned EAS Deployment Information to be stored in the UDR.

The following procedures support:

- Create/Update/Delete the AF provisioned EAS Deployment information;

#### 4.4.28.2 Creation of a new Individual EAS Deployment information resource

In order to create a new Individual EAS Deployment information resource for a given AF, the AF shall initiate an HTTP POST request to the NEF for the "EAS Deployment Information" resource. The HTTP POST request message body shall include the EasDeployInfo data structure that shall include:

- FQDN(s) of an application deployed in the Local part of the DN via an "fqdnPatternList" attribute;

and may include:

- an AF service identifier as the "afServiceId" attribute;
- an DNN as "dnn" attribute;
- an S-NSSAI as "snssai" attribute;
- an external Group Identifier as "externalGroupId" attribute;
- identification of an application as "appId" attribute;
- list of DNS server identifier and/or IP address(s) of the EAS in the local DN for each DNAI as "dnaiInfos" attribute;
- the identifier of the AF that is responsible for the EAS associated with this EAS deployment information as "targetAfId" attribute, if the "EasRelocationEnh" feature is supported; and

NOTE 1: The AF responsible for the EAS (indicated by the "targetAfId" attribute) can be different from the AF that creates the EAS Deployment information (indicated by the "afId" attribute in the URI of the resource).

NOTE 2: When the "targetAfId" attribute is provided, then all DNAI(s) correspond to the same EHE provider. The "targetAfId" attribute can be used in case of AF(s) involving different EHE providers, and the source EHE is unaware of other/target EHE specific deployment details.

- N6 delay measurement assistance information in the "n6DelayPerDnaiEas" attribute, if the "N6DelayMeasurement" feature is supported.

Upon receipt of the corresponding HTTP POST message, if the AF is authorized by the NEF to provide the EAS Deployment Information, the NEF shall interact with the UDM by using Nudm\_SubscriberDataManagement service as defined in 3GPP TS 29.503 [17] to translate the external group identifier into the corresponding internal group identifier and the NEF may derive DNN and S-NSSAI from the AF Service Identifier if not received explicitly. Then the NEF shall interact with the UDR to create the associated EAS Deployment information by using the Nudr\_DataRepository service as defined in 3GPP TS 29.504 [20]. If the "EasDnaiConsistency" feature is supported and there are existing EAS-DNAI mappings configured via OAM in the UDR (see 3GPP TS 29.519 [23] clause 6.2.23), the NEF also ensures that the EAS Deployment Information received from the AF is not in conflict with the OAM-configured information. In case of conflict the NEF shall reject the request message by sending an HTTP response to the AF with a status code set to 403 Forbidden and may include the "CONFLICT\_CONFIG\_DATA" error in the "cause" attribute of the "ProblemDetails" structure. If the request is accepted by the UDR and the UDR informs the NEF with a successful response, the NEF shall create a new "Individual EAS Deployment Information" resource. Then the NEF shall send a HTTP "201 Created" response with the EasDeployInfo data structure including the contents of the created EAS Deployment Information resource in the response body and a Location header field containing the URI of the created individual EAS Deployment Information resource. If the NEF receives an error response from the UDR, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.28.3 Modification of an existing individual EAS Deployment Information resource

In order to modify an existing individual EAS Deployment Information resource, the AF shall initiate an HTTP PUT request to the "Individual EAS Deployment Information" resource. The request body shall include the EasDeployInfo data structure. The "afServiceId" value shall remain unchanged from the previous value, if available in the HTTP PUT message.

Upon receipt of the corresponding HTTP PUT request message, if the AF is authorized by the NEF to modify the existing individual EAS Deployment Information resource, the NEF shall interact with the UDR by invoking the Nudr\_DataRepository service as described in 3GPP TS 29.504 [20] to modify the EAS Deployment Information in the UDR. If the "EasDnaiConsistency" feature is supported and there are existing EAS-DNAI mappings configured via OAM in the UDR (see 3GPP TS 29.519 [23] clause 6.2.23), the NEF also ensures that the EAS Deployment Information received from the AF is not in conflict with the OAM-configured information. In case of conflict the NEF shall reject the request message by sending an HTTP response to the AF with a status code set to 403 Forbidden and may include the "CONFLICT\_CONFIG\_DATA" error in the "cause" attribute of the "ProblemDetails" structure.

If the modification request is accepted by the UDR and the UDR informs the NEF with a successful response, the NEF shall update the existing individual EAS Deployment Information resource. Then the NEF shall send a HTTP response including "200 OK" status code with EasDeployInfo data structure or "204 No Content" status code.

If the NEF receives an error response from the UDR, the NEF shall not update the "Individual EAS Deployment Information" resource and shall respond a proper error status code to the AF. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.28.4 Deletion of an existing individual EAS Deployment Information resource

In order to delete an existing EAS Deployment Information, the AF shall send an HTTP DELETE request message to the NEF for the "Individual EAS Deployment Information" resource. The NEF shall interact with the UDR by invoking the Nudr\_DataRepository service as described in 3GPP TS 29.504 [20] to delete the EAS Deployment Information in the application data in the UDR.

After receiving a successful response from the UDR, the NEF shall delete the "Individual EAS Deployment Information" resource and shall respond to the AF with an HTTP "204 No Content" response message.

If the NEF receives an error response from the UDR, the NEF shall take proper error handling actions and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.28.5 Deletion of EAS Deployment Information based on given criteria

In order to delete existing EAS Deployment Information resource(s) which match given attributes, the AF shall send an HTTP POST request with "{apiRoot}/3gpp-eas-deployment/<apiVersion>/remove-edis" as URI. The POST request body shall contain an EdiDeleteCriteria data structure. The EdiDeleteCriteria data structure provided in the request body shall include at least one of the following:

- an AF identifier within the "afId" attribute;
- DNN and slice information within the "dnnSnssai" attribute;

Upon the reception of this HTTP POST request, if the AF is authorized by the NEF to delete the EAS Deployment Information, the NEF shall determine the EAS Deployment Information resources that match the provided criteria and interact with the UDR to delete the associated EAS Deployment Information by using the Nudr\_DataRepository service as defined in 3GPP TS 29.504 [20]. If the request is accepted by the UDR and the UDR informs the NEF with a successful response, the NEF shall send a HTTP "204 No Content" response. If the NEF receives an error code from the UDR, the NEF shall respond to the AF with a proper error status code.

### 4.4.29 Procedures for MBS Management

#### 4.4.29.1 General

The procedures described in the clauses below are used by an AF to interact with the 5GC for MBS management as defined in 3GPP TS 23.247 [53] and 3GPP TS 26.502 [65], in order to carry out the following procedures:

- MBS TMGI management procedures.
- MBS Session management procedures.
- MBS User Service management procedures.
- MBS User Data Ingest Session management procedures.

#### 4.4.29.2 Procedures for MBS TMGI management

##### 4.4.29.2.1 General

The procedures described in the clauses below are used by an AF to request and manage TMGI(s) for MBS session(s) as defined in clause 7.1 of 3GPP TS 23.247 [53].

##### 4.4.29.2.2 Procedure for MBS TMGI(s) allocation or MBS TMGI(s) expiry time refresh

This procedure is used by an AF to request the allocation of TMGI(s) for new MBS session(s) or the refresh of the expiry time of already allocated MBS TMGI(s).

In order to request the allocation of TMGI(s) for new MBS session(s) or the refresh of the expiry time of already allocated MBS TMGI(s), an AF shall send a Nnef\_MBSTMGI\_Allocation request message to the NEF using the HTTP POST method with the request body including the TmgiAllocRequest data structure that shall contain:

NOTE: The Nnef\_MBSTMGI\_Allocation service operation corresponds to the stage 2 Nnef\_MBSTMGI\_Allocate service operation defined in 3GPP TS 23.247 [53].

- within the "afId" attribute, the identifier of the AF that is sending the request;
- within the "tmgiParams" attribute, the parameters (e.g. number of TMGI(s) to be allocated, etc.) to request the allocation of TMGI(s) for new MBS session(s) or the refresh of the expiry time of already allocated TMGI(s);
- within the "suppFeat" attribute, the features supported by the AF, if feature negotiation needs to take place;

and may contain:

- within the "notificationUri" attribute, the notification URI via which the AF desires to receive notifications on timer expiry for TMGI(s);

- within the "requestTestNotification" attribute, an indication on whether the NEF should send a test notification, if the "Notification\_test\_event" feature is supported;
- within the "websockNotifConfig" attribute, the configuration parameters to set up notification delivery over Websocket protocol, if the "Notification\_websocket" feature is supported; and/or
- within the either "mbsServiceArea" attribute or the "extMbsServiceArea" attribute, the MBS service area for the TMGI(s) to be allocated, which may be needed for a local MBS service.

The NEF shall then check whether the AF is authorized to perform this operation or not as defined in clause 6.1.1 of 3GPP TS 23.247 [53]. If the AF is authorized, then:

- if the MBS Service Area information is provided via the "extMbsServiceArea" attribute, the NEF shall translate the received geographical area(s) or civic address(es) to a list of TAI(s) and/or cell ID(s);
- the NEF shall determine the target MB-SMF either by querying the NRF to discover and select an MB-SMF (service) instance that can handle this request, or based on local configuration; and
- if the received MBS Service Area information cannot be covered by the MB-SMF Service Area of a single MB-SMF, the NEF shall reject the request and respond to the AF with an HTTP "403 Forbidden" status code with the response body including the ProblemDetailsTmgiAlloc data structure containing:
  - the ProblemDetails data structure containing the "cause" attribute set to the "MBS\_SERVICE\_AREA\_TOO\_LARGE" application error; and optionally
  - the ReducedMbsServArea data structure containing the reduced MBS Service Area information;
- the NEF shall convey this MBS TMGI(s) allocation request or expiry time refresh request to the selected MB-SMF using the Nmbsmf\_TMGI service API as defined in 3GPP TS 29.532 [52]; and
- if the received MBS Service Area is not supported (e.g., the received MBS Service Area cannot be covered by the service area(s) of any MB-SMF), the NEF shall skip the following steps below and respond to the AF with an HTTP "403 Forbidden" status code with the response body including the "MBS\_SERVICE\_AREA\_NOT\_SUPPORTED" application error.

Upon reception of a successful response from the MB-SMF as defined in 3GPP TS 29.532 [52], the NEF shall forward the received information (e.g. allocated MBS TMGI(s), expiry time or updated expiry time of existing MBS TMGI(s), etc.) to the AF in a Nnef\_MBSTMGI\_Allocation response message with an HTTP "200 OK" status code and the response body including the TmgiAllocResponse data structure that shall contain:

- within the "tmgiInfo" attribute, the MBS TMGI(s) allocation information or the refreshed expiry time for already allocated MBS TMGI(s); and
- within the "supFeat" attribute, the features supported by both the AF and the NEF, if feature negotiation needs to take place and the AF provided the list of its supported features in the corresponding request body.

On failure or if the NEF receives an error response from the MB-SMF, the NEF shall take proper error handling actions, as specified in clause 5.19.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.2.3 Procedure for MBS TMGI(s) deallocation

This procedure is used by an AF to request the deallocation of previously allocated MBS TMGI(s).

In order to request the deallocation of previously allocated MBS TMGI(s), an AF shall send a Nnef\_MBSTMGI\_Deallocation request message to the NEF using the HTTP POST method with the request body including the TmgiDeallocRequest data structure that shall contain :

- NOTE: The Nnef\_MBSTMGI\_Deallocation service operation corresponds to the stage 2 Nnef\_MBSTMGI\_Deallocate service operation defined in 3GPP TS 23.247 [53].
- within the "afId" attribute, the identifier of the AF that is sending the request; and
  - within the "tmgis" attribute, the list of MBS TMGI(s) for which deallocation is requested.

The NEF shall then check whether the AF is authorized to perform this operation or not as defined in clause 6.1.1 of 3GPP TS 23.247 [53]. If the AF is authorized, the NEF shall convey this MBS TMGI(s) deallocation request to the MB-SMF using the Nmbmsmf\_TMGI service API as defined in 3GPP TS 29.532 [52].

Upon reception of a successful response from the MB-SMF confirming the deallocation of the TMGI(s), the NEF shall forward this confirmation to the AF in a Nnef\_MBSTMGIDeallocation response message with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the MB-SMF, the NEF shall take proper error handling actions, as specified in clause 5.19.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.2.4 Procedure for MBS TMGI(s) timer expiry notification

This procedure is used by the NEF to notify an already subscribed AF of timer expiry for previously allocated MBS TMGI(s).

In order to notify an AF of timer expiry for previously allocated MBS TMGI(s), the NEF shall send a Nnef\_MBSTMGIDeallocation request message to the AF using the HTTP POST method with the request body including the ExpiryNotif data structure that shall contain:

- within the "tmgis" attribute, the list of MBS TMGI(s) for which the timer has expired.

Upon reception of this notification request, the AF shall acknowledge its successful reception by sending a Nnef\_MBSTMGIDeallocation response message with an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.19.7, and respond to the NEF with an appropriate error status code.

#### 4.4.29.3 Procedures for MBS session management

##### 4.4.29.3.1 General

The procedures described in the clauses below are used by an AF to create, update or delete MBS session(s) and to subscribe to / unsubscribe from MBS Session Status event(s) reporting at the NEF.

This service is applicable for both broadcast and multicast sessions or, for a location dependent MBS session, the part of an MBS Session within an MBS service area, as defined in 3GPP TS 23.247 [53].

##### 4.4.29.3.2 Procedure for MBS session creation

This procedure is used by an AF to request the creation of a multicast or a broadcast MBS session or, for a location dependent MBS session, the part of an MBS Session within an MBS service area.

In order to request the creation of an MBS Session, an AF shall send a Nnef\_MBSSession\_Create request to the NEF using the HTTP POST method and targeting the "MBS Sessions" collection resource with the request message body including the MbsSessionCreateReq data structure that shall contain:

- within the "afId" attribute, the identifier of the AF that is sending the request; and
- within the "mbsSession" attribute, the characteristics of the MBS session that is to be created.

The "mbsSession" attribute shall be encoded using the MbsSession data structure that shall contain:

- within the "mbsSessionId" attribute, the identifier of the MBS Session (e.g. SSM, TMGI), if available;
- within the "tmgiAllocReq" attribute, the TMGI allocation request indication, if the "mbsSessionId" attribute is either absent or does not contain a TMGI; and
- within the "serviceType" attribute, the MBS service type (i.e. multicast or broadcast);
- within the "locationDependent" attribute, the location dependent MBS session indication, if the request is related to a location dependent MBS;

and may further contain:

- for a multicast or a broadcast MBS session:
  - within the "ingressAddrReq" attribute, the ingress transport address request indication to indicate whether the allocation of an ingress transport address is requested or not;
  - within the "extMbsServiceArea" attribute, the MBS service area, for a location dependent MBS session or a local MBS session;
  - within the "activationTime" attribute, the MBS session activation time;
  - within the "terminationTime" attribute, the MBS session termination time;
  - within the "mbsServInfo" attribute, the MBS Service Information for the MBS session; and
  - within the "mbsSessionSubsc" attribute, the parameters to request the creation of a subscription to MBS session status event(s) reporting;
- for a multicast MBS session:
  - within the "activityStatus" attribute, the MBS session activity status (i.e. active or inactive); and
  - within the "anyUeInd" attribute, the indication of whether any UE may join the MBS session;
- for a broadcast MBS session:
  - within the "mbsFsaIdList" attribute, the list of MBS frequency selection area Identifiers (i.e. FSA IDs); and
  - when the "5MBS2" feature is supported:
    - within the "associatedSessionId" attribute, the Associated Session ID; and
    - within the "nrRedCapUeInfo" attribute, the NR RedCap UE Information.

At the reception of this HTTP POST request for MBS session creation:

- the NEF may decide to interact with the PCF for MBS policy authorization of the received MBS Service Information;
- if the NEF decides to interact with the PCF, then:
  - if the NEF did not receive an MBS Session Identifier or received a TMGI allocation request within the "tmgiAllocReq" attribute, the NEF shall request TMGI allocation to the MB-SMF using the Nmbsmf\_TMGI service API, as specified in 3GPP TS 29.532 [52];
  - if the received MBS Session Creation request is for the creation of an MBS Session that is part of a location dependent MBS, i.e. the "locationDependent" attribute is present and set to "true", and there is a need to select the same PCF for all the MBS Sessions composing the location dependent MBS, the NEF shall interact with the BSF using the Nbsf\_Management service API to check whether there is already a PCF serving the MBS Sessions of the location dependent MBS based on the MBS Session Identifier, as specified in 3GPP TS 29.532 [52]. Then:

NOTE 1: Interacting with the BSF to discover whether there is already a PCF serving the MBS Session is not necessary in a deployment with a single PCF.

- if there is a PCF already serving the MBS Sessions of the location dependent MBS, the NEF shall use this PCF for MBS policy authorization of the received MBS Service Information;
- if there is no PCF already serving the MBS Sessions of the location dependent MBS or the NEF did not interact with the BSF, the NEF shall interact with the NRF using the Nnrf\_NFDiscovery service API to discover a PCF (service) instance to serve the MBS Session possibly based on the MBS Session Identifier, as specified in 3GPP TS 29.510 [57];
- the NEF shall then interact with the selected PCF (service) instance using the Npcf\_MBSPolicyAuthorization service API for MBS policy authorization of the received MBS Service Information and the creation of a corresponding MBS Application Session Context at the PCF, as specified in 3GPP TS 29.537 [63]; and

- if MBS session authorization is successful or when the NEF decides to not interact with the PCF for MBS policy authorization, the NEF shall interact with the MB-SMF using the Nmbsmf\_MBSSession service API to request the creation of a corresponding MBS session at the MB-SMF as specified in 3GPP TS 29.532 [52];
- if the MBS Service Area information is provided within the "extMbsServiceArea" attribute, the NEF shall translate the received geographical area(s) or civic address(es) to a list of cell ID(s) and/or list of TAI(s) before relaying it to the MB-SMF;
- if the NEF discovers the target MB-SMF based on the MBS Service Area and the received MBS Service Area information cannot be covered by the MB-SMF Service Area of a single MB-SMF, the NEF shall reject the request and respond to the AF with an HTTP "403 Forbidden" status code with the response body including the ProblemDetailsTmgiAlloc data structure containing:
  - the ProblemDetails data structure containing the "cause" attribute set to the "MBS\_SERVICE\_AREA\_TOO\_LARGE" application error; and optionally
  - the ReducedMbsServArea data structure containing the reduced MBS Service Area information;

and

- if the received MBS Service Area is not supported (e.g., the received MBS Service Area cannot be covered by the service area(s) of any MB-SMF), the NEF shall skip the following steps below and respond to the AF with an HTTP "403 Forbidden" status code with the response body including the "MBS\_SERVICE\_AREA\_NOT\_SUPPORTED" application error.

Upon reception of a successful response from the MB-SMF and successful MBS session creation at the NEF, the NEF shall return a Nnef\_MBSSession\_Create response with an HTTP "201 Created" status code to the AF including a "Location" header that shall contain the URI of the created "Individual MBS Session" resource, and the response body including the MbsSessionCreateRsp data structure that shall contain:

- within the "mbsSession" attribute, a representation of the created Individual MBS Session resource encoded using the MbsSession data structure, including:
  - the area session ID assigned by the MB-SMF in the case of a location dependent MBS within the "areaSessionId" attribute;
  - the allocated TMGI for the MBS session, if the MBS session creation request included a "tmgiAllocReq" attribute requesting TMGI allocation for the MBS session, within the "tmgi" attribute;
  - if unicast transport is used over N6mb/Nmb9, the ingress MB-UPF tunnel information, within the "ingressTunAddr" attribute;
  - if the "serviceType" value is "BROADCAST" and any MBS FSA ID(s) received from the MB-SMF, the list of MBS FSA ID(s) within the "mbsFsaIdList" attribute; and
  - if the "ReducedMbsServArea" feature is supported and the MB-SMF reduced the MBS Service Area initially requested by the AF, the reduced MBS Service Area that can be supported by the MB-SMF within either the "redMbsServArea" attribute or the "extRedMbsServArea" attribute;

and

- within the "eventList" attribute, a list of MBS Session Status Event(s) report(s), if available.

If the MBS session creation request contained a request to also create a subscription to MBS session status event(s) within the "mbsSessionSubsc" attribute, the NEF shall also create a corresponding "Individual MBS Session Subscription" resource and return a representation of it in the HTTP POST response body within the "mbsSessionSubsc" attribute of the MbsSession data structure. The "mbsSessionSubsc" attribute shall contain the identifier of the created "Individual MBS Session Subscription" resource within the "subscriptionId" attribute. The AF shall construct the URI of the created "Individual MBS Session Subscription" resource by appending the path segments "/subscriptions/{subscriptionId}", where the "subscriptionId" takes the value of the received "subscriptionId" attribute, to the URI of the created "Individual MBS Session" resource received within the HTTP Location header.

On failure or if the NEF receives an error code from the PCF, the NRF or the MB-SMF, the NEF shall take proper error handling actions, as specified in clause 5.20.7, and respond to the AF with an appropriate error status code. If the NEF



received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.3.3 Procedure for MBS session update

This procedure is used by an AF to request the modification of an existing multicast or a broadcast MBS session or, for a location dependent MBS session, the part of an MBS Session within an MBS service area.

In order to request the modification of an existing MBS Session, an AF shall send a Nnef\_MBSSession\_Update request using the HTTP PATCH method and targeting the URI of the corresponding "Individual MBS Session" resource and the request message body including an array of PatchItem data structure(s) containing the requested modifications. For a multicast or a broadcast MBS session, only the "mbsServiceArea" attribute, and/or the "mbsServInfo" attribute may be modified. For a multicast MBS session, the "activityStatus" attribute may also be modified. For a broadcast MBS session, the "mbsFsaIdList" attribute may also be modified.

At the reception of this HTTP PATCH request for MBS session modification:

- if updated MBS Service Information is provided and the NEF decided to interact with the PCF during MBS Session Creation as specified in clause 4.4.29.3.2, the NEF shall also interact with the PCF for MBS policy authorization of the received updated MBS Service Information and the update of the corresponding MBS Application Session Context, as specified in 3GPP TS 29.537 [63];
- if MBS session authorization is successful or when the NEF does not interact with the PCF, the NEF shall interact with the MB-SMF to request the modification of the corresponding MBS session at the MB-SMF as specified in 3GPP TS 29.532 [52];
- if the NEF receives an "indication that the PCF shall be contacted" within the "contactPcfInd" attribute from the PCF as specified in 3GPP TS 29.537 [63], the NEF shall relay this indication to the MB-SMF;

and

- if updated MBS Service Area information is provided within the "extMbsServiceArea" attribute, the NEF shall translate the received geographical area(s) or civic address(es) to a list of cell ID(s) and/or list of TAI(s) before relaying it to the MB-SMF.

Upon reception of a successful response from the MB-SMF and successful MBS session modification, the NEF shall return a Nnef\_MBSSession\_Update response with an HTTP "204 No Content" status code, or when the "ReducedMbsServArea" feature is supported, with either:

- if no updated MBS Service Area was provided in the corresponding request or an updated MBS Service Area was provided in the corresponding request and was fully accepted by the MB-SMF, an HTTP "204 No Content" status code; or
- if an updated MBS Service Area was provided in the corresponding request but only partially accepted by the MB-SMF (i.e., the MB-SMF reduced the MBS Service Area), an HTTP "200 OK" status code with the response body including the reduced MBS Service Area information within the MbsSessionUpdateResp data structure.

On failure or if the NEF receives an error response from the PCF or the MB-SMF, the NEF shall take proper error handling actions, as specified in clause 5.20.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.3.4 Procedure for MBS session deletion

This procedure is used by an AF to request the deletion of an existing multicast or a broadcast MBS session or, for a location dependent MBS session, the part of an MBS Session within an MBS service area.

In order to request the deletion of an existing MBS Session, an AF shall send a Nnef\_MBSSession\_Delete request using the HTTP DELETE method and targeting the URI of the corresponding "Individual MBS Session" resource.

At the reception of this HTTP DELETE request for MBS session deletion:

- if the NEF decided to interact with the PCF during MBS Session Creation as specified in clause 4.4.29.3.2, the NEF shall also interact with the PCF to request the deletion of the corresponding MBS Application Session Context, as specified in 3GPP TS 29.537 [63]; and
- the NEF shall interact with the MB-SMF to request the deletion of the corresponding MBS Session.

Upon success, the NEF shall return a Nnef\_MBSSession\_Delete response with an HTTP "204 No Content" status code. On failure or if the NEF receives an error response from the PCF or the MB-SMF, the NEF shall take proper error handling actions, as specified in clause 5.20.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.3.5 Procedure for MBS session status subscription

This procedure is used by an AF to request to create a subscription to MBS session status event(s) reporting for a multicast or a broadcast MBS session or, for a location dependent MBS session, the part of an MBS Session within an MBS service area.

In order to request the creation of a new subscription to MBS Session status event(s) reporting, an AF shall send a Nnef\_MBSSession\_StatusSubscribe request to the NEF using the HTTP POST method and targeting the "MBS Session Subscriptions" collection resource, with the request body including the MbsSessionSubsc data structure.

On successful MBS session subscription creation, the NEF shall return a Nnef\_MBSSession\_StatusSubscribe response with an HTTP "201 Created" status code to the AF, including a "Location" header containing the URI of the created "Individual MBS Session Subscription" resource and the response body containing a representation of the created resource within the MbsSessionSubsc data structure.

On failure or if the NEF receives an error response from the MB-SMF, the NEF shall take proper error handling actions, as specified in clause 5.20.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.3.6 Procedure for MBS session status unsubscription

This procedure is used by an AF to request the deletion of an existing subscription to MBS session status event(s) reporting for a multicast or a broadcast MBS session or, for a location dependent MBS session, the part of an MBS Session within an MBS service area.

In order to request the deletion of an existing subscription to MBS Session status event(s) reporting, an AF shall send a Nnef\_MBSSession\_StatusUnsubscribe request to the NEF using the HTTP DELETE method and targeting the corresponding "Individual MBS Session Subscription" resource.

On successful deletion of the subscription, the NEF shall return a Nnef\_MBSSession\_StatusUnsubscribe response with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the MB-SMF, the NEF shall take proper error handling actions, as specified in clause 5.20.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.3.7 Procedure for MBS session status notification

This procedure is used by the NEF to send MBS session status event(s) notifications to a previously subscribed AF.

In order to send an MBS Session status event(s) notification, the NEF shall send a Nnef\_MBSSession\_StatusNotify request to the AF using the HTTP POST method and targeting the notification URI provided by the AF during the corresponding MBS session subscription creation/modification, with the request body including the MbsSessionStatusNotif data structure that shall contain:

- within the "eventList" attribute, the reported MBS session event(s) and the related information, encoded via the MbsSessionEventReportList data structure that shall contain:

- within the "eventReportList" attribute, one or several MBS session event report(s), with each one of them encoded using the MbsSessionEventReport data structure that shall contain:
  - within the "eventType" attribute, the reported MBS session status event;
  - within the "timeStamp" attribute, the time at which the event is generated, if available;
  - within the "ingressTunAddrInfo" attribute, the ingress tunnel address to use to send MBS session data over N6mb/Nmb9 interface, if the "eventType" attribute is set to "INGRESS\_TUNNEL\_ADD\_CHANGE";

and

- within the "eventList" attribute, the list of MBS session events to be reported, encoded via the MbsSessionEventReportList data structure that shall contain;
- within the "eventReportList" attribute, one or several individual MBS session event report(s), with each one of them encoded within the MbsSessionEventReport data structure that shall contain:
  - within the "broadcastDelStatus" attribute, the broadcast delivery status (e.g. whether the MBS session is STARTED or TERMINATED), if the "eventType" attribute is set to "BROADCAST\_DELIVERY\_STATUS".

Upon reception of this notification request, the AF shall acknowledge its successful reception by sending a Nnef\_MBSSession\_StatusNotify response with an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.20.7, and respond to the NEF with an appropriate error status code.

#### 4.4.29.4 Procedures for MBS Parameters Provisioning

##### 4.4.29.4.1 General

The procedures described in the clauses below are used by an AF to perform MBS parameters provisioning, in order to carry out one or more of the following procedures:

- Multicast MBS Session Authorization information provisioning as defined in clause 7.2.9 of 3GPP TS 23.247 [53].
- Multicast MBS Session Assistance Information provisioning as defined in clause 7.2.9a of 3GPP TS 23.247[53].

NOTE 1: The stage 2 Nnef\_ParameterProvision API for MBS Parameters Provisioning is implemented in stage 3 via the Nnef\_MBSSession API.

NOTE 2: An AF can perform Multicast MBS Session Authorization information provisioning and Multicast MBS Session Assistance Information provisioning simultaneously, i.e., via the same MBS Parameters Provisioning.

##### 4.4.29.4.2 Procedure for multicast MBS Session Authorization information provisioning

This procedure is used by an AF to request the creation/update/deletion of an MBS Session Authorization information provisioning for a multicast MBS group.

In order to request the creation of an MBS Parameters Provisioning for the purpose of MBS Session Authorization information provisioning for a multicast MBS group, an AF shall trigger the Nnef\_MBSSession API by sending an HTTP POST request to the NEF targeting the "MBS Parameters Provisionings" collection resource, with the request body including the MbsPpData data structure that shall contain:

- within the "afId" attribute, the identifier of the AF that is sending the request;
- within the "mbsSessAuthData" attribute, the MBS Session Authorization information data to be provisioned, encoded via the MbsSessAuthData data structure that shall contain:
  - within the "extGroupId" attribute, the external group identifier of the targeted multicast MBS Group; and

- within the "gpsisList" attribute, the list of the GPSI(s) of the member UE(s) constituting the multicast MBS group, if the multicast MBS group has not yet been created or the list of its member(s) needs to be updated; and
- within the "mbsSessionIdList" attribute, the identifier(s) of the multicast MBS Session(s) that the multicast MBS group is authorized to join;

and

- within the "suppFeat" attribute, the features supported by the AF, if applicable (i.e. feature negotiation needs to take place).

The NEF shall then check whether the AF is authorized to perform this operation or not as defined in clause 7.2.9 of 3GPP TS 23.247 [53]. If the AF is authorized, the NEF shall trigger the Nudm\_ParameterProvision service API of the UDM to request the provisioning of the received MBS Session Authorization information.

Upon success and reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17], the NEF shall respond to the AF with an HTTP "201 Created" status code including a Location header field containing the URI of the created resource, and the response body containing the MbsPpData data structure containing a representation of the created "Individual MBS Parameters Provisioning" resource.

On failure or if the NEF receives an error response from the UDM, the NEF shall take proper error handling actions, as specified in clause 5.20.7, and respond to the AF with an appropriate error status code.

In order to request the update of an existing "Individual MBS Parameters Provisioning" resource for the purpose of MBS Session Authorization information provisioning for a multicast MBS group, an AF shall trigger the Nnef\_MBSSession API by sending to the NEF either:

- an HTTP PUT request targeting the concerned "Individual MBS Parameters Provisioning" resource with the request body including the MbsPpData data structure; or
- an HTTP PATCH request targeting the concerned "Individual MBS Parameters Provisioning" resource with the request body including the MbsPpDataPatch data structure.

After authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API to request the provisioning of the received updated MBS Session Authorization information.

Upon success and reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17], the NEF shall respond to the AF with an HTTP "200 OK" status code with the response body containing a representation of the updated Individual MBS Parameters Provisioning resource within the MbsPpData data structure, or an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the UDM, the NEF shall take proper error handling actions, as specified in clause 5.20.7, and respond to the AF with an appropriate error status code.

In order to request the deletion of an existing "Individual MBS Parameters Provisioning" resource for the purpose of MBS Session Authorization information provisioning for a multicast MBS group, an AF shall trigger the Nnef\_MBSSession API by sending an HTTP DELETE request targeting the concerned "Individual MBS Parameters Provisioning" resource to the NEF. After authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API to request to update accordingly the MBS Session Authorization information.

Upon success and reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17], the NEF shall respond to the AF with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the UDM, the NEF shall take proper error handling actions, as specified in clause 5.20.7, and respond to the AF with an appropriate error status code.

#### 4.4.29.4.3 Procedure for multicast MBS Session Assistance information provisioning

When the "5MBS2" feature is supported, this procedure is used by an AF to request the creation/update/deletion of an MBS Session Assistance information provisioning for multicast MBS sessions.

In order to request the creation of an MBS Parameters Provisioning for the purpose of MBS Session Assistance information provisioning for multicast MBS sessions, an AF shall trigger the Nnef\_MBSSession API by sending an

HTTP POST request to the NEF targeting the "MBS Parameters Provisionings" collection resource, with the request body including the MbsPpData data structure that shall contain:

- within the "afId" attribute, the identifier of the AF that is sending the request;
- within the "mbsSessAssistInfo" attribute, the MBS Session Assistance information to be provisioned; and
- within the "suppFeat" attribute, the features supported by the AF, which shall include the support of the "5MBS2" feature.

The NEF shall then check whether the AF is authorized to perform this operation or not, as defined in clause 7.2.9a of 3GPP TS 23.247 [53]. If the AF is authorized, the NEF shall trigger the Nudm\_ParameterProvision service API of the UDM to request the provisioning of the received MBS Session Assistance information.

Upon success and reception of a successful response from the UDM, as defined in 3GPP TS 29.503 [17], the NEF shall respond to the AF with an HTTP "201 Created" status code including an HTTP Location header field containing the URI of the created resource, and the response body containing the representation of the created "Individual MBS Parameters Provisioning" resource within the MbsPpData data structure.

On failure and/or if the NEF receives an error response from the UDM, the NEF shall take proper error handling actions, as specified in clause 5.20.7, and respond to the AF with an appropriate error status code.

In order to request the update or deletion of an existing "Individual MBS Parameters Provisioning" resource for the purpose of MBS Session Assistance information provisioning/update/deletion for multicast MBS sessions, an AF shall trigger the Nnef\_MBSSession API by reusing the same update/deletion procedures defined in clause 4.4.29.4.2.

## 4.4.29.5 Procedures for MBS User Service management

### 4.4.29.5.1 General

The procedures described in the clauses below are used by an external/untrusted AF (e.g. MBS Application Provider that lies outside the trusted DN) to manage MBS User Services via the NEF, i.e. create, retrieve, update and delete an MBS User Service, as defined in 3GPP TS 26.502 [65].

**NOTE:** The procedures defined in the clauses below are not applicable for the MBS group message delivery feature specified in clauses 6.15 and 7.5 of 3GPP TS 23.247 [53]. For MBS group message delivery, the NEF plays the role of an AF and is hence responsible for the establishment and management of the related MBS User Service based on the received MBS group message delivery request from the AF. The NEF interacts for this purpose directly with the MBSF using the Nmbsf\_MBSUserService API defined in 3GPP TS 29.580 [66]. The detailed procedures applicable for MBS group message delivery are defined in clause 4.4.29.7.

### 4.4.29.5.2 Procedure for MBS User Service creation

This procedure is used by an AF to request the creation of a new MBS User Service at the NEF.

In order to request the creation of an MBS User Service, an AF shall send a Nnef\_MBSUserService\_Create request to the NEF using the HTTP POST method and targeting the "MBS User Services" collection resource, with the request message body including the MBSUserService data structure, as specified in clause 5.26.2.2.3.2.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the Nmbsf\_MBSUserService service API of the MBSF to request the creation of the corresponding MBS User Service at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a Nnef\_MBSUserService\_Create response with an HTTP "201 Created" status code including a "Location" header field that shall contain the URI of the created resource, and the response body containing a representation of the created "Individual MBS User Service" resource within the MBSUserService data structure, as specified in clause 5.26.2.2.3.2.

On failure or if the NEF receives an error response from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.26.7, and respond to the AF with an appropriate error status code.

#### 4.4.29.5.3 Procedure for MBS User Service retrieval

This procedure is used by an AF to request the retrieval of an existing MBS User Service at the NEF.

In order to request the retrieval of an existing MBS User Service, an AF shall send a Nnef\_MBSUserService\_Retrieve request using the HTTP GET method and targeting the URI of the concerned "Individual MBS User Service" resource, as specified in clause 5.26.2.3.3.1.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the Nmbsf\_MBSUserService service API of the MBSF to request the retrieval of the corresponding MBS User Service at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a Nnef\_MBSUserService\_Retrieve response with an HTTP "200 OK" status code and the response body containing a representation of the requested Individual MBS User Service resource within the MBSUserService data structure, as specified in clauses 5.26.2.3.3.1.

On failure or if the NEF receives an error code from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.26.7, and respond to the AF with an appropriate error status code.

#### 4.4.29.5.4 Procedure for MBS User Service update/modification

This procedure is used by an AF to request the update/modification of an existing MBS User Service at the NEF.

In order to request the update of an existing MBS User Service, an AF shall send a Nnef\_MBSUserService\_Update request using the HTTP PUT method and targeting the URI of the corresponding "Individual MBS User Service" resource, with the request body including the MBSUserService data structure, as specified in clause 5.26.2.3.3.2.

In order to request the modification of an existing MBS User Service, an AF shall send a Nnef\_MBSUserService\_Update request using the HTTP PATCH method and targeting the URI of the corresponding "Individual MBS User Service" resource, with the request body including the MBSUserServicePatch data structure, as specified in clause 5.26.2.3.3.3.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the Nmbsf\_MBSUserService service API of the MBSF to request the update/modification of the corresponding MBS User Service at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a Nnef\_MBSUserService\_Update response with an HTTP "200 OK" status code with the response body containing a representation of the updated Individual MBS User Service resource within the MBSUserService data structure, or an HTTP "204 No Content" status code, as specified in clause 5.26.2.3.3.2 or clause 5.26.2.3.3.3.

On failure or if the NEF receives an error code from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.26.7, and respond to the AF with an appropriate error status code.

#### 4.4.29.5.5 Procedure for MBS User Service deletion

This procedure is used by an AF to request the deletion of an existing MBS User Service at the NEF.

In order to request the deletion of an existing MBS User Service, an AF shall send a Nnef\_MBSUserService\_Delete request using the HTTP DELETE method and targeting the URI of the concerned "Individual MBS User Service" resource, as specified in clause 5.26.2.3.3.4.

NOTE: The Nnef\_MBSUserService\_Delete service operation corresponds to the stage 2 Nnef\_MBSUserService\_Destroy service operation defined in 3GPP TS 26.502 [65].

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the Nmbsf\_MBSUserService service API of the MBSF to request the deletion of the corresponding MBS User Service at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a Nnef\_MBSUserService\_Delete response with an HTTP "204 No Content" status code, as specified in clause 5.26.2.3.3.4.

On failure or if the NEF receives an error code from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.26.7, and respond to the AF with an appropriate error status code.

#### 4.4.29.6 Procedures for MBS User Data Ingest Session management

##### 4.4.29.6.1 General

The procedures described in the clauses below are used by an external/untrusted AF (e.g. MBS Application Provider that lies outside the trusted DN) to manage an MBS User Data Ingest Session along with its subordinate MBS Distribution Session(s) via the NEF, i.e. create, retrieve, update/modify and delete an MBS User Data Ingest Session, create, retrieve, update/modify and delete an MBS User Data Ingest Session Status subscription, and manage the related MBS User Data Ingest Session Status subscriptions/notifications, as defined in 3GPP TS 26.502 [65].

**NOTE:** The procedures defined in the clauses below are not applicable for the MBS group message delivery feature specified in clauses 6.15 and 7.5 of 3GPP TS 23.247 [53]. For MBS group message delivery, the NEF plays the role of an AF and is hence responsible for the establishment and management of the related MBS User Data Ingest Session based on the received MBS group message delivery request from the AF. The NEF interacts for this purpose directly with the MBSF using the `Nmbsf_MBSUserDataIngestSession` API defined in 3GPP TS 29.580 [66]. The detailed procedures applicable for MBS group message delivery are defined in clause 4.4.29.7.

##### 4.4.29.6.2 Procedure for MBS User Data Ingest Session creation

This procedure is used by an AF to request the creation of a new MBS User Data Ingest Session at the NEF.

In order to request the creation of an MBS User Data Ingest Session, including a set of subordinate MBS Distribution Session(s), an AF shall send a `Nnef_MBSUserDataIngestSession_Create` request message to the NEF using the HTTP POST method and targeting the "MBS User Data Ingest Sessions" collection resource, with the request message body including the `MBSUserDataIngSession` data structure, as specified in clause 5.27.2.2.3.2.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the `Nmbsf_MBSUserDataIngestSession` API of the MBSF to request the creation of the corresponding MBS User Data Ingest Session at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a `Nnef_MBSUserDataIngestSession_Create` response message with an HTTP "201 Created" status code including a "Location" header field that shall contain the URI of the created resource, and the response body containing a representation of the created "Individual MBS User Data Ingest Session" resource within the `MBSUserDataIngSession` data structure, as specified in clause 5.27.2.2.3.2.

On failure or if the NEF receives an error response from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.27.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a `ProblemDetails` data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

##### 4.4.29.6.3 Procedure for MBS User Data Ingest Session retrieval

This procedure is used by an AF to request the retrieval of an existing MBS User Data Ingest Session at the NEF.

In order to request the retrieval of an existing MBS User Data Ingest Session, an AF shall send a `Nnef_MBSUserDataIngestSession_Retrieve` request message using the HTTP GET method and targeting the URI of the concerned "Individual MBS User Data Ingest Session" resource, as specified in clause 5.27.2.3.3.1.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the `Nmbsf_MBSUserDataIngestSession` service API of the MBSF to request the retrieval of the corresponding MBS User Data Ingest Session at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a `Nnef_MBSUserDataIngestSession_Retrieve` response message with an HTTP "200 OK" status code and the response body containing a representation of the requested Individual MBS User Data Ingest Session resource within the `MBSUserDataIngSession` data structure, as specified in clauses 5.27.2.3.3.1.

On failure or if the NEF receives an error code from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.27.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a ProblemDetails data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.6.4 Procedure for MBS User Data Ingest Session update/modification

This procedure is used by an AF to request the update/modification of an existing MBS User Data Ingest Session at the NEF.

In order to request the update of an existing MBS User Data Ingest Session, an AF shall send a Nnef\_MBSUserDataIngestSession\_Update request message using the HTTP PUT method and targeting the URI of the corresponding "Individual MBS User Data Ingest Session" resource, with the request body including the MBSUserDataIngestSession data structure, as specified in clause 5.27.2.3.3.2.

In order to request the modification of an existing MBS User Data Ingest Session, an AF shall send a Nnef\_MBSUserDataIngestSession\_Update request message using the HTTP PATCH method and targeting the URI of the corresponding "Individual MBS User Data Ingest Session" resource, with the request body including the MBSUserDataIngestSessionPatch data structure, as specified in clause 5.27.2.3.3.3.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the Nmbsf\_MBSUserDataIngestSession service API of the MBSF to request the update/modification of the corresponding MBS User Data Ingest Session at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a Nnef\_MBSUserDataIngestSession\_Update response message with an HTTP "200 OK" status code with the response body containing a representation of the updated Individual MBS User Data Ingest Session resource within the MBSUserDataIngestSession data structure, or an HTTP "204 No Content" status code, as specified in clause 5.27.2.3.3.2 or clause 5.27.2.3.3.3.

On failure or if the NEF receives an error code from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.27.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a ProblemDetails data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.6.5 Procedure for MBS User Data Ingest Session deletion

This procedure is used by an AF to request the deletion of an existing MBS User Data Ingest Session at the NEF.

In order to request the deletion of an existing MBS User Data Ingest Session, an AF shall send a Nnef\_MBSUserDataIngestSession\_Delete request message using the HTTP DELETE method and targeting the URI of the concerned "Individual MBS User Data Ingest Session" resource, as specified in clause 5.27.2.3.3.4.

NOTE: The Nnef\_MBSUserDataIngestSession\_Delete service operation corresponds to the stage 2 Nnef\_MBSUserDataIngestSession\_Destroy service operation defined in 3GPP TS 26.502 [65].

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the Nmbsf\_MBSUserDataIngestSession service API of the MBSF to request the deletion of the corresponding MBS User Data Ingest Session at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a Nnef\_MBSUserDataIngestSession\_Delete response message with an HTTP "204 No Content" status code, as specified in clause 5.27.2.3.3.4.

On failure or if the NEF receives an error code from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.27.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a ProblemDetails data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.6.6 Procedure for MBS User Data Ingest Session Status Subscription

This procedure is used by an AF to subscribe to MBS User Data Ingest Session status event(s) reporting at the NEF.



In order to request the creation of an MBS User Data Ingest Session Status Subscription, an AF shall send a Nnef\_MBSUserDataIngestSession\_StatusSubscribe request message to the NEF using the HTTP POST method and targeting the "MBS User Data Ingest Session Status Subscriptions" collection resource, with the request message body including the MBSUserDataIngStatSubsc data structure, as specified in clause 5.27.2.4.3.2.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the Nmbsf\_MBSUserDataIngestSession API of the MBSF to request the creation of the corresponding MBS User Data Ingest Session Status Subscription at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a Nnef\_MBSUserDataIngestSession\_StatusSubscribe response message with an HTTP "201 Created" status code including a "Location" header field that shall contain the URI of the created resource, and the response body containing a representation of the created "Individual MBS User Data Ingest Session Status Subscription" resource within the MBSUserDataIngStatSubsc data structure, as specified in clause 5.27.2.4.3.2.

On failure or if the NEF receives an error response from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.27.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a ProblemDetails data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.6.7 Procedure for MBS User Data Ingest Session Status update/modification

This procedure is used by an AF to request the update/modification of an existing MBS User Data Ingest Session Status Subscription at the NEF.

In order to request the update of an existing MBS User Data Ingest Session Status Subscription, an AF shall send a Nnef\_MBSUserDataIngestSession\_StatusSubscribeMod request message using the HTTP PUT method and targeting the URI of the corresponding "Individual MBS User Data Ingest Session Status Subscription" resource, with the request body including the MBSUserDataIngStatSubsc data structure, as specified in clause 5.27.2.5.3.2.

In order to request the modification of an existing MBS User Data Ingest Session Status Subscription, an AF shall send a Nnef\_MBSUserDataIngestSession\_StatusSubscribeMod request message using the HTTP PATCH method and targeting the URI of the corresponding "Individual MBS User Data Ingest Session Status Subscription" resource, with the request body including the MBSUserDataIngStatSubscPatch data structure, as specified in clause 5.27.2.5.3.3.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the Nmbsf\_MBSUserDataIngestSession service API of the MBSF to request the update/modification of the corresponding MBS User Data Ingest Session Status Subscription at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a Nnef\_MBSUserDataIngestSession\_StatusSubscribeMod response message with an HTTP "200 OK" status code with the response body containing a representation of the updated Individual MBS User Data Ingest Session resource within the MBSUserDataIngStatSubsc data structure, or an HTTP "204 No Content" status code, as specified in clause 5.27.2.5.3.2 or clause 5.27.2.5.3.3.

On failure or if the NEF receives an error code from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.27.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a ProblemDetails data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.6.8 Procedure for MBS User Data Ingest Session Status Unsubscription

This procedure is used by an AF to request the deletion of an existing MBS User Data Ingest Session Status Subscription at the NEF.

In order to request the deletion of an existing MBS User Data Ingest Session Status Subscription, an AF shall send a Nnef\_MBSUserDataIngestSession\_StatusUnsubscribe request message using the HTTP DELETE method and targeting the URI of the concerned Individual MBS User Data Ingest Session Stats Subscription resource, as specified in clause 5.27.2.5.3.4.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the Nmbssf\_MBSUserDataIngestSession service API of the MBSF to request the deletion of the corresponding MBS User Data Ingest Session Status Subscription at the MBSF, as specified in 3GPP TS 29.580 [66].

Upon reception of a successful response from the MBSF, as defined in 3GPP TS 29.580 [66], the NEF shall return a Nnef\_MBSUserDataIngestSession\_StatusUnsubscribe response message with an HTTP "204 No Content" status code, as specified in clause 5.27.2.5.3.4.

On failure or if the NEF receives an error code from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.27.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a ProblemDetails data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.6.9 Procedure for MBS User Data Ingest Session Status Notification

This procedure is used by the NEF to send MBS User Data Ingest Session status change notifications to a previously subscribed AF.

Upon reception of an MBS User Data Ingest Session Status Notification from the MBSF, as specified in 3GPP TS 29.580 [66], the NEF shall relay this notification to the AF by sending a Nnef\_MBSUserDataIngestSession\_StatusNotify request message to the AF using the HTTP POST method and targeting the notification URI provided by the AF during the creation of the corresponding MBS User Data Ingest Session Status Subscription, with the request body including the MBSUserDataIngStatNotif data structure, as specified in clause 5.27.4.2.3.1.

Upon successful reception of this notification request, the AF shall acknowledge its successful reception by sending a Nnef\_MBSUserDataIngestSession\_StatusNotify response message with an HTTP "204 No Content" status code, as specified in clause 5.27.4.2.3.1.

On failure, the AF shall take proper error handling actions, as specified in clause 5.27.7, and respond to the NEF with an appropriate error status code.

#### 4.4.29.7 Procedures for MBS Group Message Delivery Management

##### 4.4.29.7.1 General

The procedures described in the clauses below are used by an AF to request and manage MBS Group Message Delivery as defined in clauses 6.15 and 7.5 of 3GPP TS 23.247 [53].

##### 4.4.29.7.2 Procedure for MBS Group Message Delivery Creation

This procedure is used by an AF to request the creation of an MBS Group Message Delivery at the NEF (see also clause 7.5.1 of 3GPP TS 23.247 [53]).

In order to request the creation of an MBS Group Message Delivery, an AF shall invoke the Nnef\_MBSSGroupMsgDelivery\_Create service operation by sending an HTTP POST request message to the NEF, targeting the "MBS Group Message Deliveries" collection resource, with the request body including the MbsGroupMsgDel data structure.

The NEF shall then check whether the AF is authorized to perform this operation or not, as defined in clause 6.1.1 of 3GPP TS 23.247 [53]. If the AF is authorized, then:

- the NEF may trigger MBS User Service and MBS User Data Ingest Session provisioning towards the MBSF using the Object Distribution Method, as specified 3GPP TS 29.580 [66] (see also 3GPP TS 26.502 [65]); and
- if the AF provides the MBS Service Area in the form of geographical area(s) or civic address(es), the NEF shall translate this information into a list of TAI(s) and/or a list of cell ID(s) before sending the MBS Service Area information as part of MBS User Data Ingest Session provisioning towards the MBSF.

Upon success and/or reception of a successful response from the MBSF, the NEF shall send a Nnef\_MBSSGroupMsgDelivery\_Create response to the AF with an HTTP "201 Created" status code and the response body including the representation of the created "Individual MBS Group Message Delivery" resource within the MbsGroupMsgDel data structure.

On failure or if the NEF receives an error response from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.29.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a ProblemDetails data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.7.3 Procedure for MBS Group Message Delivery Update

This procedure is used by an AF to request the modification of an existing "Individual MBS Group Message Delivery" resource at the NEF (see also clause 7.5.2 of 3GPP TS 23.247 [53]).

In order to modify a previously submitted MBS Group Message Delivery, an AF shall invoke the Nnef\_MBSGroupMsgDelivery\_Update service operation by sending an HTTP PATCH request message to the NEF, targeting the corresponding "Individual MBS Group Message Delivery" resource, with the request body including the MbsGroupMsgDelPatch data structure.

The NEF shall then check whether the AF is authorized to perform this operation or not, as defined in clause 6.1.1 of 3GPP TS 23.247 [53]. If the AF is authorized, then:

- the NEF may further interact with the MBSF to request the modification of the associated MBS User Service and MBS User Data Ingest Session instances as specified in 3GPP TS 29.580 [66] (see also 3GPP TS 26.502 [65]); and
- if the AF provides an updated MBS Service Area and it is in the form of geographical area(s) or civic address(es), the NEF shall translate this information into a list of TAI(s) and/or a list of cell ID(s) before sending the updated MBS Service Area information as part of MBS User Data Ingest Session modification towards the MBSF.

Upon success and/or reception of a successful response from the MBSF confirming that the requested modifications were successfully performed, the NEF shall send a Nnef\_MBSGroupMsgDelivery\_Update response to the AF with either:

- an HTTP "200 OK" status code with the response body containing the updated representation of the "Individual MBS Group Message Delivery" resource within the MbsGroupMsgDel data structure; or
- an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.29.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a ProblemDetails data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.7.4 Procedure for MBS Group Message Delivery Deletion

This procedure is used by an AF to request the deletion of an existing "Individual MBS Group Message Delivery" resource at the NEF (see also clause 7.5.3 of 3GPP TS 23.247 [53]).

In order to delete a previously submitted MBS Group Message Delivery, an AF shall invoke the Nnef\_MBSGroupMsgDelivery\_Delete service operation by sending an HTTP DELETE request message to the NEF, targeting the corresponding "Individual MBS Group Message Delivery" resource.

The NEF shall then check whether the AF is authorized to perform this operation or not, as defined in clause 6.1.1 of 3GPP TS 23.247 [53]. If the AF is authorized, the NEF may further interact with the MBSF to request the deletion of the associated MBS User Service and MBS User Data Ingest Session instances as specified in 3GPP TS 29.580 [66] (see also 3GPP TS 26.502 [65]).

**NOTE:** When the Nnef\_MBSGroupMsgDelivery\_Delete request is received before the corresponding MBS Group Message is delivered or before the status of the corresponding MBS Group Message Delivery is received, then this indicates the revocation of the previously submitted MBS Group Message.

Upon success and/or reception of a successful response from the MBSF, the NEF shall send a Nnef\_MBSGroupMsgDelivery\_Delete response to the AF with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the MBSF, the NEF shall take proper error handling actions, as specified in clause 5.29.7, and respond to the AF with an appropriate error status code. If the NEF received within an

error response a ProblemDetails data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.29.7.5 Procedure for MBS Group Message Delivery Status Notification

This procedure is used by the NEF to notify a previously subscribed AF of the status of the previously submitted MBS Group Message Delivery (see also clause 7.5.1 of 3GPP TS 23.247 [53]).

In order to notify an AF of the status of a previously submitted MBS Group Message Delivery, the NEF shall invoke the Nnef\_MBSGroupMsgDelivery\_StatusNotify service operation by sending an HTTP POST request message to the AF targeting the notification URI (i.e., "{notifUri}") received during the creation/update of the corresponding MBS Group Message Delivery, as defined in clauses 4.4.29.7.2 and 4.4.29.7.3, with the request body including the MbsGroupMsgDelStatusNotif data structure.

Upon reception of this notification request and its successful processing, the AF shall send a Nnef\_MBSGroupMsgDelivery\_StatusNotify response message with an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.29.7, and respond to the NEF with an appropriate error status code.

### 4.4.30 Procedures for Data Reporting

#### 4.4.30.1 General

The procedures in this clause are used by an AF to obtain data collection and reporting information and provide Data Reports, as defined in clause 4.2 of 3GPP TS 26.531 [59] and 3GPP TS 26.532 [60].

#### 4.4.30.2 Procedure for Data Reporting Session Management

This procedure is used by an AF to request the creation/update/deletion of a Data Reporting Session in order to obtain data collection and reporting information.

In order to request the creation of a Data Reporting Session, an AF shall send a Nnef\_DataReporting\_Create request to the NEF using the HTTP POST method, targeting the "Data Reporting Sessions" collection resource with the request message body including the DataReportingSession data structure as defined in clause 5.23.2.2.3.1.

In order to read an existing Individual Data Reporting Session, an AF shall send a Nnef\_DataReporting\_Retrieve request to the NEF using the HTTP GET method, targeting the concerned "Individual Data Reporting Session" resource. If successful, the response message body contains the requested DataReportingSession data structure as defined in clause 5.23.2.3.3.1.

In order to request the update of an existing Data Reporting Session, an AF shall send a Nnef\_DataReporting\_Update request to the NEF using the HTTP PUT method, targeting the concerned "Individual Data Reporting Session" resource with the request message body including the updated resource representation within the DataReportingSession data structure as defined in clause 5.23.2.3.3.2.

In order to request the deletion of an existing Data Reporting Session, an AF shall send a Nnef\_DataReporting\_Delete request to the NEF using the HTTP DELETE method, targeting the concerned "Individual Data Reporting Session" resource as defined in clause 5.23.2.3.3.3.

At the reception of the HTTP POST GET/PUT/DELETE requests from the AF, the NEF shall trigger the necessary interaction with the DCAF as specified in 3GPP TS 26.532 [60] and:

- for an HTTP GET request, retrieve the requested "Individual Data Reporting Session" resource and respond to the AF with an HTTP "200 OK" status code;
- for an HTTP POST request, create a new "Individual Data Reporting Session" resource and respond to the AF with an HTTP "200 OK" status code including an HTTP Location header field containing the URI of the created resource and the response body including a representation of the created "Individual Data Reporting Session" resource within the DataReportingSession data structure;

- for an HTTP PUT request, update the concerned "Individual Data Reporting Session" resource and respond to the AF with an HTTP "200 OK" status code with the response body including a representation of the updated "Individual Data Reporting Session" resource within the DataReportingSession data structure; and
- for an HTTP DELETE request, delete the corresponding "Individual Data Reporting Session" resource, and respond to the AF with an HTTP "204 No Content" status code.

#### 4.4.30.3 Procedure for Data Report

This procedure is used by an AF to send collected UE Data Reports to the NEF.

In order to send a collected UE Data Report, an AF shall use the "Report" custom operation. The AF shall send for this purpose an HTTP POST request targeting the URI "{apiRoot}/3gpp-data-reporting/v1/sessions/{sessionId}/report", with the request message body including the DataReport data structure specified in 3GPP TS 26.532 [60]. Upon successful reception of the report, the NEF shall respond to the AF with an HTTP "200 OK" status code.

### 4.4.31 Procedures for Data Reporting Provisioning

#### 4.4.31.1 General

The procedures in this clause are used by an AF to supply data collection and reporting provisioning information in the form of Data Reporting Provisioning resources, as defined in clause 4.2 of 3GPP TS 26.531 [59] and 3GPP TS 26.532 [60].

#### 4.4.31.2 Procedure for Data Reporting Provisioning Session Management

This procedure is used by an AF to request the creation/deletion of a Data Reporting Provisioning Session in order to supply data collection and reporting provisioning information.

In order to request the creation of a Data Reporting Provisioning Session, an AF shall send a Nnef\_DataReportingProvisioning\_Create request to the NEF using the HTTP POST method and targeting the "Data Reporting Provisioning Sessions" collection resource, with the request message body including the DataReportingProvisioningSession data structure as defined in clause 5.24.2.2.3.1.

In order to read an existing "Individual Data Reporting Provisioning Session" resource, an AF shall send a Nnef\_DataReportingProvisioning\_Retrieve request to the NEF using the HTTP GET method and targeting the concerned "Individual Data Reporting Provisioning Session" resource, as defined in clause 5.24.2.3.3.1.

In order to request the deletion of an existing Data Reporting Provisioning Session, an AF shall send a Nnef\_DataReportingProvisioning\_Delete request to the NEF using the HTTP DELETE method and targeting the concerned "Individual Data Reporting Provisioning Session" resource as defined in clause 5.24.2.3.3.3.

At the reception of the HTTP POST/GET/DELETE request from the AF, the NEF shall trigger the necessary interactions with the DCAF as specified in 3GPP TS 26.532 [60] and:

- for an HTTP POST request, create a new "Individual Data Reporting Provisioning Session" resource and respond to the AF with an HTTP "200 OK" status code including an HTTP Location header field containing the URI of the created resource and the response body including a representation of the created "Individual Data Reporting Provisioning Session" resource within the DataReportingProvisioningSession data structure;
- for an HTTP GET request, respond to the AF with an HTTP "200 OK" status code with the response body including the representation of the requested "Individual Data Reporting Provisioning Session" resource within the DataReportingProvisioningSession data structure; and
- for an HTTP DELETE request, delete the corresponding "Individual Data Reporting Provisioning Session" resource and respond to the AF with an HTTP "204 No Content" status code.

#### 4.4.31.3 Procedure for Data Reporting Configuration management

This procedure is used by an AF to manage Data Reporting Configuration.

In order to request the creation of a Data Reporting Configuration, an AF shall send a Nnef\_DataReportingProvisioning\_CreateConfiguration request to the NEF using the HTTP POST method and targeting the "Data Reporting Configurations" collection resource, with the request message body including the DataReportingConfiguration data structure as defined in clause 5.24.2.5.3.1.

In order to read an existing Data Reporting Configuration, an AF shall send a Nnef\_DataReportingProvisioning\_RetrieveConfiguration request to the NEF using the HTTP GET method and targeting the concerned "Individual Data Reporting Configuration" resource, as defined in clause 5.24.2.4.3.1.

In order to request the update of an existing Data Reporting Configuration, an AF shall send a Nnef\_DataReportingProvisioning\_UpdateConfiguration request to the NEF using the HTTP PUT method, targeting the concerned "Individual Data Reporting Configuration" resource with the request message body including the updated resource representation within the DataReportingConfiguration data structure as defined in clause 5.24.2.5.3.3.

In order to request the modification of an existing Data Reporting Configuration, an AF shall send a Nnef\_DataReportingProvisioning\_UpdateConfiguration request to the NEF using the HTTP PATCH method and targeting the concerned "Individual Data Reporting Configuration" resource with the request message body containing the DataReportingConfigurationPatch data structure, as defined in clause 5.24.2.5.3.3A.

In order to request the deletion of an existing Data Reporting Configuration, an AF shall send a Nnef\_DataReportingProvisioning\_DeleteConfiguration request to the NEF using the HTTP DELETE method and targeting the concerned "Individual Data Reporting Configuration" resource as defined in clause 5.24.2.5.3.4.

At the reception of the HTTP POST/GET/PUT/PATCH/DELETE requests from the AF, the NEF shall trigger the necessary interactions with the DCAF as specified in 3GPP TS 26.532 [60] and:

- for an HTTP POST request, create a new "Individual Data Reporting Configuration" resource and respond to the AF with an HTTP "200 OK" status code including an HTTP Location header field containing the URI of the created resource and the response body including a representation of the created "Data Reporting Configuration" resource within the DataReportingConfiguration data structure;
- for an HTTP GET request, respond to the AF with an HTTP "200 OK" status code with the response body including the representation of the requested "Individual Data Reporting Configuration" resource within the DataReportingConfiguration data structure;
- for an HTTP PUT/PATCH request, update/modify the concerned "Individual Data Reporting Configuration" resource and respond to the AF with an HTTP "200 OK" status code with the response body including a representation of the updated/modified "Individual Data Reporting Configuration" resource within the DataReportingConfiguration data structure, or with an HTTP "204 No Content" status code; and
- for an HTTP DELETE request, delete the corresponding "Individual Data Reporting Configuration" resource and respond to the AF with an HTTP "204 No Content" status code.

## 4.4.32 Procedures for UE ID retrieval

### 4.4.32.1 General

The procedures described in the clauses below are used by an AF in order to carry out the following procedures:

- request the NEF to provide a UE ID as described in clause 4.15.10 and 4.15.10A of 3GPP TS 23.502 [2]. The UE ID retrieval procedures are used by an AF to request the NEF to retrieve either:
  - the AF specific UE ID (i.e. GPSI in the form of an External Identifier);
  - the GPSI in the form of MSISDN; or
- request the NEF to provide MSISDN verification as described in clause 4.15.10B of 3GPP TS 23.502 [2];

and

- perform UE ID Mapping provisioning as defined in 3GPP TS 23.502 [2] for:
  - Ranging/SL positioning as specified in 3GPP TS 23.586 [76].

NOTE: In this release of the specification, only the Ranging/Sidelink UE ID Mapping Information between the Application Layer ID and the GPSI with 1:1 mapping is supported.

#### 4.4.32.2 Retrieve AF specific UE ID service operation

In order to retrieve AF specific UE ID information, the AF shall send an HTTP POST request message to the NEF targeting the custom operation URI "{apiRoot}/3gpp-ueid/v1/retrieve", with the request body including the UeIdReq data structure. If the feature "PortNumber" is supported, the port number associated with the UE IP address may be also included in the UeIdReq data structure.

Upon reception of the HTTP POST request message from the AF, the NEF shall check whether the AF is authorized to perform this operation or not:

- if the AF request for AF specific UE ID retrieval is not authorized, the NEF shall respond to the AF with a "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "REQUEST\_NOT\_AUTHORIZED" application error indicating the AF authorisation failure; or
- if the AF's request for AF specific UE ID retrieval is authorized, then if the DNN and/or S-NSSAI information is not available in the request, the NEF shall determine the corresponding DNN and/or S-NSSAI information based on the requesting AF Identifier, and if provided, the MTC Provider Information.

Upon success, if the port number associated with the UE IP address is received and based on configuration, the NEF may recognize that the IP address received is different from the actual private UE IP address assigned by 5GC, i.e. the UE is behind a NAT in UPF. If so, the NEF shall discover the UPF implementing NAT functionality for the UE (public) IP address via Nnrf\_NFDISCOVERY service as defined in 3GPP TS 29.510 [57] and then the NEF shall request UE's (private) IP address and IP domain (if the UE IPv4 address is provided) from the UPF by invoking the Nupf\_GetUEPrivateIPAddrAndIdentifiers\_Get service operation as defined in 3GPP TS 29.564 [61]. If the UPF has the SUPI of the UE, the UPF may directly return the SUPI to the NEF then the NEF shall skip the interaction with the BSF for SUPI retrieval. Otherwise the NEF shall then interact with the BSF using the UE address and IP domain (if the UE IPv4 address is provided), DNN and/or S-NSSAI to retrieve the session binding information of the UE by invoking the Nbsf\_Management\_Discovery service operation, as described in 3GPP TS 29.521 [9].

If the NEF receives an error response from the UPF or BSF, the NEF shall respond to the AF with a proper error status code. If the NEF received from the BSF an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error. If no SUPI matching the provided UE information is returned by the BSF, the NEF shall respond to the AF with a "404 Not Found" status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_NOT\_FOUND" application error to indicate that the requested UE address is not found.

Upon success and a SUPI is returned from either the BSF or UPF, the NEF shall then interact with UDM to retrieve the AF specific UE Identifier using the received SUPI and at least one of the Application Port ID, MTC Provider Information or AF Identifier information by invoking Nudm\_SDM\_Get service, as described in clause 5.2.2.2 of 3GPP TS 29.503 [17]. Upon success, the UDM responds to the NEF with the AF specific UE Identifier represented as an External Identifier for the UE which is uniquely associated with the Application Port ID, MTC provider Information and/or AF Identifier. The NEF shall then respond to the AF with the received information, i.e. the AF specific UE Identifier represented as an External Identifier that was received from the UDM.

If the NEF receives an error response from the UDM, the NEF shall respond to the AF with a proper error status code. If the NEF received from the UDM an error response including a "ProblemDetails" data structure with the "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error. If the UDM indicates that the requested UE Identifier is not available in the subscription data, the NEF shall respond to the AF with a "404 Not Found" error status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_ID\_NOT\_AVAILABLE" application error to indicate that the AF specific UE ID is not available.

NOTE: The combination of IP address and Port Number can be used by 5GC to derive the UE private IP address assigned by 5GC if the UE is behind a NAT deployed with NAT within UPF.

#### 4.4.32.3 Retrieve UE ID in the form of MSISDN

This procedure may be used only when the operator policy and/or local regulations allow the UE ID exposure in MSISDN format to an authenticated and authorized AF. If local regulations and/or the operator policy require user consent for the retrieval of a UE ID in the form of MSISDN, the user consent for the targeted UE shall be checked as follows, depending on whether CAPIF is used (i.e., using the RNAA functionality) or not.

- If CAPIF is not used, then the user consent is checked by the UDM at the reception of the Nudm\_SDM\_Get request from the NEF as defined further below (see step 2.d.ii).
- If CAPIF is used, then the RNAA procedure defined in clause 5.6.2.3.2 of 3GPP TS 29.222 [12] shall be used. In such case, user consent is granted prior to this procedure as defined in clause 5.6.2.3.2 of 3GPP TS 29.222 [12] and verified by the NEF based on the OAuth2.0 token received in the request from the AF.

NOTE 1: It is possible that the UDM checks the User Consent despite the RNAA-based User Consent check having already been performed.

In order to retrieve the UE ID in the form of MSISDN, the AF shall trigger the "GetMsisdn" custom operation of the Nnef\_UEId API by sending an HTTP POST request message to the NEF targeting the corresponding custom operation URI, i.e., "{apiRoot}/3gpp-ueid/v1/get-msisdn", with the request body including the MsisdnReq data structure.

Upon reception of the HTTP POST request message from the AF, the NEF shall check whether the AF is authorized to perform this operation or not.

If the AF's request for MSISDN retrieval is not authorized, the NEF shall respond to the AF with an HTTP "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "REQUEST\_NOT\_AUTHORIZED" application error indicating the AF authorization failure.

If the AF's request for MSISDN retrieval is authorized, then:

1. if the DNN and/or S-NSSAI information is not available in the request, the NEF shall determine the corresponding DNN and/or S-NSSAI information based on the requesting AF Identifier, and if provided, the MTC Provider information;
2. if the port number associated with the UE IP address is received and based on configuration, the NEF may recognize that the IP address received is different from the actual private UE IP address assigned by the 5GC, i.e., the UE is behind a NAT in a UPF, and if it is the case:
  - a. the NEF shall discover the UPF implementing the NAT functionality for the UE (public) IP address via the Nnrf\_NFDiscovery service API as defined in 3GPP TS 29.510 [57];
  - b. the NEF shall then request the UE's (private) IP address and IP domain (if the UE IP address is provided in IPv4 format) from the UPF by invoking the Nupf\_GetUEPrivateIPAddrAndIdentifiers\_Get service operation as defined in 3GPP TS 29.564 [61], and:
    - i. if the UPF has the SUPI of the UE, the UPF may directly return the SUPI to the NEF and the NEF shall skip the interaction with the BSF for SUPI retrieval; and
    - ii. otherwise, the NEF shall interact with the BSF using the UE address, IP domain (if the UE IP address is provided in IPv4 format) and DNN and/or S-NSSAI to retrieve the session binding information of the UE by invoking the Nbsf\_Management\_Discovery service operation, as defined in 3GPP TS 29.521 [9];

NOTE 2: The combination of IP address and Port Number can be used by the 5GC to derive the UE private IP address assigned by the 5GC if the UE is behind a NAT deployed with NAPT within the UPF.

- c. if no SUPI matching the provided UE information is returned by the BSF, the NEF shall respond to the AF with a "404 Not Found" status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "UE\_NOT\_FOUND" application error to indicate that the requested UE address is not found;
- d. upon success and a SUPI is returned by either the BSF or the UPF:
  - i. the NEF shall interact with the UDM to retrieve the UE ID in MSISDN format using the received SUPI and MTC Provider information or AF Identifier information by invoking the Nudm\_SDM\_Get service operation, as defined in clause 5.2.2.2 of 3GPP TS 29.503 [17]; and



ii. when user consent is required to be checked by the UDM (i.e., the RNAA framework of CAPIF is not used) as defined above, then:

- if the UDM validates that user consent is granted and upon successful processing of the request:
  - the UDM shall respond to the NEF with the requested MSISDN associated with the SUPI; and
  - the NEF shall then respond to the AF with an HTTP "200 OK" status code with the response body including the MSISDN that was received from the UDM within the MsisdnInfo data structure;

and

- if the UDM does not validate that the user consent is granted (i.e., user consent is not granted), the NEF shall reject the request and respond to the AF with an HTTP "403 Forbidden" status code with the response body including a ProblemDetails data structure containing the "cause" attribute set to the "USER\_CONSENT\_NOT\_GRANTED" application error;

and

e. on failure or if the NEF receives an error response from the UPF, BSF or UDM, the NEF shall take proper error handling actions, as specified in clause 5.25.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.32.4 UE ID Mapping Information Provisioning

This procedure is used by an AF to request the creation/update/deletion of UE ID Mapping Information provisioning.

In order to request the creation of a UE ID Mapping Information Provisioning, an AF shall trigger the UEId API by sending an HTTP POST request to the NEF targeting the "UE ID Mapping Information Provisionings" collection resource, with the request body including the UeIdMappingInfo data structure.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall trigger the Nudr\_DataRepository service API of the UDR (for Application Data) to store the received UE ID Mapping Information as specified in 3GPP TS 29.519 [23].

Upon success and reception of a successful response from the UDR as defined in 3GPP TS 29.519 [23], the NEF shall respond to the AF with an HTTP "201 Created" status code including a "Location" header field containing the URI of the created resource, and the response body containing the UeIdMappingInfo data structure containing a representation of the created "Individual UE ID Mapping Information Provisioning" resource.

On failure or if the NEF receives an error response from the UDR, the NEF shall take proper error handling actions, as specified in clause 5.25.7, and respond to the AF with an appropriate error status code.

In order to request the update of an existing "Individual UE ID Mapping Information Provisioning" resource, an AF shall trigger the UEId API by sending to the NEF either:

- an HTTP PUT request targeting the concerned "Individual UE ID Mapping Information Provisioning" resource with the request body including the UeIdMappingInfo data structure; or
- an HTTP PATCH request targeting the concerned "Individual UE ID Mapping Information Provisioning" resource with the request body including the UeIdMappingInfoPatch data structure.

After authorizing the request, the NEF shall interact with the UDR via the Nudr\_DataRepository service API of the UDR (for Application Data) to store the received updated UE ID Mapping Information as specified in 3GPP TS 29.519 [23].

Upon success and reception of a successful response from the UDR as defined in 3GPP TS 29.519 [23], the NEF shall respond to the AF with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual UE ID Mapping Information Provisioning" resource within the UeIdMappingInfo data structure; or
- an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the UDR, the NEF shall take proper error handling actions, as specified in clause 5.25.7, and respond to the AF with an appropriate error status code.

In order to request the deletion of an existing "Individual UE ID Mapping Information Provisioning" resource, an AF shall trigger the UEId API by sending an HTTP DELETE request targeting the corresponding "Individual UE ID Mapping Information Provisioning" resource to the NEF. After authorizing the request, the NEF shall interact with the UDR via the Nudr\_DataRepository service API of the UDR (for Application Data) to request to update accordingly the UE ID Mapping Information as specified in 3GPP TS 29.519 [23].

Upon success and reception of a successful response from the UDR as defined in 3GPP TS 29.519 [23], the NEF shall respond to the AF with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the UDR, the NEF shall take proper error handling actions, as specified in clause 5.25.7, and respond to the AF with an appropriate error status code.

#### 4.4.32.5 Verify UE ID in the form of MSISDN

This procedure may be used only when the operator policy and/or local regulations allow an authenticated and authorized AF to perform MSISDN verification.

In order to request MSISDN verification (i.e., whether a given MSISDN matches the concerned UE's MSISDN retrieved from UDM) to the NEF, the AF shall send an HTTP POST request message to the NEF targeting the URI of the corresponding custom operation (i.e., "VerifyMsisdn"), with the request body including the MsisdnVerifReq data structure.

Upon reception of the HTTP POST request message from the AF, the NEF shall check whether the AF is authorized to perform this operation or not:

- if the AF's request for MSISDN verification is not authorized, the NEF shall respond to the AF with a "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "REQUEST\_NOT\_AUTHORIZED" application error indicating the AF authorization failure; or
- if the AF's request for MSISDN verification is authorized, then the NEF shall follow the same procedure as specified in clause 4.4.32.3 with the following differences:
  - instead of returning the MSISDN it retrieved from the UDM to the AF, it only compares the MSISDN it retrieved from the UDM with the MSISDN the AF provided in the request; and
  - returns to the AF the comparison result (i.e., match or not match) within the MsisdnVerifResp data structure.

### 4.4.33 Procedures for Media Streaming Event Exposure

#### 4.4.33.1 General

The procedures described in the clauses below are used by an external/untrusted event consumer AF to subscribe, update and delete a subscription to Media Streaming Exposure event(s) reporting via the NEF, also for a data collection AF to notify the observed Media Streaming event(s) which has been subscribed, as defined in 3GPP TS 26.512 [67].

#### 4.4.33.2 Procedure for Media Streaming Event Exposure Subscription Creation

This procedure is used by an event consumer AF to subscribe to at least one Media Streaming Exposure event at the NEF.

In order to subscribe to at least one Media Streaming Exposure event, an event consumer AF shall send a Nnef\_MSEventExposure\_Subscribe request message to the NEF using the HTTP POST method and targeting the "Media Streaming Event Exposure Subscriptions" collection resource, with the request message body including the AfEventExposureSubsc data structure, as specified in clause 5.28.2.2.3.2.

The NEF shall then check whether the event consumer AF is authorized to perform this operation or not. If the event consumer AF is authorized, the NEF shall then trigger the Naf\_EventExposure API of the data collection AF to request the creation of the corresponding Application Event Subscriptions at the AF, as specified in 3GPP TS 29.517 [58].

Upon reception of a successful response from the data collection AF, as defined in 3GPP TS 29.517 [58], the NEF shall return a Nnef\_MSEventExposure\_Subscribe response message with an HTTP "201 Created" status code including a "Location" header field that shall contain the URI of the created resource, i.e. "{apiRoot}/3gpp-ms-event-exposure/v1/subscriptions/{subscriptionId}", and the response body containing a representation of the created "Individual Media Streaming Event Exposure Subscription" resource within the AfEventExposureSubsc data structure, as specified in clause 5.28.2.2.3.2.

On failure or if the NEF receives an error response from the data collection AF, the NEF shall take proper error handling actions, as specified in clause 5.28.7, and respond to the event consumer AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.33.3 Procedure for Media Streaming Event Exposure Subscription Update

This procedure is used by an event consumer AF to update an existing Media Streaming Event Exposure Subscription at the NEF.

In order to update an existing Media Streaming Event Exposure Subscription, the event consumer AF shall send a Nnef\_MSEventExposure\_Subscribe request message to the NEF using the HTTP PUT method and targeting the "Individual Media Streaming Event Exposure Subscription" resource, with the request message body including the AfEventExposureSubsc data structure, as specified in clause 5.28.2.3.3.2.

The NEF shall then check whether the event consumer AF is authorized to perform this operation or not. If the event consumer AF is authorized, the NEF shall then trigger the Naf\_EventExposure API of the data collection AF to request the update of the corresponding Individual Application Event Subscription at the AF, as specified in 3GPP TS 29.517 [58].

Upon reception of a successful response from the data collection AF, as defined in 3GPP TS 29.517 [58], the NEF shall return a Nnef\_MSEventExposure\_Subscribe response message with an HTTP "200 OK" status code with the AfEventExposureSubsc data structure or "204 No Content" status code, as specified in clause 5.28.2.3.3.2.

On failure or if the NEF receives an error response from the data collection AF, the NEF shall take proper error handling actions, as specified in clause 5.28.7, and respond to the event consumer AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.33.4 Procedure for Media Streaming Event Exposure Unsubscription

This procedure is used by an event consumer AF to request the deletion of an existing Media Streaming Event Exposure Subscription at the NEF.

In order to request the deletion of an existing Media Streaming Event Exposure Subscription, an event consumer AF shall send a Nnef\_MSEventExposure\_Unsubscribe request message using the HTTP DELETE method and targeting the URI of the concerned "Individual Media Streaming Event Exposure Subscription" resource.

The NEF shall then check whether the event consumer AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then trigger the Naf\_EventExposure service API of the data collection AF to request the deletion of the corresponding Application Event Subscription at the AF, as specified in 3GPP TS 29.517 [58].

Upon reception of a successful response from the data collection AF, as defined in 3GPP TS 29.517 [58], the NEF shall return a Nnef\_MSEventExposure\_Unsubscribe response message with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error code from the data collection AF, the NEF shall take proper error handling actions, as specified in clause 5.28.7, and respond to the event consumer AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.33.5 Procedure for Media Streaming Event Exposure Notification

This procedure is used by the NEF to send a Media Streaming Event Exposure notification to a previously subscribed event consumer AF.

In order to send a Media Streaming Event Exposure notification, the NEF shall send a Nnef\_MSEventExposure\_Notify request message to the AF using the HTTP POST method and targeting the notification URI provided during the creation/update of the corresponding subscription, with the request body including the AfEventExposureNotif data structure as specified in clause 5.28.4.2.3.1.

Upon success, the event consumer AF shall send a Nnef\_MSEventExposure\_Notify response message with an HTTP "204 No Content" status code.

On failure, the event consumer AF shall take proper error handling actions, as specified in clause 5.28.7, and respond to the NEF with an appropriate error status code.

### 4.4.34 Procedures for DNAI Mapping

#### 4.4.34.1 General

The procedures are used by AF to create or delete subscription(s) of DNAI Mapping information to NEF and also by NEF to notify NF consumer about the update of the DNAI Mapping information as defined in clause 5.2.6.34 of 3GPP TS 23.502 [2]

#### 4.4.34.2 Creation of a new subscription for DNAI Mapping

In order to create a new subscription for DNAI Mapping for a given AF, the AF shall initiate an HTTP POST request to the NEF for the "DNAI Mapping Subscriptions" resource. The HTTP POST request message body shall include the DnaiMapSub data structure that shall include:

- a notification URI within the "notifUri" attribute and a notification correlation identifier within the "notifCorrId" attribute;
- either the FQDN(s) of the EAS(s) in the Local part of the DN as the "fqdns" attribute or the EAS(s) IP Address(es) in the Local part of the DN within the "easIpAddr" attribute;

and may include:

- a DNN as "dnn" attribute;
- an S-NSSAI as "snssai" attribute;
- event reporting requirements as "eventReq" attribute.

Upon receipt of the corresponding HTTP POST message, if the AF is authorized by the NEF to obtain the DNAI mapping information, the NEF may interact with the UDR by invoking the Nudr\_DataRepository service as described in 3GPP TS 29.504 [20]. If the NEF receives an error response from the UDR, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

On successful DNAI Mapping subscription creation, the NEF shall return an HTTP POST response with an HTTP "201 Created" status code to the AF, including a "Location" header containing the URI of the created "Individual DNAI Mapping Subscription" resource and the response body containing a representation of the created resource within the DnaiMapSub data structure. If one-time reporting is not requested and the subscription can be expired based on the operator's policy, an expiry time shall be included within the "monDur" attribute of the ReportingInformation in the DnaiMapSub data structure. If immediate reporting is requested, the currently available DNAI Mapping information shall be included within the "immReports" attribute of the DnaiMapSub data structure.

On failure, the NEF shall take proper error handling actions, as specified in clause 5.30.7, and respond to the AF with an appropriate error status code.

#### 4.4.34.3 Deletion of an existing individual DNAI Mapping subscription

In order to delete an existing DNAI Mapping subscription, the AF shall send an HTTP DELETE request message and targeting the corresponding "Individual DNAI Mapping Subscription" resource.

On successful deletion of the subscription, the NEF shall return an HTTP DELETE response with an HTTP "204 No Content" status code.

On failure, the NEF shall take proper error handling actions, as specified in clause 5.30.7, and respond to the AF with an appropriate error status code.

#### 4.4.34.4 Notification for updated DNAI Mapping information

This procedure is used by the NEF to send DNAI Mapping information update notifications to a previously subscribed AF.

When the NEF receives the notification of the updated DNAI Mapping information from the UDR as described in 3GPP TS 29.504 [20], the NEF shall provide a notification by sending an HTTP POST request message to the AF with the request body including the DnaiMapUpdateNotif data structure and targeting the notification URI provided by the AF during the corresponding DNAI mapping subscription.

Upon reception of this notification request, the AF shall acknowledge its successful reception by sending a HTTP POST response message with an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.30.7, and respond to the NEF with an appropriate error status code.

### 4.4.35 Procedures for negotiation of planned data transfer with QoS requirements

These procedures are used by an AF to perform negotiation of a viable time window for the planned application data transfer via the support of the NEF.

In order to create a resource for the PDTQ policy, the AF shall send an HTTP POST message to the NEF for the "PDTQ Policy Subscriptions" resource to negotiate the PDTQ policy. The body of the HTTP POST message shall include the ASP Identifier, Number of UEs, the list of Desired Time Windows, QoS reference or individual QoS parameters and optionally network area information, application identifier and Alternative Service Requirements. The AF may also include a notification URI and a request to enable the PDTQ warning notification during the planned data transfer policy negotiation.

After receiving the HTTP POST message, if the AF is authorized, the NEF may map the information received from the AF (e.g. QoS reference and network area information) based on local policies and negotiate the PDTQ policy with the PCF as described in 3GPP TS 29.543 [68]. After receiving the response including the determined PDTQ policies from the PCF, the NEF shall create an "Individual PDTQ Policy Subscription" resource which represents the PDTQ Subscription, addressed by an URI that contains the AF identifier and a NEF-created "Individual PDTQ Policy Subscription" resource identifier, and shall respond to the AF with a 201 Created message, including a Location header field containing the URI for the created resource and a message body, which shall also include a PDTQ Reference ID and a set of PDTQ policies. The AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this PDTQ Policy Subscription. If the NEF receives a response with an error code from the PCF, the NEF shall not create the resource and shall respond to the AF with a corresponding failure code as described in clause 5.31.5.

If more than one policy is included in the HTTP response, the AF shall send an HTTP PATCH message to inform the NEF for the "Individual PDTQ Policy Subscription" resource of the PDTQ policy selected by the AF. The AF may also send an HTTP PATCH to request to disable/enable the PDTQ warning notification at any moment.

After receiving the HTTP PATCH message, the NEF shall send an HTTP response to the AF with a "200 OK" status code and shall include the Pdtq data type in the response body, or with a "204 No Content" status code, then the NEF shall interact with the PCF as defined in 3GPP TS 29.543 [68]. If the NEF identifies any error (e.g. selected policy is not within the set of PDTQ policies), the NEF shall not update the resource and shall respond to the AF with a corresponding failure code as described in clause 5.31.5.

When the NEF receives the PDTQ warning notification from the PCF as defined in clause 5.2.2.4.2 of 3GPP TS 29.543 [68] and the "warnNotifEnabled" attribute was set to true, the NEF shall send an HTTP POST message including the Notification data structure to the AF identified by the notification destination URI received during the planned data transfer policy negotiation. The AF shall respond with an HTTP response to confirm the received notification and even if only one candidate PDTQ policy was provided within the PDTQ warning notification, the AF shall send the HTTP PATCH message with the "selectedPolicy" attribute to the NEF. The "selectedPolicy" attribute shall contain the identifier of the selected candidate PDTQ policy or, otherwise value "0" indicating no PDTQ policy is accepted by the AF. The AF may also request to disable/enable the PDTQ warning notification by including the "warnNotifEnabled" attribute in the HTTP PATCH message.

The AF may also send an HTTP DELETE message to the NEF for the "Individual PDTQ Policy Subscription" resource requesting to remove an individual resource identified by the URI received in the response to the request that has created resource a URI. After receiving such request, the NEF shall delete the resource and send an HTTP response to the AF with a corresponding status code. The NEF shall request to disable the PDTQ warning notification by including the "warnNotifEnabled" attribute in the HTTP PATCH message towards PCF as described in 3GPP TS 29.543 [68].

NOTE: The NEF can also remove the resource when the last window end time in PDTQ policies expires.

## 4.4.36 Procedures for Member UE Selection Assistance

### 4.4.36.1 General

The procedures described in the clauses below are used by an AF to subscribe, update and delete a subscription to Member UE selection assistance via the NEF, also for the NEF to notify the AF about the member UE selection assistance which has been subscribed.

### 4.4.36.2 Procedure for Member UE Selection Assistance Subscription Creation

In order to subscribe to receive the Member UE selection assistance, the AF shall send an HTTP POST request message to the NEF targeting the "Member UE Selection Assistance Subscriptions" collection resource, with the request message body including the MemUeSelectAssistSubsc data structure, as specified in clause 5.32.5.2.2.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized and based on the Member UE filtering criteria(s) provided by the AF, the NEF shall then interact with the corresponding different 5GC NFs via the services offered by the 5GC NFs.

Upon reception of a successful response from the 5GC NF, the NEF shall respond to the AF with a "201 Created" status code including a "Location" header field that shall contain the URI of the created resource, i.e. "{apiRoot}/3gpp-musa/<apiVersion>/{afId}/subscriptions/{subscriptionId}", and the response body containing a representation of the created "Individual Member UE Selection Assistance Subscription" resource within the MemUeSelectAssistSubsc data structure.

On failure or if the NEF receives an error response from the 5GC NF, the NEF shall take proper error handling actions, as specified in clause 5.32.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

### 4.4.36.3 Procedure for Member UE Selection Assistance Subscription Update

In order to update an existing Individual Member UE Selection Assistance Subscription, the AF shall send an HTTP PUT or PATCH request message to the NEF targeting the "Individual Member UE Selection Assistance Subscription" resource, with the request message body including respectively the MemUeSelectAssistSubsc or MemUeSelectAssistSubscPatch data structure as specified in clauses 5.32.5.2.2 and 5.32.5.2.15.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized and based on the Member UE filtering criteria(s) provided by the AF, the NEF shall then interact with the corresponding different 5GC NFs via the services offered by the 5GC NFs.

Upon reception of a successful response from the 5GC NF, the NEF shall respond to the AF with a "200 OK" status code with the MemUeSelectAssistSubsc data structure or "204 No Content" status code.

On failure or if the NEF receives an error response from the 5GC NF, the NEF shall take proper error handling actions, as specified in clause 5.32.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.36.4 Procedure for Member UE Selection Assistance Subscription Unsubscription

In order to request the deletion of an existing Individual Member UE Selection Assistance Subscription, the AF shall send an HTTP DELETE request message targeting the URI of the concerned "Individual Member UE Selection Assistance Subscription" resource.

The NEF shall then check whether the AF is authorized to perform this operation or not. If the AF is authorized, the NEF shall then unsubscribe from the different 5GC NFs to stop collecting the UE list.

Upon reception of a successful response from the 5GC NF, the NEF shall respond to the AF with a HTTP "204 No Content" status code.

On failure or if the NEF receives an error code from the 5GC AF, the NEF shall take proper error handling actions, as specified in clause 5.32.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.36.5 Procedure for Member UE Selection Assistance Notification

In order to send a Member UE Selection Assistance notification, the NEF shall send the HTTP POST request message to the AF using and targeting the notification URI provided during the creation/update of the corresponding subscription, with the request body including the MemUeSeletAssistNotif data structure as specified in clause 5.32.5.2.3.

The NEF consolidates all the information collected from other 5GC NFs to derive one or more list(s) of candidate UEs based on the Member UE filtering criterias which were provided by the AF.

Upon success, the AF shall send a HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.32.7, and respond to the NEF with an appropriate error status code.

### 4.4.37 Procedures for Group Parameters Provisioning

#### 4.4.37.1 General

The procedures described in the clauses below are used by an AF to interact with the 5GC for Group Parameters Provisioning, in order to carry out the following procedures:

- DNN and S-NSSAI specific Group Parameters Provisioning procedures (see clause 4.15.6.3e of 3GPP TS 23.502 [2]).

#### 4.4.37.2 Procedures for DNN and S-NSSAI specific Group Parameters Provisioning

This procedure is used by an AF to request the creation/update/deletion of a DNN and S-NSSAI specific Group Parameters Provisioning.

In order to request the creation of a DNN and S-NSSAI specific Group Parameters Provisioning:

- the AF shall trigger the GroupParametersProvisioning API by sending an HTTP POST request to the NEF targeting the "Group Parameters Provisionings" collection resource, with the request body including the GrpPpData data structure that shall contain:
  - within the "afId" attribute, the identifier of the AF that is sending the request;
  - within the "dnnSnssaiGrpData" attribute, the DNN and S-NSSAI specific Group parameters data that is to be provisioned; and

- within the "suppFeat" attribute, the features supported by the AF, if applicable (i.e., feature negotiation needs to take place);
- the NEF shall then check whether the AF is authorized to perform this operation or not;
- if the AF is authorized:
  - if the LADN Service Area is provided by the AF within the "dnnSnssaiGrpData" attribute (via the "ladnServArea" attribute) and in the form of a list of geographic area(s) or a list of civic address(es), the NEF shall translate this information into a list of TAI(s); and
  - the NEF shall then trigger the Nudm\_ParameterProvision service API of the UDM to request the provisioning of the received DNN and S-NSSAI Group specific parameters data as specified in 3GPP TS 29.503 [17];

and

- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with an HTTP "201 Created" status code including an HTTP "Location" header field containing the URI of the created resource, and the response body including a representation of the created "Individual Group Parameters Provisioning" resource within the GrpPpData data structure.

In order to request the update of an existing DNN and S-NSSAI specific Group Parameters Provisioning:

- the AF shall trigger the GroupParametersProvisioning API by sending to the NEF either:
  - an HTTP PUT request targeting the corresponding "Individual Group Parameters Provisioning" resource with the request body including the GrpPpData data structure; or
  - an HTTP PATCH request targeting the corresponding "Individual Group Parameters Provisioning" resource with the request body including the GrpPpDataPatch data structure;
- after authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API to request the provisioning of the received updated DNN and S-NSSAI specific Group parameters data; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with either:
  - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Group Parameters Provisioning" resource within the GrpPpData data structure; or
  - an HTTP "204 No Content" status code.

In order to request the deletion of an existing DNN and S-NSSAI specific Group Parameters Provisioning:

- the AF shall trigger the GroupParametersProvisioning API by sending an HTTP DELETE request targeting the corresponding "Individual Group Parameters Provisioning" resource to the NEF;
- after authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API as defined in 3GPP TS 29.503 [17] to request the deletion of the corresponding DNN and S-NSSAI specific Group parameters data; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the UDM, the NEF shall take proper error handling actions, as specified in clause 5.33.7, and respond to the AF with an appropriate error status code.

## 4.4.38 Procedures for Network Slice Parameters Provisioning

### 4.4.38.1 General

The procedures described in the clauses below are used by an AF to interact with the 5GC for Network Slice Parameters Provisioning, in order to carry out one or more of the following procedures:



- Network Slice Usage Control parameters provisioning procedures (see clause 4.15.6.3g of 3GPP TS 23.502 [2]).

In order to request the creation of a Network Slice Parameters Provisioning:

- the AF shall trigger the SliceParamProvision API by sending an HTTP POST request to the NEF targeting the "Slice Parameters Provisionings" collection resource, with the request body including the SlicePpData data structure that shall include:
  - within the "afId" attribute, the identifier of the AF that is sending the request; and
  - within the "suppFeat" attribute, the features supported by the AF, if applicable (i.e., feature negotiation needs to take place);
- the NEF shall then check whether the AF is authorized to perform this operation or not;
- if the AF is authorized, the NEF shall trigger the Nudm\_ParameterProvision service API of the UDM to request the provisioning of the received Network Slice Parameters Provisioning data as specified in 3GPP TS 29.503 [17]; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with an HTTP "201 Created" status code including an HTTP "Location" header field containing the URI of the created resource, and the response body including a representation of the created "Individual Slice Parameters Provisioning" resource within the SlicePpData data structure.

In order to request the update of an existing "Individual Slice Parameters Provisioning" resource:

- the AF shall trigger the SliceParamProvision API by sending to the NEF either:
  - an HTTP PUT request targeting the corresponding "Individual Slice Parameters Provisioning" resource with the request body including the updated representation of the resource within the SlicePpData data structure; or
  - an HTTP PATCH request targeting the corresponding "Individual Slice Parameters Provisioning" resource with the request body including the requested modifications to the resource within the SlicePpDataPatch data structure;
- after authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API to request the provisioning of the received updated Network Slice parameters provisioning data; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with either:
  - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Slice Parameters Provisioning" resource within the SlicePpData data structure; or
  - an HTTP "204 No Content" status code.

In order to request the deletion of an existing "Individual Slice Parameters Provisioning" resource:

- the AF shall trigger the SliceParamProvision API by sending an HTTP DELETE request targeting the corresponding "Individual Slice Parameters Provisioning" resource to the NEF;
- after authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API as defined in 3GPP TS 29.503 [17] to request the deletion of the corresponding Network Slice parameters provisioning data; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the UDM, the NEF shall take proper error handling actions, as specified in clause 5.34.7, and respond to the AF with an appropriate error status code.

#### 4.4.38.2 Procedures for Network Slice Usage Control Parameters Provisioning

This procedure is used by an AF to request Network Slice Usage Control parameters provisioning by reusing the procedures defined in clause 4.4.38.1 with the following differences:

- during the creation of the Network Slice Parameters Provisioning or update of the Network Slice Parameters Provisioning using HTTP PUT, the SlicePpData data structure shall include:
  - within the "sliceUsgCtrlData" attribute, the Network Slice Usage Control parameters data that is to be provisioned;

and

- during the modification of the Network Slice Parameters Provisioning using HTTP PATCH, the SlicePpDataPatch data structure shall include:
  - within the "sliceUsgCtrlData" attribute, the requested modifications to the Network Slice Usage Control parameters data.

### 4.4.39 Procedures for UE Address Information Management

#### 4.4.39.1 General

The procedures described in the clauses below are used by an AF to manage UE Address(es) information, in order to carry out the following procedures:

- AF request to retrieve UE Address(es) information, as defined in clause 6.2.8.2.4.3 of 3GPP TS 23.288 [29].
- AF (un)subscribe to obtain NATed UE Public IP Address information reporting from NEF as defined in clause 6.2.8.2.4.5 of 3GPP TS 23.288 [29].

#### 4.4.39.2 Procedures for UE Address(es) Information Retrieval

This procedure is used by an AF to retrieve UE Address(es) information.

In order to retrieve the UE Address(es) information:

- an AF shall invoke the UEAddress API by sending an HTTP POST request to the NEF targeting the custom operation URI "{apiRoot}/3gpp-ue-address/v1/retrieve", with the request body including the UeAddressReq data structure as defined in clause 5.35.5.2.2.

Upon reception of the HTTP POST request message from the AF, the NEF shall check whether the AF is authorized to perform this operation or not:

- if the AF's request for UE Address(es) information retrieval is authorized, the NEF shall:
  - a) determine the corresponding DNN(s) and/or S-NSSAI(s) information based on the local configuration and the identifier of the requesting AF;
  - b) invoke the Nudm\_UECM\_Get service operation of the UDM to find the SMF(s) serving the PDU session(s) for the received GPSI and the determined (DNN, S-NSSAI) combination(s), as defined in clause 5.3.2.5.7 of 3GPP TS 29.503 [17]; and
  - c) upon reception of a successful response from the UDM, invoke the Nsmf\_EventExposure\_Subscribe service operation to the identified SMF(s), including the identified PDU Session ID(s) to subscribe to be notified of any changes of the allocated IP address information of the UE, as defined in clause 4.2.2 and 4.2.3 of TS 29.508 [26];
- upon reception of a successful response from the SMF as defined in 3GPP TS 29.508 [26] and successful processing of the request, the NEF shall respond to the AF with an HTTP "200 OK" status code with the response body including the requested UE Address information within the UeAddressInfo data structure.

On failure or if the NEF receives an error code from the UDM or SMF, the NEF shall take proper error handling actions, as specified in clause 5.35.7, and respond to the AF with an appropriate error status code.

#### 4.4.39.3 UE Address Subscription Creation

In order to request the creation of a UE Address Subscription, the AF shall send an HTTP POST request message to the NEF, targeting the "UE Address Subscriptions" resource, with the request body including the UeAddrSubsc data structure as defined in clause 5.35.2.2.3.3.

Upon reception of the corresponding HTTP POST message, and if the AF is authorized by the NEF to perform this operation, the NEF shall:

- determine the corresponding DNN and S-NSSAI information associated with the received requesting AF Identifier for UE NAT mapping of specific PDU Session;
- discover the UPF implementing NAT functionality by invoking Nnrf\_NFDDiscovery service as defined in 3GPP TS 29.510 [57];
- invoke the Nupf\_EventExposure\_Subscribe service operation to obtain the e.g., NATed UE public IP address and port information from the UPF as defined in 3GPP TS 29.564 [61]; and
- upon reception of a successful response from the UPF and successful processing of the request, respond to the AF with an HTTP "201 Created" status code including an HTTP "Location" header field containing the URI of the created resource, and the response body including a representation of the created "Individual UE Address Subscription" resource within the UeAddrSubsc data structure. The NEF shall include the current UE address information received from the UPF within the "immReport" attribute, if available and the "immRepInd" attribute was provided and set to "true" in the corresponding request.

On failure or if the NEF receives an error code from the NRF or UPF, the NEF shall take proper error handling actions, as specified in clause 5.35.7, and respond to the AF with an appropriate error status code.

#### 4.4.39.4 UE Address Subscription Deletion

In order to request the deletion of an existing "Individual UE Address Subscription" resource, the AF shall trigger the UEAddress API by sending an HTTP DELETE request targeting the corresponding "Individual UE Address Subscription" resource to the NEF;

After authorizing the request, the NEF shall interact with the UPF via the the Nupf\_EventExposure service API as defined in 3GPP TS 29.564 [61], if necessary, to request the deletion of the related subscription; and

Upon reception of a successful response from the UPF, if necessary, and successful processing of the request, the NEF shall respond to the AF with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error code from the UPF, the NEF shall take proper error handling actions, as specified in clause 5.35.7, and respond to the AF with an appropriate error status code.

#### 4.4.39.5 Notification for UE Address information

This procedure is used by the NEF to send UE address related event(s) notifications to a previously subscribed AF.

In order to notify a previously subscribed AF on UE Address information related event(s), the NEF shall send an HTTP POST request to the AF targeting the notification URI provided by the AF during the corresponding UE Address Subscription creation as defined in clauses 4.4.39.3, with the request body including the UeAddrNotif data structure.

Upon reception of this notification request, the AF shall acknowledge its successful reception by returning an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.35.7, and respond to the NEF with an appropriate error status code.

## 4.4.40 Procedures for ECS Address Configuration Information provisioning in roaming

### 4.4.40.1 General

The procedures are used by the AF to provide, create, update or delete ECS Address Configuration Information to the V-NEF, and for the V-NEF to authorize the AF provisioned ECS Address Configuration Information to be stored in the V-UDR.

The following procedures support:

- Create/Update/Delete the AF provisioned ECS Address Configuration Information.

### 4.4.40.2 Creation of new ECS Address Configuration Information Set

In order to create a new "Individual ECS Address Configuration Information Set" resource for a given AF, the AF shall initiate an HTTP POST request to the V-NEF for the "ECS Address Configuration Information Sets" resource. The HTTP POST request message body shall include the EcsAddrInfo data structure that shall include:

- the ECS Server Address information within the "ecsServerAddr" attribute;

and may include:

- the spatial validity condition within the "spatialValidityCond" attribute;
- the DNN within the "dnn" attribute;
- the S-NSSAI within the "snssai" attribute;
- the supported ECS authentication methods within the "ecsAuthMethods" attribute; and
- the list of PLMNs and associated ECSPs for which EDN configuration information can be provided by the ECS, within the "supportedPlmns" attribute.

NOTE 1: The V-NEF can derive HPLMN DNN and S-NSSAI information from the AF identifier, if the "dnn" and "snssai" attributes are not included in the EcsAddrInfo data structure.

NOTE 2: The provided information applies to any UE.

Upon receipt of the corresponding HTTP POST message, the V-NEF authorizes the request and if the AF was authorized by the V-NEF to provide the ECS Address Configuration Information, the V-NEF may interact with the V-UDR to create the associated ECS Address Roaming Information by using the Nudr\_DataRepository service as defined in 3GPP TS 29.519 [23]. If the request is accepted by the V-UDR and the V-UDR informs the V-NEF with a successful response or if no interaction with the UDR takes place and the V-NEF successfully handles the information locally, the V-NEF shall create a new "Individual ECS Address Configuration Information Set" resource and send an HTTP "201 Created" response with the EcsAddrInfo data structure including the contents of the created "Individual ECS Address Configuration Information Set" resource in the response body and a Location header field containing the URI of the created "Individual ECS Address Configuration Information Set" resource. If the V-NEF receives an error response from the V-UDR, the V-NEF shall not create the resource and shall respond to the AF with a proper error status code. If the V-NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the V-NEF shall relay this error response to the AF with a corresponding application error, if applicable.

### 4.4.40.3 Modification of existing ECS Address Configuration Information Set

In order to modify an existing "Individual ECS Address Configuration Information Set" resource, the AF shall initiate an HTTP PUT or PATCH request to the "Individual ECS Address Configuration Information Set" resource. In the case of HTTP PUT, the request body shall include the EcsAddrInfo data structure, which shall include the same contents as described in clause 4.4.30.2. In the case of HTTP PATCH, the request body shall include the EcsAddrInfoPatch data structure with the contents as defined in clause 5.36.5.3.4.

Upon receipt of the corresponding HTTP PUT (or PATCH) request message, the V-NEF authorizes the request and if the AF was authorized by the V-NEF to provide the ECS Address Configuration Information, the V-NEF may interact

with the V-UDR to update the associated ECS Address Roaming Data by using the Nudr\_DataRepository service as defined in 3GPP TS 29.519 [23]. If the request is accepted by the V-UDR and the V-UDR informs the V-NEF with a successful response or if no interaction with the UDR takes place and the V-NEF successfully handles the information locally, the V-NEF shall update the "Individual ECS Address Configuration Information Set" resource and send an HTTP "200 OK" response with the EcsAddrInfo data structure including the contents of the modified "Individual ECS Address Configuration Information Set" resource in the response body or an HTTP "204 No Content" response. If the V-NEF receives an error response from the V-UDR, the V-NEF shall not update the resource and shall respond to the AF with a proper error status code. If the V-NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the V-NEF shall relay this error response to the AF with a corresponding application error, if applicable.

#### 4.4.40.4 Deletion of existing Individual ECS Address Configuration Information Set

In order to delete an existing "Individual ECS Address Configuration Information Set" resource, the AF shall send an HTTP DELETE request message to the V-NEF targeting the URI of this "Individual ECS Address Configuration Information Set" resource. The V-NEF may interact with the V-UDR by invoking the Nudr\_DataRepository service as described in 3GPP TS 29.519 [23] to delete the ECS Address Roaming Data in the application data of the V-UDR.

After receiving a successful response from the V-UDR or after successful local handling, the V-NEF shall delete the "Individual ECS Address Configuration Information Set" resource and shall respond to the AF with an HTTP "204 No Content" response message.

If the V-NEF receives an error response from the V-UDR, the V-NEF shall take proper error handling actions and shall respond to the AF with a proper error status code. If the V-NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the V-NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.40.5 Deletion of ECS Address Configuration Information based on given criteria

In order to delete existing "Individual ECS Address Configuration Information Set" which match given attributes, the AF shall send an HTTP POST request with "{apiRoot}/3gpp-ecs-address/<apiVersion>/remove-ecsaddr" as URI. The POST request body shall contain an EcsAddrDeleteCriteria data structure. The EcsAddrDeleteCriteria data structure provided in the request body shall include at least one of the following:

- an AF identifier within the "afId" attribute;
- a DNN within the "dnn" attribute;
- an S-NSSAI within the "snssai" attribute; and
- ECS Address Configuration Information which, if matched, the matching entries shall be deleted, as "ecsAddrInfo".

Upon the reception of this HTTP POST request, if the AF is authorized by the V-NEF to delete the ECS Address Configuration Information, the V-NEF shall determine the "Individual ECS Address Configuration Information Set" resources that match the provided criteria and may interact with the V-UDR to delete the associated ECS Address Roaming Data by using the Nudr\_DataRepository service as defined in 3GPP TS 29.519 [23]. If the request is accepted by the V-UDR and the V-UDR informs the V-NEF with a successful response or if the V-NEF can successfully handle the deletion locally, the V-NEF shall send a HTTP "204 No Content" response. If the V-NEF receives an error code from the V-UDR, the V-NEF shall respond to the AF with a proper error status code.

### 4.4.41 Procedures for RSLPPI Parameters Provisioning

#### 4.4.41.1 General

The procedures described in the clauses below are used by an AF to interact with the 5GC for RSLPPI Parameters Provisioning, in order to carry out the following procedures:

- RSLPPI parameters provisioning procedures (see clause 4.15.6.2 of 3GPP TS 23.502 [2]).

#### 4.4.41.2 Procedures for RSLPPI Parameters Provisioning

This procedure is used by an AF to request the creation/update/deletion of a RSLPPI parameters provisioning.

In order to request the creation of a RSLPPI Parameters Provisioning:

- an AF shall trigger the RSLPPIParametersProvisioning API by sending an HTTP POST request to the NEF targeting the "RSLPPI Parameters Provisionings" collection resource, with the request body including the RslppiPpData data structure;
- the NEF shall then check whether the AF is authorized to perform this operation or not;
- if the AF is authorized:
  - the NEF shall then trigger the Nudm\_ParameterProvision service API of the UDM to request the provisioning of the received RSLPPI parameters provisioning data as specified in 3GPP TS 29.503 [17];

and

- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with an HTTP "201 Created" status code including an HTTP "Location" header field containing the URI of the created resource, and the response body including a representation of the created "Individual RSLPPI Parameters Provisioning" resource within the RslppiPpData data structure.

In order to request the update of an existing "Individual RSLPPI Parameters Provisioning" resource:

- the AF shall trigger the RSLPPIParametersProvisioning API by sending to the NEF either:
  - an HTTP PUT request targeting the corresponding "Individual RSLPPI Parameters Provisioning" resource with the request body including the RslppiPpData data structure; or
  - an HTTP PATCH request targeting the corresponding "Individual RSLPPI Parameters Provisioning" resource with the request body including the RslppiPpDataPatch data structure;
- after authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API as defined in 3GPP TS 29.503 [17] to request the provisioning of the received updated RSLPPI parameters provisioning data; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with either:
  - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual RSLPPI Parameters Provisioning" resource within the RslppiPpData data structure; or
  - an HTTP "204 No Content" status code.

In order to request the deletion of an existing "Individual RSLPPI Parameters Provisioning" resource:

- the AF shall trigger the RSLPPIParametersProvisioning API by sending an HTTP DELETE request targeting the corresponding "Individual RSLPPI Parameters Provisioning" resource to the NEF;
- after authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API as defined in 3GPP TS 29.503 [17] to request the deletion of the corresponding RSLPPI parameters provisioning data; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error code from the UDM, the NEF shall take proper error handling actions, as specified in clause 5.37.7, and respond to the AF with an appropriate error status code.

## 4.4.42 Procedures for Addressing Parameters Provisioning

### 4.4.42.1 General

The procedures described in the clauses below are used by an AF to interact with the 5GC for Addressing Parameters Provisioning, in order to carry out the following procedures:

- Static IP addressing parameters provisioning procedures (see clause 4.15.6.3i of 3GPP TS 23.502 [2]).

### 4.4.42.2 Procedures for Static IP Addressing Parameters Provisioning

This procedure is used by an AF to request the creation/update/deletion of a Static IP Addressing Parameters Provisioning.

In order to request the creation of a new Static IP Address Parameters Provisioning:

- an AF shall trigger the AddressingParamProvision API by sending an HTTP POST request to the NEF targeting the "Addressing Parameters Provisionings" collection resource, with the request body including the AddrPpData data structure;
- the NEF shall then check whether the AF is authorized to perform this operation or not;
- if the AF is authorized, then the NEF shall:
  - check whether the received static IP addressing parameters provisioning data provided by the AF is within the IP address/prefix range allowed for the AF for the target DNN and S-NSSAI;

NOTE 1: The NEF can be locally configured with data specifying the allowed IP address/prefix range per target DNN and S-NSSAI associated with an AF.

- if the received static IP addressing parameters provisioning data is not within the IP address/prefix range allowed for the AF for the target DNN and S-NSSAI, then reject the request and respond to the AF with an HTTP "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "OUT\_OF\_ALLOWED\_RANGE" application error within the "cause" attribute and skip the following steps below;
- if the received static IP addressing parameters provisioning data is within the IP address/prefix range allowed for the AF for the target DNN and S-NSSAI, trigger the Nudm\_ParameterProvision service API of the UDM to request the provisioning of the received static IP addressing parameters provisioning data as specified in 3GPP TS 29.503 [17]; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with an HTTP "201 Created" status code including an HTTP "Location" header field containing the URI of the created resource, and the response body including a representation of the created "Individual Addressing Parameters Provisioning" resource within the AddrPpData data structure.

In order to request the update of an existing "Individual Addressing Parameters Provisioning" resource:

- the AF shall trigger the AddressingParamProvision API by sending to the NEF either:
  - an HTTP PUT request targeting the corresponding "Individual Addressing Parameters Provisioning" resource with the request body including the AddrPpData data structure; or
  - an HTTP PATCH request targeting the corresponding "Individual Addressing Parameters Provisioning" resource with the request body including the AddrPpDataPatch data structure;
- after authorizing the request, the NEF shall:
  - check whether the received updated static IP addressing parameters provisioning data provided by the AF is within the IP address/prefix range allowed for the AF for the target DNN and S-NSSAI;

NOTE 2: The NEF can be locally configured with data specifying the allowed IP address/prefix range per target DNN and S-NSSAI associated with an AF.

- if the received updated static IP addressing parameters provisioning data is not within the IP address/prefix range allowed for the AF for the target DNN and S-NSSAI, then reject the request and respond to the AF with an HTTP "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "OUT\_OF\_ALLOWED\_RANGE" application error within the "cause" attribute and skip the following steps below;
- if the received static IP addressing parameters provisioning data is within the IP address/prefix range allowed for the AF for the target DNN and S-NSSAI, interact with the UDM via the the Nudm\_ParameterProvision service API as defined in 3GPP TS 29.503 [17] to request the provisioning of the received updated static IP addressing parameters provisioning data; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with either:
  - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Addressing Parameters Provisioning" resource within the AddrPpData data structure; or
  - an HTTP "204 No Content" status code.

In order to request the deletion of an existing "Individual Addressing Parameters Provisioning" resource:

- the AF shall trigger the AddressingParamProvision API by sending an HTTP DELETE request targeting the corresponding "Individual Addressing Parameters Provisioning" resource to the NEF;
- after authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API as defined in 3GPP TS 29.503 [17] to request the deletion of the corresponding static IP address parameters provisioning data; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error code from the UDM, the NEF shall take proper error handling actions, as specified in clause 5.38.7, and respond to the AF with an appropriate error status code.

## 4.4.43 Procedures for UAV Flight Assistance Service Management

### 4.4.43.1 General

The procedures described in the clauses below are used by an AF (e.g., USS AF) to perform UAV flight assistance management, in order to carry out the following procedures:

- UAV Flight Assistance Configuration management (see clause 5.13.2 of 3GPP TS 23.256 [77]);
- retrieve UAV Flight information (see also clauses 5.12.2 and 5.13.2 of 3GPP TS 23.256 [77]); and
- perform UAV's altitude reporting (see clause 5.16 of 3GPP TS 23.256 [77]).

### 4.4.43.2 Procedures for UAV Flight Assistance Configuration Management

#### 4.4.43.2.1 General

The procedures described in the clauses below are used by an AF (e.g., USS AF) to perform UAV flight assistance configuration management, in order to carry out the following procedures:

- create/update/delete a UAV Flight Assistance Configuration (see clauses 5.12.3 and 5.13.2 of 3GPP TS 23.256 [77]);
- receive UAV Flight Assistance related event(s) reporting (see clauses 5.12.3 and 5.13.2 of 3GPP TS 23.256 [77]);
- perform UAV's altitude reporting (see clause 5.16 of 3GPP TS 23.256 [77]).



#### 4.4.43.2.2 Procedure for UAV Flight Assistance Configuration Creation

In order to create a new UAV Flight Assistance Configuration, the AF shall send an HTTP POST request message to the NEF targeting the URI of the "UAV Flight Assistance Configurations" collection resource, with the request body including the UavFlightAssistance data structure as defined in clause 5.39.5.2.2.

Upon reception of the HTTP POST request, if the AF is authorized by the NEF to perform this operation, the NEF shall proceed as defined in clauses 5.12.3 and 5.13.2 of 3GPP TS 23.256 [77].

Upon successful processing of the request, the NEF shall respond with an HTTP "201 Created" status code, with the response body including a representation of the created resource within the UavFlightAssistance data structure, and an HTTP "Location" header containing the URI of the created "Individual UAV Flight Assistance Subscription" resource.

On failure or if the NEF receives an error response from the NWDAF and/or AMF, the NEF shall take proper error handling actions, as specified in clause 5.39.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.43.2.3 Procedure for UAV Flight Assistance Configuration Update

In order to update an existing UAV Flight Assistance Configuration, the AF shall send an HTTP PUT/PATCH request message targeting the URI of the corresponding "Individual UAV Flight Assistance Configuration" resource, with the request body including either:

- the UavFlightAssistance data structure as defined in clause 5.39.5.2.2, in case the HTTP PUT method is used; or
- the UavFlightAssistancePatch data structure as defined in clause 5.39.5.2.7, in case the HTTP PATCH method is used.

Upon reception of the HTTP PUT/PATCH request, if the AF is authorized by the NEF to perform this operation, the NEF shall proceed as defined in clauses 5.12.3 and 5.13.2 of 3GPP TS 23.256 [77].

Upon successful processing of the request, the NEF shall respond with either an HTTP "200 OK" status code with the response body including a representation of the updated "Individual UAV Flight Assistance Configuration" resource within the UavFlightAssistance data structure, or an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the NWDAF and/or AMF, the NEF shall take proper error handling actions, as specified in clause 5.39.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.43.2.4 Procedure for UAV Flight Assistance Configuration Deletion

In order to delete an existing UAV Flight Assistance Configuration, the AF shall send an HTTP DELETE request message targeting the URI of the corresponding "Individual UAV Flight Assistance Configuration" resource as defined in clause 5.39.2.3.3.2.

Upon reception of the HTTP DELETE request, if the AF is authorized by the NEF to perform this operation, the NEF shall proceed as defined in clause 5.13.2 of 3GPP TS 23.256 [77].

Upon successful processing of the request, the NEF shall respond with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the NWDAF and/or AMF, the NEF shall take proper error handling actions, as specified in clause 5.39.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.43.2.5 Procedure for UAV Flight Assistance Notification

This procedure is used by the NEF to notify a previously subscribed AF on UAV Flight Assistance related event(s).

In order to notify a previously subscribed AF on UAV Flight Assistance related event(s), the NEF shall send an HTTP POST request message to the AF targeting the notification URI provided during the creation/update of the

corresponding UAV Flight Assistance Configuration as defined in clauses 4.4.43.2 and 4.4.43.3, with the request body including the UAVFlightAssistNotif data structure.

Upon reception of this notification request, the AF shall acknowledge its successful reception by returning either:

- an HTTP "204 No Content" status code; or
- an HTTP "200 OK" status code with the response body including notification related information within the UAVFlightAssistNotifResp data structure.

On failure, the AF shall take proper error handling actions, as specified in clause 5.39.7, and respond to the NEF with an appropriate error status code.

### 4.4.43.3 Procedures for UAV Flight information Retrieval

#### 4.4.43.3.1 General

The procedures described in the clauses below are used by an AF (e.g., USS AF) to perform UAV Flight information management, in order to carry out the following procedures:

- retrieve UAV Flight information (see also clauses 5.12.2 and 5.13.2 of 3GPP TS 23.256 [77]); and
- retrieve UAV's altitude reporting requirements (see clause 5.16 of 3GPP TS 23.256 [77]).

#### 4.4.43.3.2 Procedures for UAV Flight information Retrieval

This procedure is used by an AF to retrieve UAV Flight information from the NEF.

In order to obtain UAV Flight information, the AF shall send an HTTP POST request to the NEF targeting the custom operation URI "{apiRoot}/3gpp-ufa/<apiVersion>/{afId}/retrieve", with the request body including the UAVFlightInfoReq data structure.

Upon reception of this HTTP POST request message, and if the AF is authorized by the NEF to retrieve the requested UAV Flight information, the NEF shall retrieve the corresponding data from the NWDAF and/or AMF.

Upon successful response from the NWDAF and/or AMF and successful processing of the request, the NEF shall return an HTTP POST response with an HTTP "200 OK" status code and the response body including the requested UAV Flight information within the UAVFlightInfoResp data structure.

On failure or if the NEF receives an error response from the NWDAF and/or AMF, the NEF shall take proper error handling actions, as specified in clause 5.39.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

### 4.4.44 Procedures for CAG Information Parameters Provisioning

#### 4.4.44.1 General

The procedures described in the clauses below are used by an AF (e.g., a CAG owner or an authorized administrator) to provision CAG information parameters, in order to carry out one or more of the following procedures:

- CAG Information parameters provisioning (see also clause 4.15.6.3h of 3GPP TS 23.502 [2]).

In order to request the creation of a CAG Information Parameters Provisioning:

- the AF shall trigger the CagInfoParamProvision API by sending an HTTP POST request to the NEF targeting the "CAG Information Parameters Provisionings" collection resource, with the request body including the CagInfoPpData data structure as defined in clause 5.40.2.2.3.2.
- the NEF shall then check whether the AF is authorized to perform this operation or not;

- if the AF is authorized, the NEF shall trigger the Nudm\_ParameterProvision service API of the UDM to request the provisioning of the received CAG Information Parameters Provisioning data as specified in 3GPP TS 29.503 [17]; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with an HTTP "201 Created" status code including an HTTP "Location" header field containing the URI of the created resource, and the response body including a representation of the created "Individual CAG Information Parameters Provisioning" resource within the CagInfoPpData data structure.

In order to request the update of an existing "Individual CAG Information Parameters Provisioning" resource:

- the AF shall trigger the CagInfoParamProvision API by sending to the NEF either:
  - an HTTP PUT request targeting the corresponding "Individual CAG Information Parameters Provisioning" resource with the request body including the updated representation of the resource within the CagInfoPpData data structure as defined in clause 5.40.2.3.3.2; or
  - an HTTP PATCH request targeting the corresponding "Individual CAG Information Parameters Provisioning" resource with the request body including the requested modifications to the resource within the CagInfoPpDataPatch data structure as defined in clause 5.40.2.3.3.3;
- after authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API to request the provisioning of the received updated CAG Information parameters provisioning data; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with either:
  - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual CAG Information Parameters Provisioning" resource within the CagInfoPpData data structure; or
  - an HTTP "204 No Content" status code.

In order to request the deletion of an existing "Individual CAG Information Parameters Provisioning" resource:

- the AF shall trigger the CagInfoParamProvision API by sending an HTTP DELETE request targeting the corresponding "Individual CAG Information Parameters Provisioning" resource to the NEF as defined in clause 5.40.2.3.3.4;
- after authorizing the request, the NEF shall interact with the UDM via the the Nudm\_ParameterProvision service API as defined in 3GPP TS 29.503 [17] to request the deletion of the corresponding CAG Information parameters provisioning data; and
- upon reception of a successful response from the UDM as defined in 3GPP TS 29.503 [17] and successful processing of the request, the NEF shall respond to the AF with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error response from the UDM, the NEF shall take proper error handling actions, as specified in clause 5.40.7, and respond to the AF with an appropriate error status code.

## 4.4.45 Void

## 4.4.46 Procedures for IMS Session Management

### 4.4.46.1 General

The procedures described in the clauses below are used by an AF to perform IMS session management, in order to carry out the following procedures:

- create/update/delete an IMS Session with standalone data channel media (see also clause 5.2.6.40 of 3GPP TS 23.502 [2]); and
- receive IMS Session related event(s) reporting (see also clause 5.2.6.40 of 3GPP TS 23.502 [2]).

NOTE: In this release of the specification, only session management for the IMS data channel is specified.

#### 4.4.46.2 Procedure for IMS session Creation

In order to request the creation of a new IMS Session with standalone data channel media, the AF shall trigger the Nnef\_ImsSessionManagement API by sending an HTTP POST request to the NEF targeting the "IMS Sessions" Collection resource, with the request body including the ImsSessionInfo data structure.

Upon reception of the HTTP POST request:

- the NEF shall check whether the AF is authorized to perform this operation;
- if the AF is authorized:
  - if needed, the NEF may interact with the HSS as specified in 3GPP TS 29.562 [80] to retrieve the IMS AS instance serving the target user, e.g., service number of the enterprise;
  - otherwise, the NEF shall interact with the serving IMS AS to create the associated IMS Session by invoking the Nimsas\_ImsSessionManagement service API of the IMS AS as specified in 3GPP TS 29.175 [78]; and
  - upon reception of a successful response from the IMS AS and successful processing of the request, the NEF shall respond to the AF with an HTTP "201 Created" status code, with the request body including a representation of the created "Individual IMS Session" resource within the ImsSession data structure, and an HTTP "Location" header containing the URI of the created resource;

and

- on failure or if the NEF receives an error response from the HSS or IMS AS, the NEF shall take proper error handling actions, as specified in clause 5.42.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.46.3 Procedure for IMS session Update

In order to update an existing IMS data channel Session, the AF shall trigger the Nnef\_ImsSessionManagement API by sending an HTTP PUT/PATCH request targeting the URI of the corresponding "Individual IMS Session" resource, with the request body including either:

- the ImsSessiondata structure, in case the HTTP PUT method is used; or
- the requested modifications to the resource, in case the HTTP PATCH method is used.

Upon reception of the corresponding HTTP PUT/PATCH request:

- the NEF shall check whether the AF is authorized to perform this operation;
- if the AF is authorized:
  - if needed, the NEF may interact with the HSS as specified in 3GPP TS 29.562 [80] to retrieve the IMS AS instance serving the target user;
  - otherwise, the NEF shall interact with the serving IMS AS to update the associated IMS Session by invoking the Nimsas\_ImsSessionManagement service API of the IMS AS as specified in 3GPP TS 29.175 [78]; and
  - upon reception of a successful response from the IMS AS and successful processing of the request, the NEF shall respond to the AF with either:
    - an HTTP "200 OK" status code with the response body including a representation of the updated "Individual IMS Session" resource within the ImsSession data structure; or
    - an HTTP "204 No Content" status code.

and

- on failure or if the NEF receives an error response from the HSS or IMS AS, the NEF shall take proper error handling actions, as specified in clause 5.42.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an

application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.46.4 Procedure for IMS session Deletion

In order to delete an existing IMS Session, the AF shall trigger the Nnef\_ImsSessionManagement API by sending an HTTP DELETE request to the NEF targeting the URI of the corresponding "Individual IMS Session" resource.

Upon reception of the HTTP DELETE request:

- the NEF shall check whether the AF is authorized to perform this operation;
- if the AF is authorized:
  - the NEF may interact with the HSS as specified in 3GPP TS 29.562 [80] to retrieve the IMS AS instance serving the target user;
  - otherwise, the NEF shall interact with the serving IMS AS to delete the associated IMS Session by invoking the Nimsas\_ImsSessionManagement service API of the IMS AS as specified in 3GPP TS 29.175 [78]; and
  - upon reception of a successful response from the IMS AS and successful processing of the request, the NEF shall respond to the AF with an HTTP "204 No Content" status code;

NOTE: If the AF has subscribed to receive notifications on the outcome of the release of an existing IMS Session, the NEF needs to wait for the release of the data channel session to notify the AF as described in clause 4.4.46.5, before responding to the AF.

and

- on failure or if the NEF receives an error response from the HSS or IMS AS, the NEF shall take proper error handling actions, as specified in clause 5.42.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.46.5 Procedure for IMS Session Notification

In order to notify a previously subscribed AF on the IMS Session related event(s), the NEF shall send an HTTP POST request message to the AF targeting the "notifUri" that was received from the AF during the creation/update of the corresponding IMS Session as defined in clauses 4.4.46.2 and 4.4.46.3, with the request body including the ImsSessionNotif data structure.

Upon reception of this notification request, the AF shall acknowledge its successful reception by returning an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.42.7, and respond to the NEF with an appropriate error status code.

### 4.4.47 Procedures for IMS Event Exposure Management

#### 4.4.47.1 General

The procedures described in the clauses below are used by an AF to perform IMS Event Exposure management, in order to carry out the following procedures:

- create/update/delete an IMS Event Exposure Subscription (see also Annex AD.3 of 3GPP TS 23.228 [79]);
- receive IMS Event Exposure related event(s) reporting (see also Annex AD.3 of 3GPP TS 23.228 [79]).

#### 4.4.47.2 Procedure for IMS Event Exposure Subscription Creation

In order to create a new IMS Event Exposure Subscription, the AF shall send an HTTP POST request message to the NEF targeting the URI of the "IMS EE Subscriptions" Collection resource, with the request message body including the `ImeEESubsc` data structure defined in clause 5.43.5.2.2.

Upon reception of the HTTP POST request, the NEF shall:

- check whether the AF is authorized to perform this operation or not;
- if the AF is authorized and upon successful processing of the request, the NEF shall respond to the AF with an HTTP "201 Created" status code, with the response body including a representation of the created "Individual IMS EE Subscription" resource within the `ImeEESubsc` data structure, and an HTTP "Location" header containing the URI of the created resource.
- then, the NEF shall:
  - for subscriber-specific IMS event(s), discover the HSS serving the given subscriber. The NEF may determine the serving HSS based on configuration or based on HSS discovery as depicted in clause AA.3.3 of 3GPP TS 23.228 [79]. Then the NEF shall interact with the HSS via the `Nhss_ImeEventExposure` service as described in 3GPP TS 29.562 [80] separately for each of the targeted subscribers; or
  - for non-subscriber specific IMS event(s), discover the IMS AS instance(s) which support monitoring of the related IMS event(s) based on configuration or via the `Nnrf_NFDDiscovery` service API as defined in 3GPP TS 29.510 [57]. Then the NEF shall interact with all the IMS AS instance(s) which support monitoring of the related IMS event(s) via the `Nimsas_ImeEventExposure` service as described in 3GPP TS 29.175 [78];

and

- on failure, the NEF shall take proper error handling actions, as specified in clause 5.43.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

If the NEF receives an error response from the IMS AS (for non-subscriber specific IMS event(s) subscription):

- the NEF may send an HTTP POST request message to the AF including the `ImeEENotif` data structure with the received all impacted IMS AS failure result within "imsFailureCause" attribute as specified in clause 5.43.5.2.3 and targeting the notification URI provided by the AF during the corresponding IMS Event(s) subscription.

If the NEF receives an error response from the HSS (for subscriber-specific IMS event(s) subscription):

- the NEF may send an HTTP POST request message to the AF including the `ImeEENotif` data structure with the list of received failure result(s) for the targeted UE(s).

Upon reception of the notification request which may include the "imsFailureCause" attribute, the AF may acknowledge its successful reception by sending a HTTP POST response message with an HTTP "204 No Content" status code.

#### 4.4.47.3 Procedure for IMS Event Exposure Subscription Update

In order to update an existing IMS Event Exposure Subscription, the AF shall send an HTTP PUT/PATCH request message to the NEF targeting the URI of the corresponding "Individual IMS EE Subscription" resource, with the request message body including either:

- the `ImeEESubsc` data structure, in case the HTTP PUT method is used; or
- the `ImeEESubscPatch` data structure, in case the HTTP PATCH method is used.

Upon reception of the HTTP PUT/PATCH request, the NEF shall:

- check whether the AF is authorized to perform this operation or not;
- if the AF is authorized and upon successful processing of the request, the NEF shall respond to the AF with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual IMS EE Subscription" resource within the `ImsEESubsc` data structure; or
- an HTTP "204 No Content" status code.
- then, interact with the corresponding HSS separately for each of the impacted subscribers or IMS AF via the relevant services offered by the HSS or IMS AS respectively; and
- on failure, take proper error handling actions, as specified in clause 5.43.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

If the NEF receives an error response from the IMS AS (for non-subscriber specific IMS event(s) subscription):

- the NEF may send an HTTP POST request message to the AF including the `ImsEENotif` data structure with the received all impacted IMS AS failure result within the "imsFailureCause" attribute as specified in clause 5.43.5.2.3 and targeting the notification URI provided by the AF during the corresponding IMS Event(s) subscription.

If the NEF receives an error response from the HSS (for subscriber-specific IMS event(s) subscription):

- the NEF may send an HTTP POST request message to the AF including the `ImsEENotif` data structure with the list of received failure result(s) for the targeted UE(s).

Upon reception of the notification request which may include the "imsFailureCause" attribute, the AF may acknowledge its successful reception by sending a HTTP POST response message with an HTTP "204 No Content" status code.

#### 4.4.47.4 Procedure for IMS Event Exposure Subscription Deletion

In order to request the deletion of an existing IMS Event Exposure Subscription, the AF shall send an HTTP DELETE request message targeting the URI of the corresponding "Individual IMS EE Subscription" resource.

Upon reception of the HTTP DELETE request, the NEF shall:

- check whether the AF is authorized to perform this operation or not;
- if the AF is authorized and upon successful processing of the request, the NEF shall:
  - unsubscribe from the related subscriptions either at the HSS separately for each targeted subscribers or at the IMS AS; and
  - respond to the AF with an HTTP "204 No Content" status code;

and

- on failure, the NEF shall take proper error handling actions, as specified in clause 5.43.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.47.5 Procedure for IMS Event Exposure Notification

In order to notify a previously subscribed AF on IMS Event Exposure related event(s), the NEF shall send an HTTP POST request message to the AF targeting the notification URI received from the AF during the creation/update of the related IMS Event Exposure Subscription as defined in clauses 4.4.47.2 and 4.4.47.3, with the request body including the `IMSEESubscNotif` data structure.

Upon reception of this notification request, the AF shall acknowledge its successful reception by returning an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.43.7, and respond to the NEF with an appropriate error status code.

Notification of error situations during the subscription creation and update are specified in clauses 4.4.47.2 and 4.4.47.3 respectively.

## 4.4.48 Procedures for IMS Parameters Provision Service

### 4.4.48.1 General

The procedures described in the clauses below are used by an AF to interact with the 5GC for IMS parameters provisioning, in order to carry out the following procedures:

- IMS related parameters provisioning (e.g., RCD properties provisioning) (see also Annex AF.4 of 3GPP TS 23.228 [79] and clause 5.2.6.41 of TS 23.502 [2]).

### 4.4.48.2 Procedures for IMS Parameters Provisioning

This procedure is used by an AF to request the creation/update/deletion of an IMS parameters provisioning.

In order to request the creation of an IMS Parameters Provisioning:

- an AF shall trigger the `ImsParamProvisioning` API by sending an HTTP POST request to the NEF targeting the "IMS Parameters Provisionings" collection resource, with the request body including the `ImsPpData` data structure;
- the NEF shall then check whether the AF is authorized to perform this operation or not;
- if the AF is authorized:
  - the NEF shall then determine the target IMS AS instance either based on the local configuration or through discovery from the NRF via the `Nnrf_NFDiscovery` service API, as defined in 3GPP TS 29.510 [57], and provisions the received parameters to the determined IMS AS instance using the `Nimsas_ImsPP_Create` service operation to request the provisioning of the received IMS parameters provisioning data as specified in 3GPP TS 29.175 [78];

and

- upon reception of a successful response from the IMS AS as defined in 3GPP TS 29.175 [78] and successful processing of the request, the NEF shall respond to the AF with an HTTP "201 Created" status code including an HTTP "Location" header field containing the URI of the created resource, and the response body including a representation of the created "Individual IMS Parameters Provisioning" resource within the `ImsPpData` data structure.

In order to request the update of an existing "Individual IMS Parameters Provisioning" resource:

- the AF shall trigger the `ImsParamProvisioning` API by sending to the NEF with an HTTP PUT request targeting the corresponding "Individual IMS Parameters Provisioning" resource with the request body including the `ImsPpData` data structure;
- after authorizing the request, the NEF shall interact with the IMS AS to request the provisioning of the received updated IMS parameters provisioning data using the `Nimsas_ImsPP_Update` service operation as defined in 3GPP TS 29.175 [78]; and
- upon reception of a successful response from the IMS AS as defined in 3GPP TS 29.175 [78] and successful processing of the request, the NEF shall respond to the AF with either:
  - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual IMS Parameters Provisioning" resource within the `ImsPpData` data structure; or
  - an HTTP "204 No Content" status code.

In order to request the deletion of an existing "Individual IMS Parameters Provisioning" resource:

- the AF shall trigger the `ImsParamProvisioning` API by sending an HTTP DELETE request targeting the corresponding "Individual IMS Parameters Provisioning" resource to the NEF;



- after authorizing the request, the NEF shall interact with the IMS AS using the Nims\_ImsPP\_Delete service operation to request the deletion of the corresponding IMS parameters provisioning data as defined in 3GPP TS 29.175 [78]; and
- upon reception of a successful response from the IMS AS as defined in 3GPP TS 29.175 [78] and successful processing of the request, the NEF shall respond to the AF with an HTTP "204 No Content" status code.

On failure or if the NEF receives an error code from the IMS AS, the NEF shall take proper error handling actions, as specified in clause 5.44.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

## 4.4.49 Procedures for AIoT Services Management

### 4.4.49.1 General

The procedures described in the clauses below are used by an AF to perform AIoT services management at the NEF, in order to carry out the following procedures:

- perform AIoT Inventory operations (see also clause 6.2.2 of 3GPP TS 23.369 [81]);
- perform AIoT Command operations (see also clause 6.2.3 of 3GPP TS 23.369 [81]);
- receive AIoT operations related event(s) reporting (see also clauses 6.2.2 and 6.2.3 of 3GPP TS 23.369 [81]).

### 4.4.49.2 Procedures for AIoT Inventory Management

This procedure is used by an AF to request to perform an AIoT Inventory operation at the NEF (see also clause 6.2.2 of 3GPP TS 23.369 [81]).

In order to perform an AIoT Inventory operation, the AF shall send an HTTP POST request to the NEF targeting the URI of the corresponding custom operation (i.e., "InventoryRequest"), with the request body including the InventoryReq data structure.

Upon reception of this HTTP POST request message, the NEF shall:

- check whether the AF is authorized perform this operation based on operator policies, local configuration information (e.g., SLA with the AF) and/or by interacting with the ADM as defined in clause 5.6 of 3GPP TS 23.369 [81];
- if the AF is not authorized, reject the request with an HTTP "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "AF\_NOT\_AUTHORIZED" application error; and
- if the AF is authorized:
  - determine the Target AIoT Area information based on the received External Target AIoT Area information;
  - follow the procedures defined in clause 6.2.2 of 3GPP TS 23.369 [81] by interacting with the selected AIOTF(s); and
  - if the NEF fails to process the AIoT Inventory request, reject the request with an HTTP "500 Internal Server Error" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "UNSPECIFIED\_FAILURE" application error.

Upon successful response from the AIOTF(s) and successful processing of the request, the NEF shall return an HTTP "200 OK" status code to the AF, with the response body including AIoT Inventory related information within the InventoryResp data structure.

On failure or if the NEF receives an error code from the ADM and/or AIOTF(s), the NEF shall take proper error handling actions, as specified in clause 5.45.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.49.3 Procedures for AIoT Command Management

This procedure is used by an AF to request to perform an AIoT Command operation to the NEF (see also clause 6.2.3 of 3GPP TS 23.369 [81]).

In order to perform an AIoT Command operation, the AF shall send an HTTP POST request to the NEF targeting the URI of the corresponding custom operation (i.e., "CommandRequest"), with the request body including the CommandReq data structure.

Upon reception of this HTTP POST request message, the NEF shall:

- check whether the AF is authorized perform this operation based on operator policies, local configuration information (e.g., SLA with the AF) and/or by interacting with the ADM as defined in clause 5.6 of 3GPP TS 23.369 [81];
- if the AF is not authorized, reject the request with an HTTP "403 Forbidden" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "AF\_NOT\_AUTHORIZED" application error; and
- if the AF is authorized:
  - determine the Target AIoT Area information based on the received External Target AIoT Area information;
  - follow the procedures defined in clause 6.2.3 of 3GPP TS 23.369 [81] by interacting with the selected AIOTF(s); and
  - if the NEF fails to process the AIoT Command request, reject the request with an HTTP "500 Internal Server Error" status code with the response body including the ProblemDetails data structure containing the "cause" attribute set to the "UNSPECIFIED\_FAILURE" application error.

Upon successful response from the AIOT and successful processing of the request, the NEF shall return an HTTP "200 OK" status code to the AF, with the response body including AIoT Command related information within the CommandResp data structure.

On failure or if the NEF receives an error code from the ADM and/or AIOTF(s), the NEF shall take proper error handling actions, as specified in clause 5.45.7, and respond to the AF with an appropriate error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.49.4 Procedures for AIoT Operations Notification

This procedure is used by the NEF to notify a previously subscribed AF on AIoT operations related event(s) (see also clauses 6.2.2 and 6.2.3 of 3GPP TS 23.369 [81]).

**NOTE:** In this release of the specification, when there are multiple AIOTF(s) involved in the AIoT Inventory or Command procedure to which the AIoT Operations Notification is related, whether the NEF performs aggregation or not is implementation specific, based on operator policies and/or SLA with the AF provider.

In order to notify a previously subscribed AF on AIoT operations related event(s), the NEF shall send an HTTP POST request message to the AF targeting the notification URI provided within the request used to trigger the corresponding AIoT service operation (e.g., Inventory, Command) as defined in clause 4.4.49.2 or clause 4.4.49.3, with the request body including the AIoTNotif data structure.

Upon reception of this notification request, the AF shall acknowledge its successful reception by returning an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.45.7, and respond to the NEF with an appropriate error status code.

## 4.4.50 Procedures for VFL Training

### 4.4.50.1 General

These procedures are used by the AF to provide, create, update, or delete VFL Training subscriptions to the NEF, which authorizes them and subscribes accordingly to an NWDAF. They are also used to provide received notifications to the AF.

### 4.4.50.2 Creation of new VFL Training subscription

In order to create a new "Individual VFL Training Subscription" resource, the AF shall initiate an HTTP POST request to the NEF for the "VFL Training Subscriptions" resource. The HTTP POST request message body shall include the VflTrainingSubs data structure with contents as described in clause 5.46.5.3.2.

Upon receipt of the corresponding HTTP POST message, the NEF authorizes the request and upon successful authorization, the NEF shall determine the internal identifier of the targetted NWDAF based on the provided external NWDAF identifier and interact with the NWDAF by using the Nnwdaf\_VFLTraining\_Subscribe service operation as defined in 3GPP TS 29.520 [27]. If the request is accepted by the NWDAF, the NEF shall create a new "Individual VFL Training Subscription" resource and send an HTTP "201 Created" response with the VflTrainingSubs data structure including the contents of the created "Individual VFL Training Subscription" resource in the response body and a Location header field containing the URI of the created "Individual VFL Training Subscription" resource. If the NEF receives an error response from the NWDAF, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, if applicable.

### 4.4.50.3 Modification of existing Individual VFL Training Subscription

In order to modify an existing "Individual VFL Training Subscription" resource, the AF shall initiate an HTTP PUT or PATCH request to the "Individual VFL Training Subscription" resource. In the case of HTTP PUT, the request body shall include the VflTrainingSubs data structure, which shall include the same contents as described in clause 5.46.5.3.2. In the case of HTTP PATCH, the request body shall include the VflTrainingSubsPatch data structure with the contents as defined in clause 5.46.5.3.3.

Upon receipt of the corresponding HTTP PUT (or PATCH) request message, the NEF authorizes the request and upon successful authorization, the NEF shall interact with the NWDAF by using the Nnwdaf\_VFLTraining\_Subscribe service operation as defined in 3GPP TS 29.520 [27]. If the request is accepted by the NWDAF, the NEF shall update the "Individual VFL Training Subscription" resource and send an HTTP "200 OK" response with the VflTrainingSubs data structure including the contents of the updated "Individual VFL Training Subscription" resource in the response body or an HTTP "204 No Content" response. If the NEF receives an error response from the NWDAF, the NEF shall not update the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, if applicable.

### 4.4.50.4 Deletion of existing Individual VFL Training Subscription

In order to delete an existing "Individual VFL Training Subscription" resource, the AF shall send an HTTP DELETE request message to the NEF targetting the URI of this "Individual VFL Training Subscription" resource. If the request is authorized, the NEF shall interact with the NWDAF using Nnwdaf\_VFLTraining\_Unsubscribe service operation as defined in 3GPP TS 29.520 [27].

After receiving a successful response from the NWDAF, the NEF shall delete the "Individual VFL Training Subscription" resource and shall respond to the AF with an HTTP "204 No Content" response message.

If the NEF receives an error response from the NWDAF, the NEF shall take proper error handling actions and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.50.5 Handling of VFL Training Notifications

Upon receiving a VFL Training notification from the NWDAF as defined in 3GPP TS 29.520 [27], the NEF shall notify the AF accordingly by performing an HTTP POST request towards the notification URI that was provided by the AF during the creation or modification of the subscription, including the VflTrainingNotify data structure in the message body.

Upon reception of this notification request, the AF shall acknowledge its successful reception by returning an HTTP "204 No Content" status code. On failure, the AF shall take proper error handling actions, as specified in clause 5.46.7, and respond to the NEF with an appropriate error status code.

### 4.4.51 Procedures for VFL Inference

#### 4.4.51.1 General

These procedures are used by the AF to provide, create, update, or delete VFL Inference subscriptions to the NEF, which authorizes them and subscribes accordingly to an NWDAF. They are also used to provide received notifications to the AF.

#### 4.4.51.2 Creation of new VFL Inference subscription

In order to create a new "Individual VFL Inference Subscription" resource, the AF shall initiate an HTTP POST request to the NEF for the "VFL Inference subscriptions" resource. The HTTP POST request message body shall include the VflInferSub data structure with contents as described in clause 5.47.5.3.2.

Upon receipt of the corresponding HTTP POST message, the NEF authorizes the request and upon successful authorization, the NEF shall determine the internal identifier of the targetted NWDAF based on the provided external NWDAF identifier and interact with the NWDAF by using the Nnwdaf\_VFLInference\_Subscribe service operation as defined in 3GPP TS 29.520 [27]. If the request is accepted by the NWDAF, the NEF shall create a new "Individual VFL Inference subscription" resource and send an HTTP "201 Created" response with the VflInferSub data structure including the contents of the created "Individual VFL Inference subscription" resource in the response body and a Location header field containing the URI of the created "Individual VFL Inference subscription" resource. If the NEF receives an error response from the NWDAF, the NEF shall not create the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, if applicable.

#### 4.4.51.3 Modification of existing Individual VFL Inference Subscription

In order to modify an existing "Individual VFL Inference subscription" resource, the AF shall initiate an HTTP PUT or PATCH request to the "Individual VFL Inference subscription" resource. In the case of HTTP PUT, the request body shall include the VflInferSub data structure, which shall include the same contents as described in clause 5.47.5.3.2. In the case of HTTP PATCH, the request body shall include the VflInferSubPatch data structure with the contents as defined in clause 5.47.5.3.3.

Upon receipt of the corresponding HTTP PUT (or PATCH) request message, the NEF authorizes the request and upon successful authorization, the NEF shall interact with the NWDAF by using the Nnwdaf\_VFLInference\_Subscribe service operation as defined in 3GPP TS 29.520 [27]. If the request is accepted by the NWDAF, the NEF shall update the "Individual VFL Inference subscription" resource and send an HTTP "200 OK" response with the VflInferSub data structure including the contents of the updated "Individual VFL Inference subscription" resource in the response body or an HTTP "204 No Content" response. If the NEF receives an error response from the NWDAF, the NEF shall not update the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, if applicable.

#### 4.4.51.4 Deletion of existing Individual VFL Inference Subscription

In order to delete an existing "Individual VFL Inference subscription" resource, the AF shall send an HTTP DELETE request message to the NEF targeting the URI of this "Individual VFL Inference subscription" resource. If the request

is authorized, the NEF shall interact with the NWDAF using NnwdaF\_VFLInference\_Unsubscribe service operation as defined in 3GPP TS 29.520 [27].

After receiving a successful response from the NWDAF, the NEF shall delete the "Individual VFL Inference subscription" resource and shall respond to the AF with an HTTP "204 No Content" response message.

If the NEF receives an error response from the NWDAF, the NEF shall take proper error handling actions and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

#### 4.4.51.5 Handling of VFL Inference Notifications

Upon receiving a VFL Inference notification from the NWDAF as defined in 3GPP TS 29.520 [27], the NEF shall notify the AF accordingly by performing an HTTP POST request towards the notification URI that was provided by the AF during the creation or modification of the subscription, including the VflInferNotif data structure in the message body.

Upon reception of this notification request, the AF shall acknowledge its successful reception by returning an HTTP "204 No Content" status code. On failure, the AF shall take proper error handling actions, as specified in clause 5.47.7, and respond to the NEF with an appropriate error status code.

### 4.4.52 Procedures for VFL NF discovery

#### 4.4.52.1 General

The procedures described in the clauses below are used by an AF to interact with the 5GC for VFL NF discovery as defined in 3GPP TS 23.288 [29], in order to carry out the following procedures:

- NWDAF discovery procedure.
- NWDAF release procedure.

#### 4.4.52.2 Procedures for NWDAF discovery

The procedures described in the clauses below are used by an AF to request the NWDAF(s) that are to act as the VFL client(s) as defined in clause 6.2H.2.1.2 of 3GPP TS 23.288 [29].

In order to request the NWDAF(s) that are to act as VFL client(s), an AF shall send a the DiscoverNwdaF custom operation to the NEF using the HTTP POST method with the request body including the NwdaFDiscoveryRequest data structure with the contents as described in clause 5.48.5.2.2.

The NEF shall then check whether the AF is authorized to perform this operation or not as defined in clause 6.2H.2.1.2 of 3GPP TS 23.288 [29]. If the AF is authorized, then the NEF:

- translates any potentially received service area from an external representation (e.g. geographical area) to an internal representation (e.g. TAI list);
- discovers the VFL client(s) by invoking the Nnrf\_NFDiscovery service as defined in 3GPP TS 29.510 [57] based on the information provided by the AF and local configurations; and
- selects the VFL client(s) based on operator policy (e.g. further takes into account the load, priority, and/or capacity of the discovered VFL client(s)).

Upon selection of the VFL client(s), for each NWDAF Instance ID, the NEF shall translate the NWDAF Instance ID to a current external NWDAF ID and store the mapping of the current external NWDAF ID and NWDAF Instance ID. The NEF then sends the the identifier(s) of selected VFL client(s) to the AF by sending a the DiscoverNwdaF custom operation using the HTTP POST method with an HTTP "200 OK" status code and the response body including the NwdaFDiscoveryResponse data structure as defined in clause 5.48.5.2.3.

On failure, the NEF shall take proper error handling actions, as specified in clause 5.48.7, and respond to the AF with an appropriate error status code.

### 4.4.52.3 Procedures for NWDAF release

The procedures described in the clauses below are used by an AF to inform the external NWDAF ID is not used anymore as defined in clause 6.2H.2.1.2 of 3GPP TS 23.288 [29].

In order to inform the external NWDAF ID(s) are not to be used anymore, an AF shall send the ReleaseNwdaf custom operation to the NEF using the HTTP POST method with the request body including the NwdafReleaseRequest data structure as defined in clause 5.48.5.2.4.

The NEF shall then remove the stored external NWDAF ID(s) and respond to the AF with an HTTP "204 No Content" status code.

On failure, the NEF shall take proper error handling actions, as specified in clause 5.48.7, and respond to the AF with an appropriate error status code.

## 5 NEF Northbound APIs

### 5.1 Introduction

The NEF Northbound APIs are a set of APIs defining the related procedures and resources for the interaction between the NEF and the AF.

Tables 5.1-1 summarizes the APIs defined in this specification.

**Table 5.1-1: API Descriptions**

| Service Name             | Clause defined | Description                                              | OpenAPI Specification File            | API Name                        | Annex |
|--------------------------|----------------|----------------------------------------------------------|---------------------------------------|---------------------------------|-------|
| TrafficInfluence         | 5.4            | Traffic Influence API                                    | TS29522_TrafficInfluence.yaml         | 3gpp-traffic-influence          | A.2   |
| NiddConfigurationTrigger | 5.5            | NIDD (Non-IP Data Delivery) Configuration Trigger API    | TS29522_NiddConfigurationTrigger.yaml | 3gpp-nidd-configuration-trigger | A.3   |
| AnalyticsExposure        | 5.6            | Analytics Exposure API                                   | TS29522_AnalyticsExposure.yaml        | 3gpp-analyticsexposure          | A.4   |
| 5GLANParameterProvision  | 5.7            | 5G LAN Parameter Provision API                           | TS29522_5GLANParameterProvision.yaml  | 3gpp-5glan-pp                   | A.5   |
| ApplyingBdtPolicy        | 5.8            | Applying BDT Policy API                                  | TS29522_ApplyingBdtPolicy.yaml        | 3gpp-applying-bdt-policy        | A.6   |
| IPTVConfiguration        | 5.9            | IPTV Configuration API                                   | TS29522_IPTVConfiguration.yaml        | 3gpp-iptvconfiguration          | A.7   |
| LpiParameterProvision    | 5.10           | LPI (Location Privacy Indicator) Parameter Provision API | TS29522_LpiParameterProvision.yaml    | 3gpp-lpi-pp                     | A.8   |
| ServiceParameter         | 5.11           | Service Parameter API                                    | TS29522_ServiceParameter.yaml         | 3gpp-service-parameter          | A.9   |
| ACSPParameterProvision   | 5.12           | ACS Parameter Provision API                              | TS29522_ACSPParameterProvision.yaml   | 3gpp-acs-pp                     | A.10  |
| MoLcsNotify              | 5.13           | MO LCS Notify API                                        | TS29522_MoLcsNotify.yaml              | 3gpp-mo-lcs-notify              | A.11  |
| AKMA                     | 5.14           | AKMA API                                                 | TS29522_AKMA.yaml                     | 3gpp-akma                       | A.12  |
| TimeSyncExposure         | 5.15           | Time Sync Exposure API                                   | TS29522_TimeSyncExposure.yaml         | 3gpp-time-sync                  | A.13  |
| EcsAddressProvision      | 5.16           | ECS Address Provision API                                | TS29522_EcsAddressProvision.yaml      | 3gpp-ecs-address-provision      | A.14  |
| AMPolicyAuthorization    | 5.17           | AM Policy Authorization API                              | TS29522_AMPolicyAuthorization.yaml    | 3gpp-am-policyauthorization     | A.15  |

|                              |      |                                             |                                           |                                  |      |
|------------------------------|------|---------------------------------------------|-------------------------------------------|----------------------------------|------|
| AMInfluence                  | 5.18 | AM Influence API                            | TS29522_AMInfluence.yaml                  | 3gpp-am-influence                | A.16 |
| MBSTMGI                      | 5.19 | MBS TMGI API                                | TS29522_MBSTMGI.yaml                      | 3gpp-mbs-tmgi                    | A.17 |
| MBSSession                   | 5.20 | MBS Session API                             | TS29522_MBSSession.yaml                   | 3gpp-mbs-session                 | A.18 |
| EASDeployment                | 5.21 | EAS Deployment API                          | TS29522_EASDeployment.yaml                | 3gpp-eas-deployment              | A.19 |
| ASTI                         | 5.22 | ASTI API                                    | TS29522_ASTI.yaml                         | 3gpp-asti                        | A.20 |
| DataReporting                | 5.23 | DataReporting API                           | TS29522_DataReporting.yaml                | 3gpp-data-reporting              | A.21 |
| DataReportingProvisioning    | 5.24 | DataReportingProvisioning API               | TS29522_DataReportingProvisioning.yaml    | 3gpp-data-reporting-provisioning | A.22 |
| UEId                         | 5.25 | UE ID API                                   | TS29522_UEId.yaml                         | 3gpp-ueid                        | A.23 |
| MBSUserService               | 5.26 | MBSUserService API                          | TS29522_MBSUserService.yaml               | 3gpp-mb-us                       | A.24 |
| MBSUserDataIngestSession     | 5.27 | MBSUserDataIngestSession API                | TS29522_MBSUserDataIngestSession.yaml     | 3gpp-mb-ud-ingest                | A.25 |
| MSEventExposure              | 5.28 | MSEventExposure API                         | TS29522_MSEventExposure.yaml              | 3gpp-ms-event-exposure           | A.26 |
| MBSGroupMsgDelivery          | 5.29 | MBSGroupMsgDelivery API                     | TS29522_MBSGroupMsgDelivery.yaml          | 3gpp-mbs-group-msg               | A.27 |
| DNAIMapping                  | 5.30 | DNAIMapping API                             | TS29522_DNAIMapping.yaml                  | 3gpp-dnai-mapping                | A.28 |
| PDTQPolicyNegotiation        | 5.31 | PDTQPolicyNegotiation API                   | TS29522_PDTQPolicyNegotiation.yaml        | 3gpp-pdtq-policy-negotiation     | A.29 |
| MemberUESelectionAssistance  | 5.32 | MemberUESelectionAssistance API             | TS29522_MemberUESelectionAssistance.yaml  | 3gpp-musa                        | A.30 |
| GroupParametersProvisioning  | 5.33 | Group Parameters Provisioning API           | TS29522_GroupParametersProvisioning.yaml  | 3gpp-grp-pp                      | A.31 |
| SliceParamProvision          | 5.34 | Network Slice Parameters Provisioning API   | TS29522_SliceParamProvision.yaml          | 3gpp-slice-pp                    | A.32 |
| UEAddress                    | 5.35 | UE Address API                              | TS29522_UEAddress.yaml                    | 3gpp-ue-address                  | A.33 |
| ECSAddress                   | 5.36 | ECS Address Configuration Information API   | TS29522_ECSAddress.yaml                   | 3gpp-ecs-address                 | A.34 |
| RSLPPIParametersProvisioning | 5.37 | RSLPPI Parameters Provisioning API          | TS29522_RSLPPIParametersProvisioning.yaml | 3gpp-rlppi-pp                    | A.35 |
| AddressingParamProvision     | 5.38 | Addressing Parameters Provisioning API      | TS29522_AddressingParamProvision.yaml     | 3gpp-addr-pp                     | A.36 |
| UAVFlightAssistance          | 5.39 | UAV Flight Assistance API                   | TS29522_UAVFlightAssistance.yaml          | 3gpp-uav-fa                      | A.37 |
| CagInfoParamProvision        | 5.40 | CAG Information Parameters Provisioning API | TS29522_CagInfoParamProvision.yaml        | 3gpp-caginfo-pp                  | A.38 |
| ImsSessionManagement         | 5.42 | ImsSessionManagement API                    | TS29522_ImsSessionManagement.yaml         | 3gpp-ims-sm                      | A.40 |
| ImsEventExposure             | 5.43 | ImsEventExposure API                        | TS29522_ImsEventExposure.yaml             | 3gpp-ims-ee                      | A.41 |
| ImsParamProvision            | 5.44 | ImsParamProvision API                       | TS29522_ImsParamProvision.yaml            | 3gpp-ims-pp                      | A.42 |
| AIoT                         | 5.45 | AIoT API                                    | TS29522_AIoT.yaml                         | 3gpp-aiot                        | A.43 |
| VFLTraining                  | 5.46 | VFL Training API                            | TS29522_VFLTraining.yaml                  | 3gpp-vfl-training                | A.44 |
| VFLInference                 | 5.47 | VFL Inference API                           | TS29522_VFLInference.yaml                 | 3gpp-vfl-inference               | A.45 |
| VFLNFDiscovery               | 5.48 | VFL NF Discovery API                        | TS29522_VFLNFDiscovery.yaml               | 3gpp-vfl-nf-discovery            | A.46 |

## 5.2 Information applicable to several APIs

The usage of HTTP, content type and URI structure definition, as specified in clauses 5.2.2, 5.2.3 and 5.2.4 of 3GPP TS 29.122 [4] respectively, shall be applicable for NEF Northbound APIs.

The notification, error handling, feature negotiation, HTTP custom headers as specified in clauses 5.2.5, 5.2.6, 5.2.7, 5.2.8 of 3GPP TS 29.122 [4] respectively, shall be applicable for NEF Northbound APIs except that the SCEF is replaced by the NEF and the SCS/AS is replaced by the AF.

The conventions for Open API specification files as specified in clause 5.2.9 of 3GPP TS 29.122 [4] shall be applicable for NEF Northbound APIs.

When 3GPP TS 29.122 [4] is referenced for the common protocol and interface aspects for API definition in the following clauses of this specification, the NEF takes the role of the SCEF and the service consumer (i.e., AF) takes the role of the SCS/AS, unless otherwise explicitly indicated.

## 5.3 Reused APIs

This clause describes the northbound APIs which are applicable for both EPS and 5GS.

**Table 5.3-1: Reused APIs applicable for both EPS and 5GS**

| API Name                | Differences                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ResourceManagementOfBdt | - The following 5G-only features defined in clause 5.4.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "LocBdt_5G", "Group_Id", "BdtNotification_5G", "Aspld_5G" and "Energy".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| PfdManagement           | - The following 5G-only features defined in clause 5.11.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "FailureLocation_5G".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| MonitoringEvent         | - The following 5G-only features defined in clause 5.3.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "Number_of_UEs_in_an_area_notification_5G", "Downlink_data_delivery_status_5G", "Availability_after_DDN_failure_notification_enhancement", "eLCS", "eLCS_en", "NSAC", "MULTIQOS", "EDGEAPP", "UEId_retrieval", "Loss_of_connectivity_notification_5G", "GMEC", "enNB1_5G", "AppDetection_5G", "eNSAC", "Ranging_SL", "DataTransfer", "Energy", "RVAS_5G", "UAV" and "EnPduSesRatType".<br>- For the "Pdn_connectivity_status" feature, APN is equivalent to DNN; the non-IP PDN type is equivalent to the unstructured PDU session type; and the enumeration InterfaceIndication value "PDN_GATEWAY" stands for PDU session anchored in UPF in 5G.                                                                         |
| DeviceTriggering        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CpProvisioning          | - The following 5G-only features defined in clause 5.10.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "ExpectedUMT_5G", "ExpectedUmtTime_5G", "ScheduledCommType_5G", "UEId_retrieval", "ExpectedUmtTime_Add", "AppExpUeBehaviour" and "ConfAccuLevels".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ChargeableParty         | - The following 5G-only features defined in clause 5.5.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "EthChgParty_5G", "MacAddressRange_5G", "ToSTC_5G".<br>- The "LOSS_OF_BEARER", "RECOVERY_OF_BEARER" and "RELEASE_OF_BEARER" events do not apply for 5G.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| AsSessionWithQoS        | - The following 5G-only features defined in clause 5.14.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "EthAsSessionQoS_5G", "QoSMonitoring_5G", "PacketDelayFailureReport", "MacAddressRange_5G", "AlternativeQoS_5G", "TSC_5G", "DisableUENotification_5G", "ExposureToEAS", "AltQosWithIndParams_5G", "EnEthAsSessionQoS_5G", "enNB_5G", "AltQoSProfilesSupportReport", "ExtQoS_5G", "EnTSCAC", "L4S", "MultiMedia", "PowerSaving", "EnQoSMon", "PDUSetHandling", "RTLatenacy", "ToSTC_5G", "QoSTiming_5G", "ListUE_5G", "GMEC", "QoSMonCapRepo", "MpxMedia", "N6DelayMeasurement", "TrafficCharChange", "HeaderHandling", "OnPathN6MediaInfo", "RateLimitReport", "ExtQoS_v2", "AcceptableQosDetails" and "EnQoSMon_v2".<br>- The "LOSS_OF_BEARER", "RECOVERY_OF_BEARER" and "RELEASE_OF_BEARER" events do not apply for 5G. |
| MsisdNLessMoSms         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



|                           |                                                                                                                                                    |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| NpConfiguration           | - The following 5G-only features defined in clause 5.13.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "NpExpiry_5G", "UEId_retrieval". |
| NIDD                      |                                                                                                                                                    |
| RacsParameterProvisioning |                                                                                                                                                    |
| ECRControl                | - The following 5G-only features defined in clause 5.12.4 of 3GPP TS 29.122 [4] may be supported only by the NEF: "ECR_WB_5G".                     |

## 5.4 TrafficInfluence API

### 5.4.0 Introduction

The Nnef\_TrafficInfluence service shall use the TrafficInfluence API.

The API URI of TrafficInfluence API shall be:

**{apiRoot}/3gpp-traffic-influence/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-traffic-influence".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.4.1 Resources

#### 5.4.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.4.1.1-1 and the resources and HTTP methods used for the TrafficInfluence API.

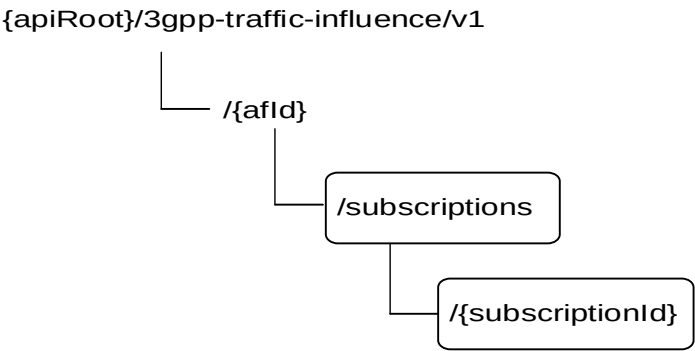


**Figure 5.4.1.1-1: Resource URI structure of the TrafficInfluence API**

Table 5.4.1.1-1 provides an overview of the resources and HTTP methods applicable for the TrafficInfluence API.

**Table 5.4.1.1-1: Resources and methods overview**

| Resource name                  | Resource URI          | HTTP method | Description                                    |
|--------------------------------|-----------------------|-------------|------------------------------------------------|
| Traffic Influence Subscription | /{afId}/subscriptions | GET         | Read all subscriptions for a given AF          |
|                                |                       | POST        | Create a new subscription to traffic influence |

|                                           |                                       |        |                                                                                |
|-------------------------------------------|---------------------------------------|--------|--------------------------------------------------------------------------------|
| Individual Traffic Influence Subscription | {afId}/subscriptions/{subscriptionId} | GET    | Read a subscription to traffic influence                                       |
|                                           |                                       | PUT    | Modify all of the properties of an existing subscription to traffic influence  |
|                                           |                                       | PATCH  | Modify part of the properties of an existing subscription to traffic influence |
|                                           |                                       | DELETE | Delete a subscription to traffic influence                                     |

### 5.4.1.2 Resource: Traffic Influence Subscription

#### 5.4.1.2.1 Introduction

This resource allows a AF to read all active traffic influence subscriptions for the given AF.

#### 5.4.1.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-traffic-influence/v1/{afId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.4.1.2.2-1.

**Table 5.4.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

#### 5.4.1.2.3 Resource Methods

##### 5.4.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.4.1.2.2.

##### 5.4.1.2.3.2 GET

The GET method allows to read all active subscriptions for a given AF. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.4.1.2.3.2-1.

**Table 5.4.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.4.1.2.3.2-2 and the response data structures and response codes specified in table 5.4.1.2.3.2-3.

**Table 5.4.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.4.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(TrafficInfluSub)                                                                                                   | M | 0..N        | 200 OK                 | The subscription information for the AF in the request URI are returned.                                                                                                                                                                                        |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                 |

**Table 5.4.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.4.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.4.1.2.3.3 POST

The POST method creates a new subscription resource to traffic influence subscription for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.4.1.2.3.3-1 and the response data structures and response codes specified in table 5.4.1.2.3.3-2.

**Table 5.4.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type       | P | Cardinality | Description                                                                                                                       |
|-----------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
| TrafficInfluSub | M | 1           | Parameters to register a subscription to influencing traffic routing and/or notification about UP management events with the NEF. |

**Table 5.4.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------|
| TrafficInfluSub                                                                                                           | M | 1           | 201 Created    | The subscription was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                |

**Table 5.4.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                                                                                                       |
|----------|--------|---|---|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-traffic-influence/v1/{afId}/subscriptions/{subscriptionId} |
|----------|--------|---|---|-------------------------------------------------------------------------------------------------------------------------------------------------------|

### 5.4.1.3 Resource: Individual Traffic Influence Subscription

#### 5.4.1.3.1 Introduction

This resource allows a AF to register a subscription to influencing traffic routing and/or notification about UP management events with the NEF.

#### 5.4.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-traffic-influence/v1/{afId}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.4.1.3.2-1.

**Table 5.4.1.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                          |
|----------------|-----------|-------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId           | string    | Identifier of the AF.               |
| subscriptionId | string    | Identifier of the subscription.     |

#### 5.4.1.3.3 Resource Methods

##### 5.4.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.4.1.3.2.

##### 5.4.1.3.3.2 GET

The GET method allows to read the active subscription for a given AF and subscription Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.4.1.3.3.2-1.

**Table 5.4.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.4.1.3.3.2-2 and the response data structures and response codes specified in table 5.4.1.3.3.2-3.

**Table 5.4.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.4.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type       | P | Cardinality | Response codes | Description                                                              |
|-----------------|---|-------------|----------------|--------------------------------------------------------------------------|
| TrafficInfluSub | M | 1           | 200 OK         | The subscription information for the AF in the request URI are returned. |

|                                                                                                                          |  |  |                              |                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                      |  |  | 307<br>Temporary<br>Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |  |  | 308<br>Permanent<br>Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                              |                                                                                                                                                                                                                                                                 |

**Table 5.4.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.4.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.4.1.3.3.3 PUT

The PUT method is used to replace an existing subscription resource to update a subscription. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.4.1.3.3.3-1 and the response data structures and response codes specified in table 5.4.1.3.3.3-2.

**Table 5.4.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type       | P | Cardinality | Description                                                                                                                 |
|-----------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------|
| TrafficInfluSub | M | 1           | Modify an existing subscription to influencing traffic routing and/or notification about UP management events with the NEF. |

**Table 5.4.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes               | Description                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TrafficInfluSub                                                                                                          | M | 1           | 200 OK                       | The subscription was replaced successfully and a representation is returned.                                                                                                                                                                                       |
| N/A                                                                                                                      |   |             | 204 No Content               | The subscription was replaced successfully.                                                                                                                                                                                                                        |
| N/A                                                                                                                      |   |             | 307<br>Temporary<br>Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308<br>Permanent<br>Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                              |                                                                                                                                                                                                                                                                    |

**Table 5.4.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.4.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.4.1.3.3.4 PATCH

The PATCH method allows to change some properties of an existing traffic influence subscription. The AF shall initiate the HTTP PATCH request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.4.1.3.3.4-1 and the response data structures and response codes specified in table 5.4.1.3.3.4-2.

**Table 5.4.1.3.3.4-1: Data structures supported by the PATCH Request Body on this resource**

| Data type            | P | Cardinality | Description                                                                                                                   |
|----------------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------|
| TrafficInfluSubPatch | M | 1           | Partial update of a subscription to influencing traffic routing and/or notifications about UP management events with the NEF. |

**Table 5.4.1.3.3.4-2: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TrafficInfluSub                                                                                                            | M | 1           | 200 OK                 | The subscription was partial modified successfully and a representation is returned.                                                                                                                                                                               |
| N/A                                                                                                                        |   |             | 204 No Content         | The subscription was partial modified successfully.                                                                                                                                                                                                                |
| N/A                                                                                                                        |   |             | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                        |   |             | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                    |

**Table 5.4.1.3.3.4-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.4.1.3.3.4-4: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

#### 5.4.1.3.3.5 DELETE

The DELETE method deletes the traffic influence subscription for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.4.1.3.3.5-1.

**Table 5.4.1.3.3.5-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.4.1.3.3.5-2 and the response data structures and response codes specified in table 5.4.1.3.3.5-3.

**Table 5.4.1.3.3.5-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.4.1.3.3.5-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |   |             | 204 No Content         | The subscription was terminated successfully.                                                                                                                                                                                                                     |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                   |

**Table 5.4.1.3.3.5-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.4.1.3.3.5-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.4.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.4.2 Notifications

### 5.4.2.1 Introduction

Upon receipt of a UP management event notification from the SMF indicating the subscribed event (e.g. a DNAI has changed) is detected, the NEF shall send an HTTP POST message including the notified event to the AF.

Upon receipt of the event notification, the AF may send an HTTP POST request as acknowledgement for the UP path management event notification to inform the NEF about the result of application layer relocation.

Upon receipt of a handling of payload headers event notification from the UPF indicating the header handling action on payload headers was performed, the NEF shall send an HTTP POST message including the header handling report to the AF.

The NEF and the AF shall support the notification mechanism as described in clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.4.2.1-1: Notifications overview**

| Notification                          | Callback URI              | HTTP method or custom operation | Description (service operation)                                                                                                     |
|---------------------------------------|---------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Event Notification                    | {notificationDestination} | POST                            | The UP management event notification from the NEF to the AF.                                                                        |
| Acknowledgement of event notification | {afAckUri}                | POST                            | The Acknowledgement of Event Notification is used by the AF to acknowledge the NEF about handling result of the event notification. |
| Event Notification of Payload Headers | {notificationDestination} | POST                            | The handling of Payload Headers event notification from the NEF to the AF.                                                          |

### 5.4.2.2 Event Notification

#### 5.4.2.2.1 Description

The Event Notification is used by the NEF to report the UP path management event notification from the SMF to the AF.

#### 5.4.2.2.2 Target URI

The Callback URI "{notificationDestination}" shall be used with the callback URI variables defined in table 5.4.2.2.2-1.

**Table 5.4.2.2.2-1: Callback URI variables**

| Name                    | Data type | Definition                                                                                                                                                                                                                         |
|-------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| notificationDestination | Link      | Callback reference provided by the AF during creation/modification of the subscription within the TrafficInfluSub data type as defined in table 5.4.3.3.2-1 or the TrafficInfluSubPatch data type as defined in table 5.4.3.3.3-1. |

#### 5.4.2.2.3 Operation Definition

##### 5.4.2.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.4.2.2.3.1-1 and the response data structures and response codes specified in table 5.4.2.2.3.1-2.

**Table 5.4.2.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type         | P | Cardinality | Description                                                            |
|-------------------|---|-------------|------------------------------------------------------------------------|
| EventNotification | M | 1           | The UP management event notification is provided by the NEF to the AF. |



**Table 5.4.2.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                       |   |             | 204 No Content         | The event notification is received successfully.                                                                                                                                                                                                                                                    |
| N/A                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                     |

**Table 5.4.2.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.4.2.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

#### 5.4.2.2.3.2 Notification via Websocket

If supported by both AF and NEF and successfully negotiated, the EventNotification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4 of 3GPP TS 29.122 [4].

### 5.4.2.3 Acknowledgement of event notification

#### 5.4.2.3.1 Description

The Acknowledgement of Event Notification is used by the AF to acknowledge the NEF about handling result of the event notification (e.g. UP path change).

#### 5.4.2.3.2 Target URI

The Callback URI "{afAckUri}" shall be used with the callback URI variables defined in table 5.4.2.3.2-1.

**Table 5.4.2.3.2-1: Callback URI variables**

| Name     | Data type | Definition                                                                                                                               |
|----------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|
| afAckUri | Link      | Callback reference provided by the NEF during event notification within the EventNotification data type as defined in Table 5.4.3.3.4-1. |

### 5.4.2.3.3 Operation Definition

#### 5.4.2.3.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.4.2.3.3.1-1 and the response data structures and response codes specified in table 5.4.2.3.3.1-2.

**Table 5.4.2.3.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description                                        |
|-----------|---|-------------|----------------------------------------------------|
| AfAckInfo | M | 1           | Acknowledgement information of event notification. |

**Table 5.4.2.3.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                       |   |             | 204 No Content         | The acknowledgement of event notification is received successfully.                                                                                                                                                                                                                                                     |
| N/A                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection, during acknowledgement of event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NEF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection, during acknowledgement of event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NEF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                                         |

**Table 5.4.2.3.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative NEF towards which the notification should be redirected. |

**Table 5.4.2.3.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative NEF towards which the notification should be redirected. |

### 5.4.2.4 Event Notification of Payload Headers

#### 5.4.2.4.1 Description

The Event Notification of Payload Headers is used by the NEF to report the handling of payload headers events from the UPF to the AF.

#### 5.4.2.4.2 Target URI

The Callback URI "{**notificationDestination**}" shall be used with the callback URI variables defined in table 5.4.2.4.2-1.

**Table 5.4.2.4.2-1: Callback URI variables**

| Name                    | Data type | Definition                                                                                                                                                                                                                         |
|-------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| notificationDestination | Link      | Callback reference provided by the AF during creation/modification of the subscription within the TrafficInfluSub data type as defined in table 5.4.3.3.2-1 or the TrafficInfluSubPatch data type as defined in table 5.4.3.3.3-1. |

### 5.4.2.4.3 Operation Definition

#### 5.4.2.4.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.4.2.4.3.1-1 and the response data structures and response codes specified in table 5.4.2.4.3.1-2.

**Table 5.4.2.4.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type            | P | Cardinality | Description                                                                                            |
|----------------------|---|-------------|--------------------------------------------------------------------------------------------------------|
| HeaderHandlingReport | M | 1           | The event notification related to handling of payload headers events is provided by the NEF to the AF. |

**Table 5.4.2.4.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                       |   |             | 204 No Content         | The event notification is received successfully.                                                                                                                                                                                                                                                    |
| N/A                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                     |

**Table 5.4.2.4.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.4.2.4.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.4.3 Data Model

### 5.4.3.1 General

This clause specifies the application data model supported by the TrafficInfluence API.

Table 5.4.3.1-1 specifies the data types defined for the TrafficInfluence API.

**Table 5.4.3.1-1: TrafficInfluence API specific Data Types**

| Data type            | Clause defined | Description                                                                                                                                                                                                           | Applicability     |
|----------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| AfAckInfo            | 5.4.3.3.6      | Represents acknowledgement information of a traffic influence event notification.                                                                                                                                     |                   |
| AfResultInfo         | 5.4.3.3.5      | Identifies the result of application layer handling.                                                                                                                                                                  |                   |
| AfResultStatus       | 5.4.3.4.4      | Represents the status of application handling result.                                                                                                                                                                 |                   |
| EventNotification    | 5.4.3.3.4      | Represents a traffic influence event notification.                                                                                                                                                                    |                   |
| HeaderHandlingReport | 5.4.3.3.9      | Represents header handling reporting events notification.                                                                                                                                                             | HeaderHandling    |
| SubscribedEvent      | 5.4.3.4.3      | Represents the type of UP path management events for which the AF requests to be notified.                                                                                                                            |                   |
| TrafficInfluSub      | 5.4.3.3.2      | Represents a traffic influence subscription.                                                                                                                                                                          |                   |
| TrafficInfluSubPatch | 5.4.3.3.3      | Represents parameters to request the modification of a traffic influence subscription resource.                                                                                                                       |                   |
| TrafficDataSet       | 5.4.3.3.7      | Represents a set of traffic filters and the corresponding N6 traffic routing requirements.                                                                                                                            | MultiTrafficInflu |
| TrafficDataSetRm     | 5.4.3.3.8      | Represents a set of traffic filters and the corresponding N6 traffic routing requirements. This data type is defined in the same way as the TrafficDataSet data type, but with the OpenAPI "nullable: true" property. | MultiTrafficInflu |

### 5.4.3.2 Reused data types

The data types reused by the TrafficInfluence API from other specifications are listed in table 5.4.3.2-1.

**Table 5.4.3.2-1: Re-used Data Types**

| Data type                   | Reference           | Comments                                                                                                                  |
|-----------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------|
| AfHeaderHandlingControlInfo | 3GPP TS 29.514 [7]  | Represents the header handling control information.                                                                       |
| Dnai                        | 3GPP TS 29.571 [8]  | Identifies a DNAI.                                                                                                        |
| DnaiChangeType              | 3GPP TS 29.571 [8]  | Describes the types of DNAI change.                                                                                       |
| Dnn                         | 3GPP TS 29.571 [8]  | Identifies a DNN.                                                                                                         |
| DurationSec                 | 3GPP TS 29.571 [8]  | Identifies a period of time in units of seconds.                                                                          |
| EasIpReplacementInfo        | 3GPP TS 29.571 [8]  | Represents EAS IP replacement information.                                                                                |
| EthFlowDescription          | 3GPP TS 29.514 [7]  | Contains the Ethernet data flow information. (NOTE)                                                                       |
| ExternalGroupId             | 3GPP TS 29.122 [4]  | External Group Identifier for a user group.                                                                               |
| FlowInfo                    | 3GPP TS 29.122 [4]  | Contains the IP data flow information.                                                                                    |
| GeographicalArea            | Clause 5.17.3.3.4   | Identifies a geographical area.                                                                                           |
| Gpsi                        | 3GPP TS 29.571 [8]  | Identifies a GPSI.                                                                                                        |
| HeaderHandlingActionRequest | 3GPP TS 29.514 [7]  | Represents the header handling action related information.                                                                |
| Ipv4Addr                    | 3GPP TS 29.122 [4]  | Identifies an IPv4 address.                                                                                               |
| Ipv6Addr                    | 3GPP TS 29.122 [4]  | Identifies an IPv6 address.                                                                                               |
| Ipv6Prefix                  | 3GPP TS 29.571 [8]  | Identifies an IPv6 Prefix.                                                                                                |
| Link                        | 3GPP TS 29.122 [4]  | Identifies a referenced resource.                                                                                         |
| MacAddr48                   | 3GPP TS 29.571 [8]  | Identifies a MAC address.                                                                                                 |
| Metadata                    | 3GPP TS 29.571 [8]  | Contains opaque information for the service functions in the N6-LAN that is provided by AF and transparently sent to UPF. |
| PlmnId                      | 3GPP TS 29.571 [8]  | Identifies a PLMN Identifier.                                                                                             |
| Port                        | 3GPP TS 29.122 [4]  | Identifies a port number.                                                                                                 |
| ReportingInformation        | 3GPP TS 29.523 [22] | Represents the event reporting requirements.                                                                              |
| RouteToLocation             | 3GPP TS 29.571 [8]  | Describes the traffic routes to the locations of the application.                                                         |
| Snsai                       | 3GPP TS 29.571 [8]  | Identifies the S-NSSAI.                                                                                                   |

|                                                                                                                                                                        |                     |                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------|
| SupportedFeatures                                                                                                                                                      | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features defined in table 5.4.4-1.                                 |
| TemporalValidity                                                                                                                                                       | 3GPP TS 29.514 [7]  | Indicates the time interval(s) during which the AF request is to be applied                                            |
| TrafficCorrelationInfo                                                                                                                                                 | 3GPP TS 29.519 [23] | Contains the information for traffic correlation.                                                                      |
| TrafficRouteReqOutcome                                                                                                                                                 | 3GPP TS 29.508 [26] | Indicates the installation outcome of the traffic routing requirements requested by AF.                                |
| UInteger                                                                                                                                                               | 3GPP TS 29.571 [8]  | Unsigned integer.                                                                                                      |
| UIntegerRm                                                                                                                                                             | 3GPP TS 29.571 [8]  | This data type is defined in the same way as the "UInteger" data type, but with the OpenAPI "nullable: true" property. |
| Uri                                                                                                                                                                    | 3GPP TS 29.122 [4]  | Identifies a URI.                                                                                                      |
| WebsocketNotifConfig                                                                                                                                                   | 3GPP TS 29.122 [4]  | Contains the configuration parameters to set up notification delivery over Websocket protocol.                         |
| NOTE: In order to support a set of MAC addresses with a specific range in the traffic filter, feature MacAddressRange as specified in clause 5.4.4 shall be supported. |                     |                                                                                                                        |

### 5.4.3.3 Structured data types

#### 5.4.3.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.4.3.3.2 Type: TrafficInfluSub

This type represents a traffic influence subscription. The same structure is used in the subscription request and subscription response.

**Table 5.4.3.3.2-1: Definition of type TrafficInfluSub**

| Attribute name   | Data type               | P | Cardinality | Description                                                                                                                                                                                                                                                                                                         | Applicability (NOTE 1) |
|------------------|-------------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| afServiceId      | string                  | O | 0..1        | Identifies a service on behalf of which the AF is issuing the request.                                                                                                                                                                                                                                              |                        |
| afAppId          | string                  | O | 0..1        | Identifies an application. (NOTE 3)                                                                                                                                                                                                                                                                                 |                        |
| afTransId        | string                  | O | 0..1        | Identifies an NEF Northbound interface transaction, generated by the AF.                                                                                                                                                                                                                                            |                        |
| appReloInd       | boolean                 | O | 0..1        | Identifies whether an application can be relocated once a location of the application has been selected.<br><br><ul style="list-style-type: none"> <li>- Set to "true" if it shall be relocated.</li> <li>- Set to "false" if it shall not be relocated.</li> <li>- Default value is "false" if omitted.</li> </ul> |                        |
| dnn              | Dnn                     | O | 0..1        | Identifies a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.                                                                                                                                                                                   |                        |
| snssai           | Snssai                  | O | 0..1        | Identifies an S-NSSAI.                                                                                                                                                                                                                                                                                              |                        |
| externalGroupId  | ExternalGroupId         | O | 0..1        | Identifies a group of users. (NOTE 2) (NOTE 6)                                                                                                                                                                                                                                                                      |                        |
| externalGroupIds | array(ExternalGroupIds) | O | 2..N        | List of external group identifiers associated with the subscriber. (NOTE 2) (NOTE 6) (NOTE 7)                                                                                                                                                                                                                       | FinerGranUEs           |

|                         |                        |   |      |                                                                                                                                                                                                                                                                                                                                                                                                         |                         |
|-------------------------|------------------------|---|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| extSubscCats            | array(string)          | O | 1..N | List of external categories associated with the subscriber.<br>(NOTE 8)                                                                                                                                                                                                                                                                                                                                 | FinerGranUEs            |
| anyUeInd                | boolean                | O | 0..1 | Identifies whether the AF request applies to any UE (i.e. all UEs).<br><br><ul style="list-style-type: none"> <li>- Set to "true": the AF request is applicable to any UE.</li> <li>- Set to "false": the AF request is not applicable to any UE.</li> <li>- Default value is "false" if omitted.</li> </ul> (NOTE 2)                                                                                   |                         |
| subscribedEvents        | array(SubscribedEvent) | O | 1..N | Identifies the requirement to be notified of the event(s).<br>(NOTE 16)                                                                                                                                                                                                                                                                                                                                 |                         |
| gpsi                    | Gpsi                   | O | 0..1 | Identifies a user.<br>(NOTE 2)                                                                                                                                                                                                                                                                                                                                                                          |                         |
| ipv4Addr                | Ipv4Addr               | O | 0..1 | Identifies the IPv4 address.<br>(NOTE 2)                                                                                                                                                                                                                                                                                                                                                                |                         |
| ipDomain                | string                 | O | 0..1 | The IPv4 address domain identifier.<br>The attribute may only be provided if the ipv4Addr attribute is present.                                                                                                                                                                                                                                                                                         |                         |
| ipv6Addr                | Ipv6Addr               | O | 0..1 | Identifies the IPv6 address.<br>(NOTE 2)                                                                                                                                                                                                                                                                                                                                                                |                         |
| macAddr                 | MacAddr48              | O | 0..1 | Identifies the MAC address.<br>(NOTE 2)                                                                                                                                                                                                                                                                                                                                                                 |                         |
| dnaiChgType             | DnaiChangeType         | O | 0..1 | Identifies a type of notification regarding UP path management event.                                                                                                                                                                                                                                                                                                                                   |                         |
| notificationDestination | Link                   | C | 0..1 | Contains the Callback URL to receive the notification from the NEF.<br>It shall be present if the "subscribedEvents" is present or if the "hHndlgControlInfo" is present.                                                                                                                                                                                                                               |                         |
| requestTestNotification | boolean                | O | 0..1 | Indicates whether the AF requests the NEF to send a test notification.<br><br><ul style="list-style-type: none"> <li>- Set to "true" by the AF to request the NEF to send a test notification as defined in clause 5.2.5.3 of 3GPP TS 29.122 [4].</li> <li>- Set to "false" by the AF to not to request the NEF to send a test notification.</li> <li>- Default value is "false" if omitted.</li> </ul> | Notification_test_event |
| websocketNotifConfig    | WebsocketNotifConfig   | O | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol.                                                                                                                                                                                                                                                                                                                       | Notification_websocket  |

|                   |                           |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |
|-------------------|---------------------------|---|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| self              | Link                      | C | 0..1 | Link to the created resource.<br><br>This parameter shall be supplied by the NEF in HTTP responses that include an object of TrafficInfluSub type                                                                                                                                                                                                                                                                       |                   |
| trafficFilters    | array(FlowInfo)           | O | 1..N | Identifies IP packet filters.<br><br>(NOTE 3)                                                                                                                                                                                                                                                                                                                                                                           |                   |
| ethTrafficFilters | array(EthFlowDescription) | O | 1..N | Identifies Ethernet packet filters.<br><br>(NOTE 3)                                                                                                                                                                                                                                                                                                                                                                     |                   |
| trafficRoutes     | array(RouteToLocation)    | O | 1..N | Identifies the N6 traffic routing requirement.<br><br>(NOTE 9, NOTE 11)                                                                                                                                                                                                                                                                                                                                                 |                   |
| trafficDataSets   | map(TrafficDataSet)       | O | 2..N | Contains multiple sets of traffic filters with the corresponding N6 traffic routing requirements.<br><br>The key of the map shall be the value of the "setId" attribute of the TrafficDataSet data type.<br><br>(NOTE 3, NOTE 11, NOTE 12, NOTE 13)                                                                                                                                                                     | MultiTrafficInflu |
| sfcdDI            | string                    | O | 0..1 | Reference to a pre-configured steering of user traffic to service function chain in downlink.<br><br>(NOTE 5)                                                                                                                                                                                                                                                                                                           | SFC               |
| sfcdUI            | string                    | O | 0..1 | Reference to a pre-configured steering of user traffic to service function chain in uplink.<br><br>(NOTE 5)                                                                                                                                                                                                                                                                                                             | SFC               |
| metadata          | Metadata                  | O | 0..1 | Contains opaque information for the service functions in the N6-LAN that is provided by AF and transparently sent to UPF. May only be provided when "sfcdDI" and/or "sfcdUI" are provided.                                                                                                                                                                                                                              | SFC               |
| tfcCorrInd        | boolean                   | O | 0..1 | Indication of traffic correlation. May only be included when "externalGroupId" attribute was included within the TrafficInfluSub data type previously.<br>It is used to indicate that for the group of UEs, the targeted PDU sessions should be correlated by a common DNAI. Set to "true" if it should be correlated; otherwise set to "false". Default value is "false" if omitted.<br><br>(NOTE 4, NOTE 10, NOTE 13) |                   |
| tfcCorreInfo      | TrafficCorrelationInfo    | O | 0..1 | Contains the information for traffic correlation. The "notifUri" and "notifCorrId" attributes are not applicable for "tfcCorreInfo" attribute.                                                                                                                                                                                                                                                                          | CommonEAS DNAI    |

|                 |                         |   |      |                                                                                                                                                                                                                                                                                                                                                                                                     |                    |
|-----------------|-------------------------|---|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
|                 |                         |   |      | (NOTE 10, NOTE 13)                                                                                                                                                                                                                                                                                                                                                                                  |                    |
| tempValidities  | array(TemporalValidity) | O | 1..N | Indicates the time interval(s) during which the AF request is to be applied.                                                                                                                                                                                                                                                                                                                        |                    |
| validGeoZonelds | array(string)           | O | 1..N | Identifies a geographic zone that the AF request applies only to the traffic of UE(s) located in this specific zone. This attribute is deprecated; the attribute "geoAreas" should be used instead.                                                                                                                                                                                                 |                    |
| geoAreas        | array(GeographicalArea) | O | 1..N | Identifies geographical areas within which the AF request applies. This attribute deprecates validGeoZonelds attribute.                                                                                                                                                                                                                                                                             |                    |
| afAckInd        | boolean                 | O | 0..1 | Identifies whether the AF acknowledgement of UP path event notification is expected.<br><br><ul style="list-style-type: none"> <li>- "true" indicates that the AF acknowledgement of UP path event is expected.</li> <li>- "false" indicates that the AF acknowledgement of UP path event notification is not expected.</li> <li>- Default value is "false" if omitted.</li> </ul>                  | URLLC              |
| addrPreserInd   | boolean                 | O | 0..1 | Indicates whether UE IP address shall be preserved.<br><br><ul style="list-style-type: none"> <li>- "true" indicates that the UE IP address shall be preserved.</li> <li>- "false" indicates that the UE IP address shall not be preserved.</li> <li>- Default value is "false" if omitted.</li> </ul>                                                                                              | URLLC              |
| simConnInd      | boolean                 | O | 0..1 | Indication of whether simultaneous connectivity shall be temporarily maintained for the source and target PSA.<br><br><ul style="list-style-type: none"> <li>- "true" indicates that the temporary simultaneous connectivity shall be kept.</li> <li>- "false" indicates that the temporary simultaneous connectivity shall not be kept.</li> <li>- Default value is "false" if omitted.</li> </ul> | SimultConnectivity |
| simConnTerm     | DurationSec             | O | 0..1 | (NOTE 16)<br>Indication of the minimum time interval to be considered for inactivity of the traffic routed via the source PSA during the edge re-location procedure. It may be included when the "simConnInd" attribute is set to true.                                                                                                                                                             | SimultConnectivity |
| maxAllowedUpLat | UInteger                | O | 0..1 | Indicates the target user plane latency in units of milliseconds.                                                                                                                                                                                                                                                                                                                                   | AF_lantency        |



|                   |                             |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |
|-------------------|-----------------------------|---|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|                   |                             |   |      | The SMF may use this value to decide whether edge relocation is needed to ensure that the user plane latency does not exceed the value.                                                                                                                                                                                                                                                                                                                           |                  |
| easIpReplaceInfos | array(EasIpReplacementInfo) | O | 1..N | Contains EAS IP replacement information.                                                                                                                                                                                                                                                                                                                                                                                                                          | EASIPreplacement |
| easRedisInd       | boolean                     | O | 0..1 | Indicates whether the EAS rediscovery is required for the application.<br><br><ul style="list-style-type: none"> <li>- "true" indicates that the EAS rediscovery is required for the application.</li> <li>- "false" indicates that the EAS rediscovery is not required for the application.</li> <li>- Default value is "false" if omitted.</li> </ul> <p>The indication shall be invalid after it was applied unless it is provided again.</p>                  | EASDiscovery     |
| eventReq          | ReportingInformation        | O | 0..1 | Indicates the event reporting requirements.<br><br>This attribute may be provided if the "EDGEAPP" feature is supported and the "subscribedEvents" attribute is present.                                                                                                                                                                                                                                                                                          | EDGEAPP          |
| eventReports      | array(EventNotification)    | C | 1..N | Represents user plane path management event report(s).<br><br>This attribute shall be present in an HTTP POST response if the immediate reporting indication in the "immRep" attribute within the "eventReq" attribute is set to true and the "subscribedEvents" was present in the corresponding HTTP POST request and the report(s) are available.<br><br>This attribute may also be present in an HTTP PUT or PATCH response when the report(s) are available. | EDGEAPP          |
| candDnailInd      | boolean                     | O | 0..1 | Indicates whether the reporting of the candidate DNAI(s) is requested.<br><br><ul style="list-style-type: none"> <li>- "true" indicates that the reporting of the candidate DNAI(s) is requested for the PDU session.</li> <li>- "false" indicates that the reporting of the candidate DNAI(s) is not requested for the PDU session.</li> <li>- The default value is "false" if this attribute is omitted.</li> </ul> <p>(NOTE 13)</p>                            | CommonEASDNAI    |
| plmnId            | PlmnId                      | O | 0..1 | Identifies the H-PLMN of the UE.                                                                                                                                                                                                                                                                                                                                                                                                                                  | HR-SBO           |

|                   |                             |   |      |                                                                                                                                                                                                                                                                                                                                                                                           |                    |
|-------------------|-----------------------------|---|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| portNumber        | Port                        | O | 0..1 | Indicates the UDP or TCP port number associated with the UE IP address as provided in the "ipv4Addr" or "ipv6Addr" property.                                                                                                                                                                                                                                                              | HR-SBO             |
| n6DelayInd        | boolean                     | O | 0..1 | Indicates whether the AF requests to consider the N6 delay measurements.<br><br><ul style="list-style-type: none"> <li>- "true" indicates that the AF requests to consider the N6 delay measurements.</li> <li>- "false" indicates that the AF does not request to consider the N6 delay measurements.</li> <li>- The default value is "false" when this attribute is omitted.</li> </ul> | N6DelayMeasurement |
| hHndlgControlInfo | AfHeaderHandlingControlInfo | O | 0..1 | Contains header handling control information for handling of payload headers.<br><br>(NOTE 14, NOTE 15)                                                                                                                                                                                                                                                                                   | HeaderHandling     |
| suppFeat          | SupportedFeatures           | C | 0..1 | Contains the list of supported feature(s) among the ones defined in clause 5.4.4.<br><br>This attribute shall be present only when feature negotiation needs to take place.                                                                                                                                                                                                               |                    |

NOTE 1: Properties marked with a feature as defined in clause 5.4.4 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property applies for all the features.

NOTE 2: If "HR-SBO" feature is not supported, only one of individual UE identifier (i.e. "gpsi", "macAddr", "ipv4Addr" or "ipv6Addr"), External Group Identifier (i.e. "externalGroupId" or "externalGroupIds" (is included when FinerGranUEs feature is supported)) or any UE indication "anyUeInd" shall be included. If "HR-SBO" feature is supported and the AF requests to influence traffic routing is working in HR-SBO mode in the VPLMN, only one of individual UE identifier (i.e. "gpsi", "ipv4Addr" or "ipv6Addr") or any UE indication "anyUeInd" shall be included.

NOTE 3: Only one of "afAppId", "trafficFilters", "ethTrafficFilters" or "trafficDataSets" shall be present.

NOTE 4: The indication of traffic correlation shall be provided only when the AF requires that all the PDU sessions related to the 5G VN group member UEs should be correlated by a common DNAI in the user plane for the traffic as described in 3GPP TS 23.501 [3], clause 5.6.7.1 and clause 5.29.

NOTE 5: When the SFC feature is supported, for the purpose of influencing service function chaining, at least one attribute shall be present.

NOTE 6: The attributes "externalGroupId" and "externalGroupIds" are mutually exclusive attributes.

NOTE 7: The AF request applies to the UE(s) that belong to all the External Group Identifiers indicated by the attribute "externalGroupIds", when included.

NOTE 8: The AF request applies to the UE(s) that belong to all the External Subscriber Categories indicated by the attribute "extSubscCats", which is included only if either "externalGroupIds" attribute is included or "externalGroupId" is included or "anyUeInd" attribute is included. If "HR-SBO" feature is supported and the AF requests to influence is working in HR-SBO mode, the "extSubscCats" attribute shall not be provided.

NOTE 9: When only one DNAI is included, and the Indication of traffic correlation within the "tfcCorrInd" attribute is available or the "corrType" attribute of the "tfcCorreInfo" includes the value "COMMON\_DNAI", the DNAI is used as common DNAI for UEs identified by AF request.

NOTE 10: The "tfcCorrInd" attribute and the "tfcCorreInfo" attribute are mutually exclusive.

NOTE 11: When the "MultiTrafficInflu" feature is supported, these attributes are mutually exclusive. Either one of them may be present.

NOTE 12: When the "MultiTrafficInflu" feature is supported and the "MultiTrafficInflu\_Ext1" is not supported, this attribute may be present only if one of the "macAddr" attribute, the "ipv4Addr" attribute or the "ipv6Addr" attribute is provided.

NOTE 13: When the "MultiTrafficInflu" is supported, if the "trafficDataSets" attribute is present, then the "candDnailnd", "tfcCorrInd" and "tfcCorreInfo" attributes shall not be present, and the other attributes of this data type shall apply to all the traffic data sets provided within this attribute.

NOTE 14: When the HeaderHandling feature is supported, for the purpose of handling payload headers, this attribute shall be present.

NOTE 15: The "notifId" and "notifUri" attributes within the AfHeaderHandlingControlInfo data type are not applicable.  
 NOTE 16: The "SIM\_CONN\_FAIL" event may be contained in the "subscribedEvents" attribute only when the "simConnInd" attribute is provided and set to "true".

#### 5.4.3.3.3 Type: TrafficInfluSubPatch

This type represents a subscription of traffic influence parameters provided by the AF to the NEF. The structure is used for HTTP PATCH request.

**Table 5.4.3.3.3-1: Definition of type TrafficInfluSubPatch**

| Attribute name    | Data type                 | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Applicability     |
|-------------------|---------------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| appReloInd        | boolean                   | O | 0..1        | Identifies whether an application should be relocated once a location of the application has been selected.<br><br><ul style="list-style-type: none"> <li>"true" indicates that an application shall be relocated once a location of the application has been selected.</li> <li>"false" indicates that an application shall not be relocated once a location of the application has been selected.</li> </ul> (NOTE 1)                                          |                   |
| trafficDataSets   | map(TrafficDataSetRm)     | O | 1..N        | Contains one or several set(s) of traffic filters with the corresponding N6 traffic routing requirements.<br><br>The key of the map shall be the value of the "setId" attribute of the TrafficDataSetRm data type.                                                                                                                                                                                                                                               | MultiTrafficInflu |
| trafficFilters    | array(FlowInfo)           | O | 1..N        | Identifies IP packet filters.                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |
| ethTrafficFilters | array(EthFlowDescription) | O | 1..N        | Identifies Ethernet packet filters.                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |
| trafficRoutes     | array(RouteToLocation)    | O | 1..N        | Identifies the N6 traffic routing requirement.<br><br>(NOTE 1)                                                                                                                                                                                                                                                                                                                                                                                                   |                   |
| sfcdDl            | string                    | O | 0..1        | Reference to a pre-configured steering of user traffic to service function chain in downlink.                                                                                                                                                                                                                                                                                                                                                                    | SFC               |
| sfcdUl            | string                    | O | 0..1        | Reference to a pre-configured steering of user traffic to service function chain in uplink.                                                                                                                                                                                                                                                                                                                                                                      | SFC               |
| metadata          | Metadata                  | O | 0..1        | Contains opaque information for the service functions in the N6-LAN that is provided by AF and transparently sent to UPF.                                                                                                                                                                                                                                                                                                                                        | SFC               |
| tfCorrInd         | boolean                   | O | 0..1        | Indication of traffic correlation. May only be included when "externalGroupId" attribute was included within the TrafficInfluSub data type previously.<br><br><ul style="list-style-type: none"> <li>"true" indicates that for the group of UEs, the targeted PDU sessions should be correlated by a common DNAI.</li> <li>"false" indicates that for the group of UEs, the targeted PDU sessions should not be correlated by a common DNAI.</li> </ul> (NOTE 2) | CommonEASD<br>NAI |

|                   |                             |   |      |                                                                                                                                                                                                                                                                                                         |                    |
|-------------------|-----------------------------|---|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| tfcCorreInfo      | TrafficCorrelationInfo      | O | 0..1 | Contains the information for traffic correlation. The "notifUri" and "notifCorrId" attributes are not applicable for "tfcCorreInfo" attribute. (NOTE 2)                                                                                                                                                 | CommonEASD NAI     |
| tempValidities    | array(Temporal Validity)    | O | 1..N | Indicates the time interval(s) during which the AF request is to be applied. (NOTE 1)                                                                                                                                                                                                                   |                    |
| validGeoZoneIds   | array(string)               | O | 1..N | Identifies a geographic zone that the AF request applies only to the traffic of UE(s) located in this specific zone. (NOTE 1)<br>This attribute is deprecated; the attribute "geoAreas" should be used instead.                                                                                         |                    |
| geoAreas          | array(GeographicalArea)     | O | 1..N | Identifies geographical areas within which the AF request applies. (NOTE 1)<br>This attribute deprecates validGeoZoneIds attribute.                                                                                                                                                                     |                    |
| afAckInd          | boolean                     | O | 0..1 | Identifies whether the AF acknowledgement of UP path event notification is expected.<br><br>- "true" indicates that the AF acknowledgement of UP path event notification is expected.<br>- "false" indicates that the AF acknowledgement of UP path event notification is not expected.<br><br>(NOTE 3) | URLLC              |
| addrPreserInd     | boolean                     | O | 0..1 | Indicates whether UE IP address shall be preserved.<br><br>- "true" indicates that the UE IP address shall be preserved.<br>- "false" indicates that the UE IP address shall not be preserved.<br><br>(NOTE 3)                                                                                          | URLLC              |
| simConnInd        | boolean                     | O | 0..1 | Indication of whether simultaneous connectivity shall be temporarily maintained for the source and target PSA.<br><br>- "true" indicates that temporary simultaneous connectivity shall be kept.<br>- "false" indicates that the temporary simultaneous connectivity shall not be kept.                 | SimultConnectivity |
| simConnTerm       | DurationSec                 | O | 0..1 | Indication of the minimum time interval to be considered for inactivity of the traffic routed via the source PSA during the edge re-location procedure.                                                                                                                                                 | SimultConnectivity |
| maxAllowedUpLat   | UIntegerRm                  | O | 0..1 | Indicates the target user plane latency in units of milliseconds. The SMF may use this value to decide whether edge relocation is needed to ensure that the user plane latency does not exceed the value.                                                                                               | AF_latency         |
| easIpReplaceInfos | array(EasIpReplacementInfo) | O | 1..N | Contains EAS IP replacement information.                                                                                                                                                                                                                                                                | EASIPreplacement   |
| easRedisInd       | boolean                     | O | 0..1 | Indicates whether the EAS rediscovery is required for the application.                                                                                                                                                                                                                                  | EASDiscovery       |

|                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |   |      |                                                                                                                                                                                                                                                                                                                    |                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |   |      | <ul style="list-style-type: none"> <li>- "true" indicates that the EAS rediscovery is required for the application.</li> <li>- "false" indicates that the EAS rediscovery is not required for the application.</li> </ul> <p>The indication shall be invalid after it was applied unless it is provided again.</p> |                    |
| notificationDestination                                                                                                                                                                                                                                                                                                                                                                                                                  | Link                        | O | 0..1 | Contains the Callback URL to receive the notification from the NEF.                                                                                                                                                                                                                                                |                    |
| eventReq                                                                                                                                                                                                                                                                                                                                                                                                                                 | ReportingInformation        | O | 0..1 | Indicates the event reporting requirements.<br><br>This attribute may be provided if the "EDGEAPP" feature is supported.                                                                                                                                                                                           | EDGEAPP            |
| n6DelayInd                                                                                                                                                                                                                                                                                                                                                                                                                               | boolean                     | O | 0..1 | Indicates whether the AF requests to consider the N6 delay measurements.<br><br><ul style="list-style-type: none"> <li>- "true" indicates that the AF requests to consider the N6 delay measurements.</li> <li>- "false" indicates that the AF does not request to consider the N6 delay measurements.</li> </ul>  | N6DelayMeasurement |
| hHndlgControlInfo                                                                                                                                                                                                                                                                                                                                                                                                                        | AfHeaderHandlingControlInfo | O | 0..1 | Contains header handling control information for handling of payload headers.<br><br>(NOTE 4)                                                                                                                                                                                                                      | HeaderHandling     |
| <p>NOTE 1: The value of the property shall be set to NULL for removal.</p> <p>NOTE 2: The "tfcCorrInd" attribute and the "tfcCorrInfo" attribute are mutually exclusive.</p> <p>NOTE 3: The value of the property shall be set to NULL for removal, and in that case, the default value "false" applies.</p> <p>NOTE 4: The "notifId" and "notifUri" attributes within the AfHeaderHandlingControlInfo data type are not applicable.</p> |                             |   |      |                                                                                                                                                                                                                                                                                                                    |                    |

#### 5.4.3.3.4 Type: EventNotification

**Table 5.4.3.3.4-1: Definition of type EventNotification**

| Attribute name     | Data type       | P | Cardinality | Description                                                                                                                                                                                              | Applicability (NOTE 1) |
|--------------------|-----------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| afTransId          | string          | O | 0..1        | Identifies an NEF Northbound interface transaction, generated by the AF.                                                                                                                                 |                        |
| dnaiChgType        | DnaiChangeType  | C | 0..1        | Identifies the type of notification regarding UP path management event.<br><br>This attribute shall be present when the "subscribedEvent" attribute is set to "UP_PATH_CHANGE".<br><br>(NOTE 4)          |                        |
| sourceTrafficRoute | RouteToLocation | O | 0..1        | Identifies the N6 traffic routing information associated to the source DNAI.<br>May be present if the "subscribedEvent" sets to "UP_PATH_CHANGE", "TRAFF_ROUTE_REQ_OUTCOME" or "SIM_CONN_FAIL". (NOTE 3) |                        |
| subscribedEvent    | SubscribedEvent | M | 1           | Identifies a UP path management event the AF requested to be notified of.                                                                                                                                |                        |

|                      |                      |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |
|----------------------|----------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| targetTrafficRoute   | RouteToLocation      | O | 0..1 | Identifies the N6 traffic routing information associated to the target DNAI.<br>May be present if the "subscribedEvent" sets to "UP_PATH_CHANGE", "TRAFF_ROUTE_REQ_OUTCOME" or "SIM_CONN_FAIL". (NOTE 3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |
| sourceDnai           | Dnai                 | O | 0..1 | Source DN Access Identifier. Shall be included for events "UP_PATH_CHANGE", "TRAFF_ROUTE_REQ_OUTCOME" and "SIM_CONN_FAIL" if the DNAI changed (NOTE 2, NOTE 3).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |
| targetDnai           | Dnai                 | O | 0..1 | Target DN Access Identifier. Shall be included for events "UP_PATH_CHANGE", "TRAFF_ROUTE_REQ_OUTCOME" and "SIM_CONN_FAIL" if the DNAI changed (NOTE 2, NOTE 3).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |
| traffRouteReqOutcome | TraffRouteReqOutcome | C | 0..1 | Contains the installation outcome of the requested traffic routing requirements.<br><br>This attribute shall be present when the "subscribedEvent" attribute is set to "TRAFF_ROUTE_REQ_OUTCOME".<br>(NOTE 4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TraffRouteReqOutcome |
| candidateDnais       | array(Dnai)          | O | 1..N | The candidate DNAI(s) for the PDU Session. May be included for event "UP_PATH_CHANGE".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CommonEASD NAI       |
| candDnaisPriolnd     | boolean              | O | 0..1 | Indicates whether the candidate DNAI(s) provided within the "candidateDnais" attribute are in descending priority order, i.e., the lower the array index of the "candidateDnais" attribute the higher the priority of the respective DNAI.<br><br>- "true" indicates that the candidate DNAI(s) provided within the "candidateDnais" attribute are in descending priority order.<br>- "false" indicates that the candidate DNAI(s) provided within the "candidateDnais" attribute are not in descending priority order.<br>- The default value is "false" if this attribute is omitted.<br><br>This attribute may only be present if the "candidateDnais" attribute is also present and the "dnaiChgType" attribute is set to the value "EARLY". | CommonEASD NAI       |
| easRediscoverInd     | boolean              | O | 0..1 | Indication of EAS re-discovery. If present and set to "true", it indicates the EAS re-discovery is performed, e.g. due to change of common EAS. Default value is "false" if omitted. May be included for event "UP_PATH_CHANGE".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CommonEASD NAI       |
| gpsi                 | Gpsi                 | O | 0..1 | Identifies a user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |
| srcUelpv4Addr        | Ipv4Addr             | O | 0..1 | The IPv4 Address of the served UE for the source DNAI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |
| srcUelpv6Prefix      | Ipv6Prefix           | O | 0..1 | The Ipv6 Address Prefix of the served UE for the source DNAI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |   |      |                                                                                                                                                                                                                                                                                                                                                   |        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| tgtUeIpv4Addr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ipv4Addr          | O | 0..1 | The IPv4 Address of the served UE for the target DNAI.                                                                                                                                                                                                                                                                                            |        |
| tgtUeIpv6Prefix                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Ipv6Prefix        | O | 0..1 | The Ipv6 Address Prefix of the served UE for the target DNAI.                                                                                                                                                                                                                                                                                     |        |
| ueMac                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | MacAddr48         | O | 0..1 | UE MAC address of the served UE.                                                                                                                                                                                                                                                                                                                  |        |
| afAckUri                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Link              | O | 0..1 | The URI provided by the NEF for the AF acknowledgement.<br>May only be included for event "UP_PATH_CHANGE".                                                                                                                                                                                                                                       | URLLC  |
| offloadPlmnId                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | PlmnId            | O | 0..1 | If the event is "UP_PATH_CHANGE" and the UE has moved to a serving PLMN where local traffic offloading is allowed, this attribute contains the identifier of the serving PLMN.                                                                                                                                                                    | HR-SBO |
| hDnn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Dnn               | O | 0..1 | If the event is "UP_PATH_CHANGE" and the UE has moved to a serving PLMN where local traffic offloading is allowed, this attribute contains the DNN at the Home PLMN.                                                                                                                                                                              | HR-SBO |
| hSnssai                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Snssai            | O | 0..1 | If the the event is "UP_PATH_CHANGE" and UE has moved to a serving PLMN where local traffic offloading is allowed, this attribute contains the S-NSSAI at the Home PLMN.                                                                                                                                                                          | HR-SBO |
| suppFeatures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SupportedFeatures | C | 0..1 | List of Traffic Influence negotiated features as described in clause 5.4.4. This parameter shall be supplied by the NEF when it determines that it needs to update the supported features that were negotiated during the resource creation due to a notification received by the SMF which contained updated supported features on the SMF side. | HR-SBO |
| <p>NOTE 1: Properties marked with a feature as defined in clause 5.4.4 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property applies for all the features.</p> <p>NOTE 2: If the DNAI is not changed while the N6 traffic routing information is changed, the "sourceDnai" attribute and "targetDnai" attribute shall not be provided.</p> <p>NOTE 3: The change from the UP path status where no DNAI applies to a status where a DNAI applies indicates the activation of the related AF request and therefore only the target DNAI and N6 traffic routing information is provided in the event notification; the change from the UP path status where a DNAI applies to a status where no DNAI applies indicates the de-activation of the related AF request and therefore only the source DNAI and N6 traffic routing information is provided in the event notification.</p> <p>NOTE 4: These attributes are mutually exclusive.</p> |                   |   |      |                                                                                                                                                                                                                                                                                                                                                   |        |

#### 5.4.3.3.5 Type: AfResultInfo

**Table 5.4.3.3.5-1: Definition of type AfResultInfo**

| Attribute name | Data type       | P | Cardinality | Description                                                                                                                                                          | Applicability |
|----------------|-----------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afStatus       | AfResultStatus  | M | 1           | Identifies the result of the application relocation.                                                                                                                 |               |
| trafficRoute   | RouteToLocation | O | 0..1        | Identifies the N6 traffic routing information associated to the target DNAI.<br>May only be present if the "afStatus" sets to "SUCCESS".                             |               |
| upBuffInd      | boolean         | O | 0..1        | Indicates whether buffering of uplink traffic to the target DNAI is needed.<br><br>- "true" indicates that buffering of uplink traffic to the target DNAI is needed. | ULBuffering   |

|                   |                             |   |      |                                                                                                                                                                                                                                                                           |                  |
|-------------------|-----------------------------|---|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|                   |                             |   |      | <ul style="list-style-type: none"> <li>- "false" indicates that buffering of uplink traffic to the target DNAI is not needed.</li> <li>- Default value is "false" if omitted.</li> </ul> <p>This attribute may only be present if the "afStatus" is set to "SUCCESS".</p> |                  |
| easIpReplaceInfos | array(EasIpReplacementInfo) | O | 1..N | Contains EAS IP replacement information.                                                                                                                                                                                                                                  | EASIPreplacement |

#### 5.4.3.3.6 Type AfAckInfo

**Table 5.4.3.3.6-1: Definition of type AfAckInfo**

| Attribute name | Data type    | P | Cardinality | Description                                                                                                                         | Applicability |
|----------------|--------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afTransId      | string       | C | 0..1        | Identifies an NEF Northbound interface transaction, generated by the AF. It shall be provided if the AF has previously provided it. |               |
| ackResult      | AfResultInfo | M | 1           | Identifies the result of application layer handling.                                                                                |               |
| gpsi           | Gpsi         | O | 0..1        | Identifies a GPSI.                                                                                                                  |               |

#### 5.4.3.3.7 Type TrafficDataSet

**Table 5.4.3.3.7-1: Definition of type TrafficDataSet**

| Attribute name    | Data type                 | P | Cardinality | Description                                   | Applicability |
|-------------------|---------------------------|---|-------------|-----------------------------------------------|---------------|
| setId             | string                    | M | 1           | Identifies the traffic data set.              |               |
| trafficFilters    | array(FlowInfo)           | C | 1..N        | Contains IP packet filters.<br>(NOTE)         |               |
| ethTrafficFilters | array(EthFlowDescription) | C | 1..N        | Contains Ethernet packet filters.<br>(NOTE)   |               |
| trafficRoutes     | array(RouteToLocation)    | M | 1..N        | Contains the N6 traffic routing requirements. |               |

NOTE: These attributes are mutually exclusive. Either one of them shall be present.

#### 5.4.3.3.8 Type TrafficDataSetRm

This data type is defined in the same way as the "TrafficDataSet" data type, but:

- with the OpenAPI "nullable: true" property.
- the removable attributes "trafficFilters" and "ethTrafficFilters" and "trafficRoutes" are defined as nullable in the OpenAPI.

**Table 5.4.3.3.8-1: Definition of type TrafficDataSetRm**

| Attribute name | Data type       | P | Cardinality | Description                      | Applicability |
|----------------|-----------------|---|-------------|----------------------------------|---------------|
| setId          | string          | M | 1           | Identifies the traffic data set. |               |
| trafficFilters | array(FlowInfo) | O | 1..N        | Contains IP packet filters.      |               |



|                   |                           |   |      |                                               |  |
|-------------------|---------------------------|---|------|-----------------------------------------------|--|
| ethTrafficFilters | array(EthFlowDescription) | O | 1..N | Contains Ethernet packet filters.             |  |
| trafficRoutes     | array(RouteToLocation)    | O | 1..N | Contains the N6 traffic routing requirements. |  |

#### 5.4.3.3.9 Type: HeaderHandlingReport

**Table 5.4.3.3.9-1: Definition of type HeaderHandlingReport**

| Attribute name | Data type                          | P | Cardinality | Description                                                                   | Applicability |
|----------------|------------------------------------|---|-------------|-------------------------------------------------------------------------------|---------------|
| afTransId      | string                             | M | 1           | Identifies an NEF Northbound interface transaction, generated by the AF.      |               |
| repEvents      | array(HeaderHandlingActionRequest) | M | 1..N        | The list of reported header handling action performed on the Payload Headers. |               |

### 5.4.3.4 Simple data types and enumerations

#### 5.4.3.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.4.3.4.2 Simple data types

The simple data types defined in table 5.4.3.4.2-1 shall be supported.

**Table 5.4.3.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

#### 5.4.3.4.3 Enumeration: SubscribedEvent

The enumeration SubscribedEvent represents the type of UP path management events for which the AF requests to be notified. It shall comply with the provisions defined in table 5.4.3.4.3-1.

**Table 5.4.3.4.3-1: Enumeration SubscribedEvent**

| Enumeration value       | Description                                                                                                                                                                                                  | Applicability          |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| UP_PATH_CHANGE          | The AF requests to be notified when the UP path changes for the PDU session.                                                                                                                                 |                        |
| TRAFF_ROUTE_REQ_OUTCOME | The AF requests to be notified about the installation outcome of the requested traffic routing requirements.                                                                                                 | TrafficRouteReqOutcome |
| SIM_CONN_FAIL           | The AF requests to be notified if the requested Simultaneous Connectivity over the source and the target PDU Session Anchor fails. If the Simultaneous Connectivity succeeds, no notifications will be sent. | SimConnFailure         |

#### 5.4.3.4.4 Enumeration: AfResultStatus

The enumeration AfResultStatus represents the status of application handling result. It shall comply with the provisions defined in table 5.4.3.4.4-1.

**Table 5.4.3.4.4-1: Enumeration AfResultStatus**

| Enumeration value    | Description                                                                     |
|----------------------|---------------------------------------------------------------------------------|
| SUCCESS              | The application layer is ready or the relocation is completed.                  |
| TEMPORARY_CONGESTION | The application relocation fails due to temporary congestion.                   |
| RELOC_NO_ALLOWED     | The application relocation fails because application relocation is not allowed. |
| OTHER                | The application relocation fails due to other reason.                           |

## 5.4.4 Used Features

The table below defines the features applicable to the TrafficInfluence API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.4.4-1: Features used by TrafficInfluence API**

| Feature number | Feature Name            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | Notification_websocket  | The delivery of notifications over Websocket is supported as described in 3GPP TS 29.122 [4]. This feature requires that the Notification_test_event feature is also supported.                                                                                                                                                                                                                                                                        |
| 2              | Notification_test_event | The testing of notification connection is supported as described in 3GPP TS 29.122 [4].                                                                                                                                                                                                                                                                                                                                                                |
| 3              | URLLC                   | This feature indicates support of Ultra Reliable Low Latency Communication (URLLC) requirements (i.e. AF application relocation acknowledgement and UE address(es) preservation).                                                                                                                                                                                                                                                                      |
| 4              | MacAddressRange         | Indicates the support of a set of MAC addresses with a specific range in the traffic filter.                                                                                                                                                                                                                                                                                                                                                           |
| 5              | AF_latency              | This feature indicates support for Edge relocation considering user plane latency.                                                                                                                                                                                                                                                                                                                                                                     |
| 6              | EASDiscovery            | This feature indicates the support of EAS (re)discovery.                                                                                                                                                                                                                                                                                                                                                                                               |
| 7              | EASIPreplacement        | This feature indicates the support of provisioning of EAS IP replacement info.                                                                                                                                                                                                                                                                                                                                                                         |
| 8              | ExposureToEAS           | This feature indicates support for the indication provided by the AF of direct event notification of QoS monitoring events from the UPF to the Local NEF or the AF in 5GC.                                                                                                                                                                                                                                                                             |
| 9              | SimultConnectivity      | This feature indicates support of temporary simultaneous connectivity over source and target PSA at edge relocation.                                                                                                                                                                                                                                                                                                                                   |
| 10             | ULBuffering             | This feature indicates support for Uplink buffering indication for edge relocation.                                                                                                                                                                                                                                                                                                                                                                    |
| 11             | EDGEAPP                 | This feature controls the support of EDGE applications related functionalities (e.g. support the provisioning of event reporting requirements).                                                                                                                                                                                                                                                                                                        |
| 12             | SFC                     | This feature indicates support for application function influence on service function chaining(s).                                                                                                                                                                                                                                                                                                                                                     |
| 13             | FinerGranUEs            | This feature indicates support for handling of more granular set of UEs.                                                                                                                                                                                                                                                                                                                                                                               |
| 14             | CommonEASDNAI           | This feature controls the support of the common EAS/DNAI selection.                                                                                                                                                                                                                                                                                                                                                                                    |
| 15             | HR-SBO                  | This feature indicates the support of HR-SBO scenarios.                                                                                                                                                                                                                                                                                                                                                                                                |
| 16             | MultiTrafficInflu       | This feature indicates the support for providing more than one set of traffic filters and the corresponding N6 traffic routing requirements for traffic influence.                                                                                                                                                                                                                                                                                     |
| 17             | MultiTrafficInflu_Ext1  | This feature indicates the support of enhancements related to providing more than one set of traffic filters and the corresponding N6 traffic routing requirements for traffic influence request not identified by UE Address. This support requires that the MultiTrafficInflu feature is also supported.                                                                                                                                             |
| 18             | TraffRouteReqOutcome    | This feature indicates the support of providing the installation outcome of the traffic routing requirements provided by the AF.                                                                                                                                                                                                                                                                                                                       |
| 19             | N6DelayMeasurement      | This feature indicates the support of considering N6 delay measurements in traffic influence management.                                                                                                                                                                                                                                                                                                                                               |
| 20             | HeaderHandling          | <p>This feature indicates the support of the header handling functionality.</p> <p>This feature enables the following functionality:</p> <ul style="list-style-type: none"> <li>- The support of provisioning of Header Handling Control information for handling of Payload Headers.</li> <li>- The support of notifications on UPF events related to detection of Payload Headers or related to the actions performed on Payload Headers.</li> </ul> |

|    |                |                                                                                                                                                                   |
|----|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 21 | SimConnFailure | This feature indicates the support of Simultaneous Connectivity failure events.<br>This feature requires that the "SimultConnectivity" feature is also supported. |
|----|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 5.4.5 Error handling

### 5.4.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.4.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the TrafficInfluence API.

### 5.4.5.3 Application Errors

The application errors defined for TrafficInfluence API are listed in table 5.4.5.3-1.

**Table 5.4.5.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.5 NiddConfigurationTrigger API

### 5.5.0 Introduction

The Nnef\_NiddConfigurationTrigger service shall use the NiddConfigurationTrigger API.

The API URI of NiddConfigurationTrigger API shall be:

**{apiRoot}/3gpp-nidd-configuration-trigger/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-nidd-configuration-trigger".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.5.1 Resources

There is no resource defined for this API in this release of the specification.

### 5.5.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.5.2 Notifications

### 5.5.2.1 Introduction

Upon receipt of a NIDD connection establishment request from the SMF and there is no NIDD configuration for the UE, the NEF may send an HTTP POST message in order to trigger the AF to start the NIDD configuration procedure as described in clause 5.6.3.2.3.4 of 3GPP TS 29.122 [4].

**Table 5.5.2.1-1: Notifications overview**

| Notification       | Callback URI      | HTTP method or custom operation | Description (service operation)            |
|--------------------|-------------------|---------------------------------|--------------------------------------------|
| Event Notification | {notificationUri} | POST                            | Request for the NIDD Configuration Trigger |

### 5.5.2.2 Event Notification

The Callback URI "{notificationUri}" shall be used with the callback URI variables defined in table 5.5.2.2-1.

**Table 5.5.2.2-1: Callback URI variables**

| Name            | Data type | Definition                                                                                                                                          |
|-----------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| notificationUri | Link      | A URI indicating the notification destination where N33 notification requests shall be delivered to.<br>This URI shall be preconfigured in the NEF. |

### 5.5.2.3 Operation Definition

#### 5.5.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.5.2.3.1-1 and the response data structures and response codes specified in table 5.5.2.3.1-2.

**Table 5.5.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type                | P | Cardinality | Description                                                      |
|--------------------------|---|-------------|------------------------------------------------------------------|
| NiddConfigurationTrigger | M | 1           | The NIDD Configuration Trigger is provided by the NEF to the AF. |

**Table 5.5.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NiddConfigurationTriggerReply                                                                                             | M | 1           | 200 OK                 | The trigger is received successfully.                                                                                                                                                                                                                                                                  |
| N/A                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection, during Configuration Trigger. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection, during Configuration Trigger. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                        |

**Table 5.5.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.5.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

### 5.5.2.3.2 Notification via Websocket

Not specified in the present specification.

## 5.5.3 Data Model

### 5.5.3.1 General

This clause specifies the application data model supported by the NiddConfigurationTrigger API.

### 5.5.3.2 Reused data types

The data types reused by the NiddConfigurationTrigger API from other specifications are listed in table 5.5.3.2-1.

**Table 5.5.3.2-1: Re-used Data Types**

| Data type         | Reference          | Comments                                                                               |
|-------------------|--------------------|----------------------------------------------------------------------------------------|
| Gpsi              | 3GPP TS 29.571 [8] | Identifies a GPSI.                                                                     |
| SupportedFeatures | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features defined in table 5.5.4-1. |

### 5.5.3.3 Structured data types

#### 5.5.3.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.5.3.3.2 Type: NiddConfigurationTrigger

This type represents a NIDD configuration trigger which is sent from the NEF to the AF.

**Table 5.5.3.3.2-1: Definition of type NiddConfigurationTrigger**

| Attribute name | Data type         | P | Cardinality | Description                                                                 | Applicability (NOTE) |
|----------------|-------------------|---|-------------|-----------------------------------------------------------------------------|----------------------|
| afId           | string            | M | 1           | Identifies the trigger receiving entity.                                    |                      |
| nefId          | string            | M | 1           | Identifies the trigger sending entity.                                      |                      |
| gpsi           | Gpsi              | M | 1           | Identifies a user.                                                          |                      |
| suppFeat       | SupportedFeatures | M | 1           | Indicates the list of Supported features used as described in clause 5.5.4. |                      |

NOTE: Properties marked with a feature as defined in clause 5.5.4 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property applies for all the features.

### 5.5.3.3.3 Type: NiddConfigurationTriggerReply

This data type represents a reply to a NIDD configuration trigger and is sent from the AF to the NEF.

**Table 5.5.3.3.3-1: Definition of type NiddConfigurationTriggerReply**

| Attribute name                                                                                                                                                                                                      | Data type         | P | Cardinality | Description                                                                 | Applicability (NOTE) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---|-------------|-----------------------------------------------------------------------------|----------------------|
| suppFeat                                                                                                                                                                                                            | SupportedFeatures | M | 1           | Indicates the list of Supported features used as described in clause 5.5.4. |                      |
| NOTE: Properties marked with a feature as defined in clause 5.5.4 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property applies for all the features. |                   |   |             |                                                                             |                      |

### 5.5.3.4 Simple data types and enumerations

#### 5.5.3.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.5.3.4.2 Simple data types

The simple data types defined in table 5.5.3.4.2-1 shall be supported.

**Table 5.5.3.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.5.4 Used Features

The table below defines the features applicable to the NiddConfigurationTrigger API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.5.4-1: Features used by NiddConfigurationTrigger API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

### 5.5.5 Error handling

#### 5.5.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

5.5.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the NiddConfigurationTrigger API.

5.5.5.3 Application Errors

The application errors defined for NiddConfigurationTrigger API are listed in table 5.5.5.3-1.

Table 5.5.5.3-1: Application errors

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

5.6 AnalyticsExposure API

5.6.0 Introduction

The Nnef\_AnalyticsExposure service shall use the AnalyticsExposure API.

The API URI of AnalyticsExposure API shall be:

**{apiRoot}/3gpp-analyticsexposure/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-analyticsexposure".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

5.6.1 Resources

5.6.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.6.1.1-1 and the resources and HTTP methods used for the AnalyticsExposure API.

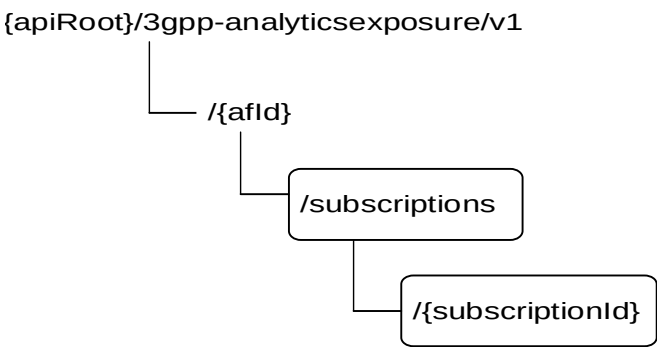


Figure 5.6.1.1-1: Resource URI structure of the AnalyticsExposure API

Table 5.6.1.1-1 provides an overview of the resources and HTTP methods applicable for the AnalyticsExposure API.

**Table 5.6.1.1-1: Resources and methods overview**

| Resource name                              | Resource URI                           | HTTP method | Description                                                          |
|--------------------------------------------|----------------------------------------|-------------|----------------------------------------------------------------------|
| Analytics Exposure Subscriptions           | /{afId}/subscriptions                  | GET         | Retrieve all the subscriptions to analytics exposure for a given AF. |
|                                            |                                        | POST        | Create a new subscription to analytics exposure.                     |
| Individual Analytics Exposure Subscription | /{afId}/subscriptions/{subscriptionId} | GET         | Retrieve an existing subscription to analytics exposure.             |
|                                            |                                        | PUT         | Update an existing subscription to analytics exposure.               |
|                                            |                                        | DELETE      | Delete an existing subscription to analytics exposure.               |

## 5.6.1.2 Resource: Analytics Exposure Subscriptions

### 5.6.1.2.1 Introduction

This resource allows a AF to read all active analytics exposure subscriptions for the given AF, or allows a AF to create a new subscription to retrieve analytics information.

### 5.6.1.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-analyticsexposure/v1/{afId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.6.1.2.2-1.

**Table 5.6.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

### 5.6.1.2.3 Resource Methods

#### 5.6.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.6.1.2.2.

#### 5.6.1.2.3.2 GET

The GET method allows to read all active subscriptions for a given AF. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.6.1.2.3.2-1.

**Table 5.6.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name      | Data type         | P | Cardinality | Description                              |
|-----------|-------------------|---|-------------|------------------------------------------|
| supp-feat | SupportedFeatures | O | 0..1        | Contains the list of supported features. |

This method shall support the request data structures specified in table 5.6.1.2.3.2-2 and the response data structures and response codes specified in table 5.6.1.2.3.2-3.

**Table 5.6.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
|-----------|---|-------------|-------------|



|     |  |  |  |
|-----|--|--|--|
| N/A |  |  |  |
|-----|--|--|--|

**Table 5.6.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(AnalyticsExposureSubsc)                                                                                              | M | 0..N        | 200 OK                 | The subscription information for the AF in the request URI are returned.                                                                                                                                                                                        |
| N/A                                                                                                                        |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                        |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                             | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                                                        |
| NOTE 1: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                 |
| NOTE 2: Failure causes are described in clause 5.6.5.                                                                      |   |             |                        |                                                                                                                                                                                                                                                                 |

**Table 5.6.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.6.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.6.1.2.3.3 POST

The POST method creates a new subscription resource to analytics exposure subscription for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.6.1.2.3.3-1 and the response data structures and response codes specified in table 5.6.1.2.3.3-2.

**Table 5.6.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type              | P | Cardinality | Description                                                                          |
|------------------------|---|-------------|--------------------------------------------------------------------------------------|
| AnalyticsExposureSubsc | M | 1           | Parameters to request a subscription to retrieve analytics information with the NEF. |

**Table 5.6.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type              | P | Cardinality | Response codes | Description                                                                                                                    |
|------------------------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------|
| AnalyticsExposureSubsc | M | 1           | 201 Created    | The subscription was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |

|                                                                                                                             |   |      |                           |          |
|-----------------------------------------------------------------------------------------------------------------------------|---|------|---------------------------|----------|
| ProblemDetails                                                                                                              | O | 0..1 | 400 Bad Request           | (NOTE 2) |
| ProblemDetails                                                                                                              | O | 0..1 | 403 Forbidden             | (NOTE 2) |
| ProblemDetails                                                                                                              | O | 0..1 | 404 Not Found             | (NOTE 2) |
| ProblemDetails                                                                                                              | O | 0..1 | 500 Internal Server Error | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |      |                           |          |
| NOTE 2: Failure causes are described in clause 5.6.5.                                                                       |   |      |                           |          |

**Table 5.6.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                                  |
|----------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br><br>{apiRoot}/3gpp-analyticsexposure/v1/{afId}/subscriptions/{subscriptionId} |

### 5.6.1.3 Resource: Individual Analytics Exposure Subscription

#### 5.6.1.3.1 Introduction

This resource allows a AF to read/modify/cancel a subscription to retrieve analytics information with the NEF.

#### 5.6.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-analyticsexposure/v1/{afId}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.6.1.3.2-1.

**Table 5.6.1.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                               |
|----------------|-----------|------------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].      |
| afId           | string    | Identifier of the AF.                    |
| subscriptionId | string    | Identifier of the subscription resource. |

#### 5.6.1.3.3 Resource Methods

##### 5.6.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.6.1.3.2.

##### 5.6.1.3.3.2 GET

The GET method allows to read the active subscription for a given AF and subscription Id. The AF shall initiate the HTTP GET request message and theNEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.6.1.3.3.2-1.

**Table 5.6.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name      | Data type         | P | Cardinality | Description                              |
|-----------|-------------------|---|-------------|------------------------------------------|
| supp-feat | SupportedFeatures | O | 0..1        | Contains the list of supported features. |

This method shall support the request data structures specified in table 5.6.1.3.3.2-2 and the response data structures and response codes specified in table 5.6.1.3.3.2-3.

**Table 5.6.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.6.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AnalyticsExposureSubsc                                                                                                   | M | 1           | 200 OK                 | The subscription information for the AF in the request URI are returned.                                                                                                                                                                                               |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                        |

**Table 5.6.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.6.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.6.1.3.3.3 PUT

The PUT method modifies an existing subscription resource to update a subscription. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.6.1.3.3.3-1 and the response data structures and response codes specified in table 5.6.1.3.3.3-2.

**Table 5.6.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type              | P | Cardinality | Description                                                                     |
|------------------------|---|-------------|---------------------------------------------------------------------------------|
| AnalyticsExposureSubsc | M | 1           | Modify an existing subscription to retrieve analytics information with the NEF. |

**Table 5.6.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response codes            | Description                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AnalyticsExposureSubsc                                                                                                     | M | 1           | 200 OK                    | The subscription was updated successfully.                                                                                                                                                                                                                                |
| N/A                                                                                                                        |   |             | 204 No Content            | The subscription was updated successfully.                                                                                                                                                                                                                                |
| N/A                                                                                                                        |   |             | 307 Temporary Redirect    | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                        |   |             | 308 Permanent Redirect    | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                             | O | 0..1        | 400 Bad Request           | (NOTE 2)                                                                                                                                                                                                                                                                  |
| ProblemDetails                                                                                                             | O | 0..1        | 403 Forbidden             | (NOTE 2)                                                                                                                                                                                                                                                                  |
| ProblemDetails                                                                                                             | O | 0..1        | 500 Internal Server Error | (NOTE 2)                                                                                                                                                                                                                                                                  |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                           |                                                                                                                                                                                                                                                                           |
| NOTE 2: Failure causes are described in clause 5.6.5.                                                                      |   |             |                           |                                                                                                                                                                                                                                                                           |

**Table 5.6.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.6.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.6.1.3.3.4 DELETE

The DELETE method deletes the analytics exposure subscription for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.6.1.3.3.4-1.

**Table 5.6.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.6.1.3.3.4-2 and the response data structures and response codes specified in table 5.6.1.3.3.4-3.

**Table 5.6.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.6.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |   |             | 204 No Content         | The subscription was terminated successfully.                                                                                                                                                                                                                            |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                          |

**Table 5.6.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.6.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.6.1A Custom Operations without associated resources

### 5.6.1A.1 Overview

Custom operations used for this API are summarized in table 5.6.1A.1-1. "apiRoot" is set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

**Table 5.6.1A.1-1: Custom operations without associated resources**

| Operation name | Custom operation URI                             | Mapped HTTP method | Description                            |
|----------------|--------------------------------------------------|--------------------|----------------------------------------|
| fetch          | {apiRoot}/3gpp-analyticsexposure/v1/{afId}/fetch | POST               | Request to fetch analytics information |

## 5.6.1A.2 Operation: fetch

### 5.6.1A.2.1 Description

The custom operation allows a service consumer to fetch analytics information via the NEF.

### 5.6.1A.2.2 Operation Definition

This operation shall support the response data structures and response codes specified in tables 5.6.1A.2.2-1 and 5.6.1A.2.2-2.

**Table 5.6.1A.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type        | P | Cardinality | Description                                           |
|------------------|---|-------------|-------------------------------------------------------|
| AnalyticsRequest | M | 1           | Parameters to request to fetch analytics information. |

**Table 5.6.1A.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes            | Description                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AnalyticsData                                                                                                               | M | 1           | 200 OK                    | The requested analytics information was returned successfully.                                                                                                                                                                                                                  |
| n/a                                                                                                                         |   |             | 204 No Content            | If the request Analytics data does not exist, the NEF shall respond with "204 No Content".                                                                                                                                                                                      |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect    | Temporary redirection, during analytics information retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect    | Permanent redirection, during analytics information retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                              | O | 0..1        | 400 Bad Request           | (NOTE 2)                                                                                                                                                                                                                                                                        |
| ProblemDetails                                                                                                              | O | 0..1        | 403 Forbidden             | (NOTE 2)                                                                                                                                                                                                                                                                        |
| ProblemDetails                                                                                                              | O | 0..1        | 500 Internal Server Error | (NOTE 2)                                                                                                                                                                                                                                                                        |
| ProblemDetailsAnalyticsInfoRequest                                                                                          | O | 0..1        | 500 Internal Server Error | The request is rejected by the NEF and more details (not only the ProblemDetails) may be returned.<br>(NOTE 2)                                                                                                                                                                  |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                           |                                                                                                                                                                                                                                                                                 |
| NOTE 2: Failure causes are described in clause 5.6.5.                                                                       |   |             |                           |                                                                                                                                                                                                                                                                                 |

**Table 5.6.1A.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.6.1A.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

## 5.6.2 Notifications

### 5.6.2.1 Introduction

Upon receipt of analytics information notification from the NWDAF indicating the subscribed analytics event is detected, the NEF shall send an HTTP POST message including the notified analytics event to the AF. The NEF and the AF shall support the notification mechanism as described in clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.6.2.1-1: Notifications overview**

| Notification       | Callback URI | HTTP method or custom operation | Description (service operation)                                    |
|--------------------|--------------|---------------------------------|--------------------------------------------------------------------|
| Event Notification | {notifUri}   | POST                            | The analytics event notification is provided by the NEF to the AF. |

### 5.6.2.2 Event Notification

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 5.6.2.2-1.

**Table 5.6.2.2-1: Callback URI variables**

| Name     | Definition                                                                                                                                                          |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| notifUri | Callback reference provided by the AF during creation/modification of the subscription within the AnalyticsExposureSubsc data type as defined in Table 5.6.3.3.2-1. |

### 5.6.2.3 Operation Definition

#### 5.6.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.6.2.3.1-1 and the response data structures and response codes specified in table 5.6.2.3.1-2.

**Table 5.6.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type                  | P | Cardinality | Description                                                        |
|----------------------------|---|-------------|--------------------------------------------------------------------|
| AnalyticsEventNotification | M | 1           | The analytics event notification is provided by the NEF to the AF. |

**Table 5.6.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                         |
|-----------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A       |   |             | 204 No Content         | The event notification is received successfully.                                                                                                                                                                                                                                                    |
| N/A       |   |             | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A       |   |             | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.                                                                           |

|                                                                                                                           |  |  |  |                                                                           |
|---------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------|
|                                                                                                                           |  |  |  | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |  |                                                                           |

**Table 5.6.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.6.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

### 5.6.2.3.2 Notification via Websocket

If supported by both AF and NEF and successfully negotiated, the AnalyticsEventNotification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4 of 3GPP TS 29.122 [4].

## 5.6.3 Data Model

### 5.6.3.1 General

This clause specifies the application data model supported by the AnalyticsExposure API.

Table 5.6.3.1-1 specifies the data types defined for the AnalyticsExposure API.

**Table 5.6.3.1-1: AnalyticsExposure API specific Data Types**

| Data type                  | Clause defined | Description                                                                                                            | Applicability        |
|----------------------------|----------------|------------------------------------------------------------------------------------------------------------------------|----------------------|
| AbnormalExposure           | 5.6.3.3.15     | Represents a user's abnormal behavior information.                                                                     | Abnormal_Behavior    |
| AnalyticsData              | 5.6.3.3.14     | Represents analytics data.                                                                                             |                      |
| AnalyticsEvent             | 5.6.3.4.3      | Event that is subscribed.                                                                                              |                      |
| AnalyticsEventFilter       | 5.6.3.3.13     | Represents analytics event filter information.                                                                         |                      |
| AnalyticsEventFilterSubsc  | 5.6.3.3.6      | Represents an analytics event filter.                                                                                  |                      |
| AnalyticsEventNotif        | 5.6.3.3.4      | Represents an analytics event to be reported.                                                                          |                      |
| AnalyticsEventNotification | 5.6.3.3.3      | Represents an analytics event(s) notification.                                                                         |                      |
| AnalyticsEventSubsc        | 5.6.3.3.5      | Represents a subscribed analytics event.                                                                               |                      |
| AnalyticsExposureSubsc     | 5.6.3.3.2      | Represents an analytics exposure subscription.                                                                         |                      |
| AnalyticsFailureCode       | 5.6.3.4.4      | Identifies the failure reason.                                                                                         |                      |
| AnalyticsFailureEventInfo  | 5.6.3.3.20     | Represents an event for which the subscription request was not successful and including the associated failure reason. |                      |
| AnalyticsRequest           | 5.6.3.3.12     | Represents the parameters to request to retrieve analytics information.                                                |                      |
| CongestInfo                | 5.6.3.3.16     | Represents a UE's user data congestion information.                                                                    | Congestion           |
| CongestionAnalytics        | 5.6.3.3.17     | Represents data congestion analytics for transfer over the user plane, control plane or both.                          |                      |
| NetworkPerfExposure        | 5.6.3.3.19     | Represents network performance information.                                                                            | Network_Performance  |
| QoSSustainabilityExposure  | 5.6.3.3.18     | Represents a QoS sustainability information.                                                                           | QoS_Sustainability   |
| TargetUeId                 | 5.6.3.3.7      | Represents the target UE(s) information.                                                                               |                      |
| UeLocationInfo             | 5.6.3.3.10     | Represents a UE location information.                                                                                  |                      |
| UeMobilityExposure         | 5.6.3.3.9      | Represents a UE mobility information.                                                                                  | Ue_Mobility          |
| WlanPerformInfo            | 5.6.3.3.21     | Prpresents WLAN performance information                                                                                | WlanPerformance_AIML |



### 5.6.3.2 Reused data types

The data types reused by the AnalyticsExposure API from other specifications are listed in table 5.6.3.2-1.

**Table 5.6.3.2-1: Re-used Data Types**

| Data type                 | Reference           | Comments                                                                      | Applicability                                                                                                                                    |
|---------------------------|---------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| AccuracyInfo              | 3GPP TS 29.520 [27] | The analytics accuracy information.                                           | AnalyticsAccuracy                                                                                                                                |
| AccuracyReq               | 3GPP TS 29.520 [27] | Represents the analytics accuracy requirement information.                    | AnalyticsAccuracy                                                                                                                                |
| AdditionalMeasurement     | 3GPP TS 29.520 [27] | Represents additional measurement information.                                |                                                                                                                                                  |
| AddrFqdn                  | 3GPP TS 29.517 [58] | Represents an IP address and/or an FQDN.                                      | ServiceExperience<br>DnPerformance                                                                                                               |
| AnalyticsFeedbackInfo     | 3GPP TS 29.520 [27] | Represents analytics feedback information.                                    |                                                                                                                                                  |
| AnalyticsSubset           | 3GPP TS 29.520 [27] | Represents an analytics Subset used to indicate the content of the analytics. | EneNA                                                                                                                                            |
| ApplicationId             | 3GPP TS 29.571 [8]  | Contains the application identifier.                                          | Abnormal_Behavior<br>Ue_Communication<br>Dispersion<br>DnPerformance<br>ServiceExperience<br>E2eDataVolTransTime                                 |
| BitRate                   | 3GPP TS 29.571 [8]  | Represents a bit rate.                                                        |                                                                                                                                                  |
| BwRequirement             | 3GPP TS 29.520 [27] | Represents bandwidth requirements.                                            | ServiceExperience                                                                                                                                |
| CongestionType            | 3GPP TS 29.520 [27] | Represents a congestion analytics type.                                       |                                                                                                                                                  |
| DateTime                  | 3GPP TS 29.122 [4]  | Represents a date and a time.                                                 |                                                                                                                                                  |
| DirectionInfo             | 3GPP TS 29.520 [27] | Represents the UE direction information                                       | UeMobilityExt_AIML                                                                                                                               |
| DispersionInfo            | 3GPP TS 29.520 [27] | Dispersion information.                                                       | Dispersion                                                                                                                                       |
| DispersionRequirement     | 3GPP TS 29.520 [27] | Dispersion requirement.                                                       | Dispersion                                                                                                                                       |
| Dnai                      | 3GPP TS 29.571 [8]  | Identifies a user plane access to one or more DN(s).                          | DnPerformance<br>ServiceExperience<br>E2eDataVolTransTime                                                                                        |
| Dnn                       | 3GPP TS 29.571 [8]  | Represents a DNN.                                                             | Ue_Communication<br>Abnormal_Behavior<br>DnPerformance<br>ServiceExperience<br>E2eDataVolTransTime                                               |
| DnPerfInfo                | 3GPP TS 29.520 [27] | DN Performance information.                                                   | DnPerformance                                                                                                                                    |
| DnPerformanceReq          | 3GPP TS 29.520 [27] | DN Performance requirement.                                                   | DnPerformance                                                                                                                                    |
| DurationSec               | 3GPP TS 29.122 [4]  | Seconds of duration.                                                          | EneNA<br>NetworkPerfExt_eNA<br>Ue_MobilityExt_eNA<br>CongestionExt_eNA<br>QoS_SustainabilityExt_eNA<br>DispersionExt_eNA<br>DnPerformanceExt_eNA |
| EventReportingRequirement | 3GPP TS 29.520 [27] | Represents the required type of reporting.                                    |                                                                                                                                                  |
| ExternalGroupId           | 3GPP TS 29.122 [4]  | External Group Identifier for a user group.                                   | Abnormal_BehaviorUe_Mobility<br>Ue_Communication<br>Network_Performance<br>Dispersion<br>DnPerformance<br>ServiceExperience                      |
| Exception                 | 3GPP TS 29.520 [27] | Represents exception information.                                             |                                                                                                                                                  |

|                                    |                     |                                                                                                                                   |                                                                                                                                                            |
|------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ExceptionId                        | 3GPP TS 29.520 [27] | Represents the identifier of an exception.                                                                                        | Abnormal_Behavior                                                                                                                                          |
| ExpectedAnalyticsType              | 3GPP TS 29.520 [27] | Represents the exception's trend.                                                                                                 | Abnormal_Behavior                                                                                                                                          |
| ExpectedUeBehaviourData            | 3GPP TS 29.503 [17] | Represents the expected UE behaviour data.                                                                                        | Abnormal_Behavior                                                                                                                                          |
| Float                              | 3GPP TS 29.571 [8]  | Represents a number with the "float" format.                                                                                      |                                                                                                                                                            |
| GeoDistributionInfo                | 3GPP TS 29.520 [27] | Represents the geographical distribution of the UEs.                                                                              | UeMobilityExt_eNA                                                                                                                                          |
| GeographicalArea                   | 5.17.3.3.4          | Identifies the geographical information with shapes.                                                                              | ServiceExperienceExt_eNA<br>Ue_MobilityExt_eNA<br>QoS_SustainabilityExt_eNA                                                                                |
| Gpsi                               | 3GPP TS 29.571 [8]  | Identifies a GPSI.                                                                                                                | Abnormal_Behavior<br>Congestion<br>Ue_Mobility<br>Ue_Communication<br>Network_Performance<br>Dispersion<br>DnPerformance<br>ServiceExperience              |
| LocationArea5G                     | 3GPP TS 29.122 [4]  | Represents a user location area when the UE is attached to 5G.                                                                    | Abnormal_BehaviorExt_eNA<br>DnPerformanceExt_eNA<br>ServiceExperienceExt_eNA<br>UeCommunicationExt_eNA<br>E2eDataVolTransTime<br>NSLoad<br>SignallingStorm |
| LocInfoGranularity                 | 3GPP TS 29.520 [27] | Represents the preferred granularity of location information.                                                                     | ServiceExperienceExt_eNA<br>Ue_MobilityExt_eNA<br>DispersionExt_eNA                                                                                        |
| MatchingDirection                  | 3GPP TS 29.520 [27] | Matching direction                                                                                                                | QoS_Sustainability<br>Congestion,<br>Network_Performance<br>NSLoad                                                                                         |
| MovBehavInfo                       | 3GPP TS 29.520 [27] | Represents the Movement Behaviour information.                                                                                    | MovementBehaviour                                                                                                                                          |
| MovBehavReq                        | 3GPP TS 29.520 [27] | Represents the Movement Behaviour analytics requirements.                                                                         | MovementBehaviour                                                                                                                                          |
| NetworkPerfRequirement             | 3GPP TS 29.520 [27] | Represents a network performance requirement.                                                                                     | Network_Performance                                                                                                                                        |
| NfInstanceId                       | 3GPP TS 29.571 [8]  | Identifies an NF instance                                                                                                         | SignallingStorm                                                                                                                                            |
| NfSetId                            | 3GPP TS 29.571 [8]  | Identifies an NF Set instance.                                                                                                    | SignallingStorm                                                                                                                                            |
| NsIdInfo                           | 3GPP TS 29.520 [27] | Represents the S-NSSAI and the optionally associated Network Slice Instance Identifier(s).                                        | ServiceExperience<br>DnPerformance<br>NSLoad                                                                                                               |
| NsiLoadLevelInfo                   | 3GPP TS 29.520 [27] | Represents the network slice load level information.                                                                              | NSLoad                                                                                                                                                     |
| NwdafFailureCode                   | 3GPP TS 29.520 [27] | Identifies the analytics failure reason.                                                                                          |                                                                                                                                                            |
| PacketDelBudget                    | 3GPP TS 29.571 [8]  | Represents the packet delay budget.                                                                                               | QoS_SustainabilityExt2                                                                                                                                     |
| PduSessionInfo                     | 3GPP TS 29.520 [27] | Identifies combination of PDU Session parameters information.                                                                     | ServiceExperienceExt_eNA                                                                                                                                   |
| ProblemDetails                     | 3GPP TS 29.122 [4]  | Represents error related information.                                                                                             |                                                                                                                                                            |
| ProblemDetailsAnalyticsInfoRequest | 3GPP TS 29.520 [27] | Represents an extension to the ProblemDetails data structure with additional information on why the analytics request is rejected |                                                                                                                                                            |
| QosRequirement                     | 3GPP TS 29.520 [27] | Represents QoS requirements.                                                                                                      | QoS_Sustainability<br>E2eDataVolTransTime                                                                                                                  |

|                            |                     |                                                                                               |                                                                                                                                                                                  |
|----------------------------|---------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RatFreqInformation         | 3GPP TS 29.520 [27] | Represents the RAT type and/or Frequency information.                                         | ServiceExperience                                                                                                                                                                |
| RelProxInfo                | 3GPP TS 29.520 [27] | Represents the Relative Proximity information.                                                | RelProxInfo                                                                                                                                                                      |
| RelProxReq                 | 3GPP TS 29.520 [27] | Represents the Relative Proximity analytics requirements.                                     | RelProxReq                                                                                                                                                                       |
| ReportingInformation       | 3GPP TS 29.523 [22] | Describes the analytics reporting requirement information.                                    |                                                                                                                                                                                  |
| ResourceUsageRequirement   | 3GPP TS 29.520 [27] |                                                                                               | NetworkPerformanceExt_AIML                                                                                                                                                       |
| RetainabilityThreshold     | 3GPP TS 29.520 [27] | Represents a QoS flow retainability threshold.                                                | QoS_Sustainability                                                                                                                                                               |
| SamplingRatio              | 3GPP TS 29.571 [8]  | Indicates Sampling Ratio.                                                                     |                                                                                                                                                                                  |
| ScheduledCommunicationTime | 3GPP TS 29.122 [4]  | Represents an offered scheduled communication time.                                           |                                                                                                                                                                                  |
| ServiceExperienceInfo      | 3GPP TS 29.520 [27] | Represents the service experience information.                                                | ServiceExperience                                                                                                                                                                |
| SignalStormInfo            | 3GPP TS 29.520 [27] | Represents the signalling storm analytics information.                                        | SignallingStorm                                                                                                                                                                  |
| SignalStormReq             | 3GPP TS 29.520 [27] | Represents the signalling storm analytics requirement information.                            | SignallingStorm                                                                                                                                                                  |
| Snssai                     | 3GPP TS 29.571 [8]  | Represents an S-NSSAI.                                                                        | UeCommunication<br>QoS_Sustainability<br>Abnormal_Behavior<br>Congestion<br>Dispersion<br>ServiceExperience<br>DnPerformance<br>E2eDataVolTransTime<br>NSLoad<br>SignallingStorm |
| SupportedFeatures          | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features.                                 |                                                                                                                                                                                  |
| TermCause                  | 3GPP TS 29.520 [27] | Cause for requesting the termination of a subscription.                                       | TermRequest                                                                                                                                                                      |
| ThresholdLevel             | 3GPP TS 29.520 [27] | Represents a threshold level.                                                                 | Congestion                                                                                                                                                                       |
| TimestampedLocation        | 3GPP TS 29.520 [27] | Represents a timestamped UE location.                                                         | UeMobilityExt3                                                                                                                                                                   |
| TimeWindow                 | 3GPP TS 29.122 [4]  | Represents a time window.                                                                     | NetworkPerfExt_eNA                                                                                                                                                               |
| TopApplication             | 3GPP TS 29.520 [27] | Top application that contributes the most to the traffic.                                     | CongestionExt                                                                                                                                                                    |
| UeCommunication            | 3GPP TS 29.520 [27] | Represents UE communication information.                                                      | Ue_Communication                                                                                                                                                                 |
| UeCommReq                  | 3GPP TS 29.520 [27] | UE communication analytics requirement.                                                       | UeCommunicationExt_eNA                                                                                                                                                           |
| UeMobilityReq              | 3GPP TS 29.520 [27] | UE mobility analytics requirement.                                                            | Ue_MobilityExt_eNA                                                                                                                                                               |
| Uinteger                   | 3GPP TS 29.571 [8]  | Unsigned integer.                                                                             |                                                                                                                                                                                  |
| Uri                        | 3GPP TS 29.122 [4]  | Identifies a referenced resource.                                                             |                                                                                                                                                                                  |
| UserDataCongestReq         | 3GPP TS 29.520 [27] | The User Data Congestion requirement.                                                         | CongestionExt_eNA                                                                                                                                                                |
| UserDataConOrderCrit       | 3GPP TS 29.520 [27] | The ordering criterion for the list of User Data Congestion analytics.                        | CongestionExt_eNA                                                                                                                                                                |
| WlanPerformanceReq         | 3GPP TS 29.520 [27] | Represents the WLAN performance analytics requirement.                                        |                                                                                                                                                                                  |
| WlanPerSsidPerformanceInfo | 3GPP TS 29.520 [27] | WLAN performance information per SSID of WLAN access points deployed in the Area of Interest. |                                                                                                                                                                                  |

|                            |                     |                                                                                                |  |
|----------------------------|---------------------|------------------------------------------------------------------------------------------------|--|
| WlanPerUeIdPerformanceInfo | 3GPP TS 29.520 [27] | WLAN performance information per UE ID of WLAN access points deployed in the Area of Interest. |  |
|----------------------------|---------------------|------------------------------------------------------------------------------------------------|--|

### 5.6.3.3 Structured data types

#### 5.6.3.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.6.3.3.2 Type: AnalyticsExposureSubsc

This type represents an analytics exposure subscription. The same structure is used in the subscription request and subscription response.

**Table 5.6.3.3.2-1: Definition of type AnalyticsExposureSubsc**

| Attribute name          | Data type                        | P | Cardinality | Description                                                                                                                                                                                                                                | Applicability (NOTE 1)  |
|-------------------------|----------------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| analyEventsSubs         | array(AnalyticsEventSubsc)       | M | 1..N        | Subscribed analytics events.                                                                                                                                                                                                               |                         |
| analyRepInfo            | ReportingInformation             | O | 0..1        | Reporting requirement information of the subscription. If omitted, the default values within the ReportingInformation data type apply. (NOTE 2)                                                                                            |                         |
| notifUri                | Uri                              | M | 1           | Notification URI for analytics event reporting.                                                                                                                                                                                            |                         |
| notifId                 | string                           | M | 1           | Notification Correlation ID assigned by the AF.                                                                                                                                                                                            |                         |
| eventNotifis            | array(AnalyticsEventNotif)       | C | 1..N        | Represents the Events to be reported. Shall only be present if the immediate reporting indication in the "immRep" attribute within the "analyRepInfo" attribute sets to true during the event subscription, and the reports are available. |                         |
| failEventReports        | array(AnalyticsFailureEventInfo) | O | 1..N        | Supplied by the NWDAF. When available, shall contain the event(s) for which the subscription is not successful, including the failure reason(s).                                                                                           |                         |
| suppFeat                | SupportedFeatures                | C | 0..1        | Contains the list of supported feature(s) among the ones defined in clause 5.6.4.<br><br>This attribute shall be present only when feature negotiation needs to take place.                                                                |                         |
| self                    | Link                             | C | 0..1        | Identifies the Individual Analytics Exposure Subscription resource. Shall be present in the HTTP GET response when reading all the subscriptions for an AF.                                                                                |                         |
| requestTestNotification | boolean                          | O | 0..1        | Set to true by the AF to request the NEF to send a test notification as defined in clause 5.2.5.3 of 3GPP TS 29.122 [4]. The                                                                                                               | Notification_test_event |

|                                                                                                                                                                                                                       |                      |   |      |                                                                                   |                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---|------|-----------------------------------------------------------------------------------|------------------------|
|                                                                                                                                                                                                                       |                      |   |      | default value is "false" if omitted.                                              |                        |
| websocketNotifConfig                                                                                                                                                                                                  | WebsocketNotifConfig | O | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol. | Notification_websocket |
| NOTE 1: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property applies for all the features. |                      |   |      |                                                                                   |                        |
| NOTE 2: The attributes "partitionCriteria" and "notifFlag" of the data type ReportingInformation are applicable only if the "EneNA" feature is supported.                                                             |                      |   |      |                                                                                   |                        |

#### 5.6.3.3.3 Type: AnalyticsEventNotification

**Table 5.6.3.3.3-1: Definition of type AnalyticsEventNotification**

| Attribute name   | Data type                  | P | Cardinality | Description                                                                                                                                                           | Applicability |
|------------------|----------------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| notifId          | string                     | M | 1           | Notification Correlation ID assigned by the AF.                                                                                                                       |               |
| analyEventNotifs | array(AnalyticsEventNotif) | M | 1..N        | Represents the analytics events to be reported according to the subscription corresponding to the Notification Correlation ID.                                        |               |
| termCause        | TermCause                  | O | 0..1        | A cause for which the NEF will send no further notifications for this subscription. Its presence indicates that the NEF requests the termination of the subscription. | TermRequest   |

#### 5.6.3.3.4 Type: AnalyticsEventNotif

**Table 5.6.3.3.4-1: Definition of type AnalyticsEventNotif**

| Attribute name  | Data type                 | P | Cardinality | Description                                                                                                                                                                                                                                                                  | Applicability |
|-----------------|---------------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| analyEvent      | AnalyticsEvent            | M | 1           | Detected analytics event.                                                                                                                                                                                                                                                    |               |
| expiry          | DateTime                  | O | 0..1        | Defines the expiration time after which the analytics information will become invalid. (NOTE 2)                                                                                                                                                                              |               |
| timeStamp       | DateTime                  | M | 1           | Time at which the event is observed.                                                                                                                                                                                                                                         |               |
| failNotifyCode  | NwdafFailureCode          | C | 0..1        | Identifies the failure reason for the event notification. It shall only be included if the event notification is failed or the analytics information is not ready. (NOTE 1)                                                                                                  | EneNA         |
| rvWaitTime      | DurationSec               | O | 0..1        | Indicates a recommended time interval (in seconds) which is used to determine the time when analytics information is needed in similar future event subscriptions. It may only be included if the "failNotifyCode" attribute sets to "UNSATISFIED_REQUESTED_ANALYTICS_TIME". | EneNA         |
| ueMobilityInfos | array(UeMobilityExposure) | C | 1..N        | Contains the UE mobility information. Shall be present if the "analyEvent" attribute sets to "UE_MOBILITY".<br><br>(NOTE 5, NOTE 7)                                                                                                                                          | Ue_Mobility   |

|                 |                                   |   |      |                                                                                                                                                  |                                                                              |
|-----------------|-----------------------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| ueCommInfos     | array(UeCommunication)            | C | 1..N | Contains the application communication information. Shall be present if the "analyEvent" attribute sets to "UE_COMM".<br>(NOTE 7)                | Ue_Communication                                                             |
| abnormalInfos   | array(AbnormalExposure)           | C | 1..N | Contains the user's abnormal behavior information. Shall be present if the "analyEvent" attribute sets to "ABNORMAL_BEHAVIOR".<br>(NOTE 7)       | Abnormal_Behavior                                                            |
| congestInfos    | array(CongestionInfo)             | C | 1..N | Contains the UE's user data congestion information. Shall be present if the "analyEvent" attribute sets to "CONGESTION".<br>(NOTE 7)             | Congestion                                                                   |
| nwPerfInfos     | array(NetworkPerformanceExposure) | C | 1..N | Contains the network performance information. Shall be present if the "analyEvent" attribute is set to "NETWORK_PERFORMANCE".<br>(NOTE 7)        | Network_Performance                                                          |
| qosSustainInfos | array(QoS_SustainabilityExposure) | C | 1..N | Contains the QoS sustainability information. Shall be present if the "analyEvent" attribute is set to "QOS_SUSTAINABILITY".<br>(NOTE 7)          | QoS_Sustainability                                                           |
| disperInfos     | array(DispersionInfo)             | C | 1..N | Contains the Dispersion information. Shall be present if the "analyEvent" attribute is set to "DISPERSION".<br>(NOTE 7)                          | Dispersion                                                                   |
| dnPerfInfos     | array(DnPerfInfo)                 | C | 1..N | Contains the DN performance information. Shall be present if the "analyEvent" attribute is set to "DN_PERFORMANCE".<br>(NOTE 4) (NOTE 7)         | DnPerformance                                                                |
| svcExps         | array(ServiceExperienceInfo)      | C | 1..N | Contains the service experience information. Shall be present if the "analyEvent" attribute is set to "SERVICE_EXPERIENCE".<br>(NOTE 7) (NOTE 8) | ServiceExperience                                                            |
| timeStampGen    | DateTime                          | O | 0..1 | It defines the timestamp of analytics generation.                                                                                                | EneNA                                                                        |
| start           | DateTime                          | O | 0..1 | It defines the start time of which the analytics information will become valid. (NOTE 2)                                                         | EneNA                                                                        |
| locArea         | LocationArea5G                    | O | 0..1 | Identification of locationarea to which the notification applies within the subscribed location area.<br>(NOTE 3)                                | Abnormal_BehaviorExt_eNA<br>DnPerformanceExt_eNA<br>ServiceExperienceExt_eNA |

|                 |                                |   |      |                                                                                                                                                                                                                                                                                                                            |                                                         |
|-----------------|--------------------------------|---|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|                 |                                |   |      |                                                                                                                                                                                                                                                                                                                            | UeCommunicationExt_eNA<br>E2eDataVolTransTime<br>NSLoad |
| dataVITrnsTmlfs | array(E2eDataVolTransTimeInfo) | C | 1..N | E2E data volume transfer time information.<br>Shall be present if the subscribed event is "E2E_DATA_VOL_TRANS_TIME".<br><br>(NOTE 7)                                                                                                                                                                                       | E2eDataVolTransTime                                     |
| accuInfo        | AccuracyInfo                   | C | 0..1 | The analytics accuracy information. It shall be provided when "accuReq" attribute was provided in the subscription request and the "cancelAccuInd" attribute is set to "false" or omitted.                                                                                                                                 | AnalyticsAccuracy                                       |
| cancelAccuInd   | boolean                        | O | 0..1 | Indicates cancelled subscription of the analytics accuracy information.<br>Set to "true" indicates the NWDAF cancelled subscription of analytics accuracy information as the NWDAF does not support the accuracy checking capability. Otherwise set to "false". Default value is "false" if omitted.                       | AnalyticsAccuracy                                       |
| movBehavInfos   | array(MovBehaviourInfo)        | C | 1..N | The Movement Behaviour information.<br>Shall be present if the "analyEvent" attribute is set to "MOVEMENT_BEHAVIOUR".<br><br>(NOTE 7, NOTE 9)                                                                                                                                                                              | MovementBehaviour                                       |
| relProxInfos    | array(RelProximityInfo)        | C | 1..N | The Relative Proximity information.<br>Shall be present if the "analyEvent" attribute is set to "RELATIVE_PROXIMITY". The "supis" and "intGroupIds" attributes inside the RelProximity data type are not applicable in this API, and only the "gpsis" and "exterGroupIds" attributes can be used.<br><br>(NOTE 7, NOTE 10) | RelativeProximity                                       |
| wlanInfos       | array(WlanPerformanceInfo)     | C | 1..N | The WLAN performance related information.<br>Shall be present if the "analyEvent" attribute is set to "WLAN_PERFORMANCE".<br><br>(NOTE 7)                                                                                                                                                                                  | WlanPerformance_AIML                                    |
| pauseInd        | boolean                        | O | 0..1 | Pause analytics consumption indication applicable on analytics ID level. Set to "true" to indicate the consumer to stop the consumption of the analytics because the accuracy level needs to be increased.<br><br>Default value is "false" if omitted.                                                                     | AnalyticsAccuracy                                       |
| resumeInd       | boolean                        | O | 0..1 | Resume analytics consumption indication applicable on analytics                                                                                                                                                                                                                                                            | AnalyticsAccuracy                                       |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                         |   |      |                                                                                                                                                                                           |                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                         |   |      | ID level. Set to "true" to indicate the consumer to resume the consumption of the analytics because the accuracy has been improved.<br><br>Default value is "false" if omitted.           |                 |
| nsiLoadLevelData                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | array(NsiLoadLevelInfo) | C | 1..N | Contains the network slice load level analytics information for each S-NSSAI.<br><br>This attribute shall be present if the subscribed event is "NS_LOAD_LEVEL".<br><br>(NOTE 6) (NOTE 7) | NSLoad          |
| signalStorms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | array(SignalStormInfo)  | C | 1..N | The signalling storm information. Shall be present if the "analyEvent" attribute is set to "SIGNALLING_STORM".<br><br>(NOTE 7, NOTE 11)                                                   | SignallingStorm |
| <p>NOTE 1: The values of "PREDICTION_NOT_ALLOWED" and "BOTH_STAT_PRED_NOT_ALLOWED" of the NwdafFailureCode data type is not applicable for the "failNotifyCode" attribute. The value of "UNAVAILABLE_DATA" of the NwdafFailureCode data type is applicable for the "failNotifyCode" attribute only when the "StatisticsFailure" feature is supported.</p> <p>NOTE 2: If the "start" attribute and the "expiry" attribute are both provided, the DateTime of the "expiry" attribute shall not be earlier than the DateTime of the "start" attribute.</p> <p>NOTE 3: The NetworkAreaInfo data type within the "locArea" attribute is not applicable for the untrusted AF unless the corresponding SLA is agreed between the operator and application provider. The NEF may translate the network area information (received from the NWDAF, e.g. for "ABNORMAL_BEHAVIOR", "DN_PERFORMANCE", "SERVICE_EXPERIENCE", "UE_COMM" or "NS_LOAD_LEVEL" event) to an external representation of the area, which is provided within the "locArea" attribute.</p> <p>NOTE 4: The "minTrafficRate", "aggTrafficRate", "varTrafficRate", "trafRateUeIds", "avePacketDelay", "maxPacketDelay", "varPacketDelay", "packDelayUeIds", "maxPacketLossRate", "varPacketLossRate" and "packetLossUeIds" attribute(s) within the DnPerfInfo data type is applicable only if the "DnPerformanceExt_AIML" feature is supported.</p> <p>NOTE 5: If the "Ue_MobilityExt_eNA" feature is supported and the "locGranularity" attribute value "LON_AND_LAT_LEVEL" is subscribed, the "geoLoc" attribute within the "locInfo" attribute contained in the UeMobilityExposure data type may be provided to report the geographical location (longitude and latitude level).</p> <p>NOTE 6: When the "NSLoad" feature is supported, the "nsild" attribute and NSI related analytics information within the NsiLoadLevelInfo data structure is not applicable for the "NS_LOAD_LEVEL" event within each array element of this attribute.</p> <p>NOTE 7: If the "AnalyticsAccuracy" feature is supported and the notification is only for notifying about the accuracy information of subscribed events, this attribute is not required to be included even if the respective event was subscribed.</p> <p>NOTE 8: The "geoLoc" attribute within the ServiceExperienceInfo data type is applicable only if the "ServiceExperienceExt_eNA" feature is supported.</p> <p>NOTE 9: When the "MovementBehaviourExt" feature is supported, the "supis" attribute inside the MovBehavInfo data type is not applicable in this API and only the "gpsis" attribute can be used, and the "gpsis" attribute is the subset of the "gpsis" attribute provided within the "tgtUe" attribute in the request.</p> <p>NOTE 10: When the "RelativeProximityExt" feature is supported:</p> <ul style="list-style-type: none"> <li>- if the "TIME_TO_COLLISION" value within the "listOfAnaSubsets" attribute is provided in the request, the "collisionSpace" attribute with optionally "colSpCConfidence" attribute, and/or the "colliDirection" attribute with optionally "colDirConfidence" or "colDirAccuracy" attributes within the RelProxInfo data type may be provided;</li> <li>- the "exterGroupIds" within the RelProxInfo data type may be provided.</li> </ul> <p>NOTE 11: The "supis" and "intGroupIds" attributes inside the SignalStormInfo data type are not applicable in this release of the specification and only the "gpsis" and "exterGroupIds" attributes can be used.</p> |                         |   |      |                                                                                                                                                                                           |                 |

## 5.6.3.3.5 Type: AnalyticsEventSubsc

Table 5.6.3.3.5-1: Definition of type AnalyticsEventSubsc

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
|----------------|-----------|---|-------------|-------------|---------------|



|                  |                           |   |      |                                    |  |
|------------------|---------------------------|---|------|------------------------------------|--|
| analyEvent       | AnalyticsEvent            | M | 1    | Requested analytics event.         |  |
| analyEventFilter | AnalyticsEventFilterSubsc | O | 0..1 | Represents analytics event filter. |  |
| tgtUe            | TargetUeId                | O | 0..1 | Identifies target UE information   |  |

#### 5.6.3.3.6 Type: AnalyticsEventFilterSubsc

**Table 5.6.3.3.6-1: Definition of type AnalyticsEventFilterSubsc**

| Attribute name  | Data type                     | P | Cardinality | Description                                                                                                                          | Applicability                                                                                                                                                                                                                                                     |
|-----------------|-------------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| locArea         | LocationArea5G                | O | 0..1        | Identification of network area to which the subscription applies. (NOTE 1) (NOTE 7) (NOTE 14)                                        | Abnormal_Behavior<br>Congestion<br>Ue_Communication<br>Ue_Mobility<br>QoS_Sustainability<br>Network_Performance<br>Dispersion<br>DnPerformance<br>ServiceExperience<br>E2eDataVolTransTime<br>MovementBehaviour<br>RelativeProximity<br>NSLoad<br>SignallingStorm |
| fineGranAreas   | array(GeographicalArea)       | O | 1..N        | Indicates the fine granularity areas to which the subscription applies. (i.e. with a finer granularity than cell). (NOTE 1, NOTE 14) | ServiceExperienceExt_eNA<br>Ue_MobilityExt_eNA<br>QoS_SustainabilityExt_eNA                                                                                                                                                                                       |
| dnn             | Dnn                           | O | 0..1        | Identifies the DNN. (NOTE 7)                                                                                                         | Ue_Communication<br>Abnormal_Behavior<br>ServiceExperience<br>DnPerformance<br>RelativeProximity                                                                                                                                                                  |
| dnns            | array(Dnn)                    | O | 1..N        | Identifies the DNN(s) to which the subscription applies. (NOTE 7)                                                                    | UeCommunicationExt_eNA<br>Abnormal_BehaviorExt_eNA<br>ServiceExperienceExt_eNA<br>DnPerformanceExt_eNA<br>E2eDataVolTransTime                                                                                                                                     |
| dnais           | array(Dnai)                   | O | 1..N        | Identification(s) of user plane access to DN(s) which the subscription applies.                                                      | DnPerformance<br>ServiceExperience<br>E2eDataVolTransTime                                                                                                                                                                                                         |
| applIds         | array(ApplicationId)          | O | 1..N        | Each element identifies an application. (NOTE 7) (NOTE 13)                                                                           | Abnormal_Behavior<br>Ue_Communication<br>Dispersion<br>DnPerformance<br>ServiceExperience<br>E2eDataVolTransTime                                                                                                                                                  |
| dataVITrnsTmRqs | array(E2eDataVolTransTimeReq) | O | 1..N        | Represents the E2E data volume transfer time requirements                                                                            | E2eDataVolTransTime                                                                                                                                                                                                                                               |
| excepRequs      | array(Exception)              | O | 1..N        | Represents a list of Exception Ids with associated thresholds. (NOTE 2, NOTE 3)                                                      | Abnormal_Behavior                                                                                                                                                                                                                                                 |
| exptAnaType     | ExpectedAnalyticsType         | O | 0..1        | Represents expected UE analytics type. (NOTE 3)                                                                                      | Abnormal_Behavior                                                                                                                                                                                                                                                 |

|              |                                      |   |      |                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                            |
|--------------|--------------------------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| exptUeBehav  | ExpectedUeBehaviourData              | O | 0..1 | Represents expected UE behaviour.                                                                                                                                                                                                                                                                                        | Abnormal_Behavior                                                                                                                                                                                                          |
| matchingDir  | MatchingDirection                    | O | 0..1 | A matching direction may be provided alongside a threshold. If omitted, the default value is CROSSED.                                                                                                                                                                                                                    | QoS_Sustainability<br>Congestion,<br>Network_Performance<br>NSLoad                                                                                                                                                         |
| reptThlds    | array(ThresholdLevel)                | O | 1..N | Represents the levels to be reached in order to be notified by the NEF. (NOTE 4)                                                                                                                                                                                                                                         | Congestion                                                                                                                                                                                                                 |
| nwPerfReqs   | array(NetworkPerformanceRequirement) | C | 1..N | Represents the network performance requirements. This attribute shall be included when subscribed event is "NETWORK_PERFORMANCE".                                                                                                                                                                                        | Network_Performance                                                                                                                                                                                                        |
| snssai       | Snssai                               | O | 0..1 | Identifies the network slice information. (NOTE 7)                                                                                                                                                                                                                                                                       | UeCommunication<br>QoS_Sustainability<br>Abnormal_Behavior<br>Congestion<br>Dispersion<br>ServiceExperience<br>DnPerformance<br>SignallingStorm                                                                            |
| snssais      | array(Snssai)                        | O | 1..N | Identifies the network slice information. (NOTE 7)                                                                                                                                                                                                                                                                       | Ue_CommunicationExt_eNA<br>QoS_SustainabilityExt_eNA<br>Abnormal_BehaviorExt_eNA<br>CongestionExt_eNA<br>DispersionExt_eNA<br>ServiceExperienceExt_eNA<br>DnPerformanceExt_eNA<br>E2eDataVolTransTime<br>RelativeProximity |
| nsildInfos   | array(NsildInfo)                     | O | 1..N | Each element identifies the S-NSSAI and the optionally associated network slice instance(s). May be included when subscribed event is "SERVICE_EXPERIENCE", "DN_PERFORMANCE" or "NS_LOAD_LEVEL". (NOTE 15)                                                                                                               | ServiceExperience<br>DnPerformance<br>NSLoad                                                                                                                                                                               |
| nsLevelThrds | map(Uinteger)                        | O | 1..N | Contains the network slice load level related thresholds.<br><br>The key of the map shall be the value of the S-NSSAI (among the ones provided within the "nsildInfos" attribute) to which the provided thresholds within the map value apply.<br><br>(NOTE 16)<br><br>Each map value shall have a maximum value of 100. | NSLoad                                                                                                                                                                                                                     |
| qosReq       | QosRequirement                       | C | 0..1 | Represents the QoS requirements. This attribute shall be included when subscribed                                                                                                                                                                                                                                        | QoS_Sustainability<br>E2eDataVolTransTime                                                                                                                                                                                  |

|                  |                               |   |      |                                                                                                                                                                                                                                                                                                                                                     |                                    |
|------------------|-------------------------------|---|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
|                  |                               |   |      | event is "QOS_SUSTAINABILITY".                                                                                                                                                                                                                                                                                                                      |                                    |
| qosFlowRetThds   | array(RetainabilityThreshold) | C | 1..N | Represents the QoS flow retainability thresholds. Shall be supplied for the 5QI of GBR resource type. (NOTE 5)                                                                                                                                                                                                                                      | QoS_Sustainability                 |
| ranUeThrouThds   | array(BitRate)                | C | 1..N | Represents the RAN UE throughput thresholds. Shall be supplied for the 5QI of non-GBR resource type. (NOTE 5)                                                                                                                                                                                                                                       | QoS_Sustainability                 |
| e2eDelayThds     | array(PacketDelayBudget)      | C | 1..N | Represents the end-to-end delay (i.e., sum of RAN delay and GTP delay) thresholds. (NOTE 5)                                                                                                                                                                                                                                                         | QoSSustainabilityExt 2             |
| deviations       | array(Uinteger)               | O | 1..N | Each element indicates an acceptable deviation from the threshold level included in the "ranUeThrouThds" attribute, the "qosFlowRetThds" attribute or the "e2eDelayThds" attribute.<br><br>This attribute may only be present if either the "ranUeThrouThds" attribute, the "qosFlowRetThds" attribute or the "e2eDelayThds" attribute is provided. | QoSSustainabilityExt 2             |
| disperReqs       | array(DispersionRequirement)  | O | 1..N | Represents the dispersion analytics requirements.                                                                                                                                                                                                                                                                                                   | Dispersion                         |
| dnPerfReqs       | array(DnPerformanceReq)       | O | 1..N | Represents the DN performance analytics requirements.                                                                                                                                                                                                                                                                                               | DnPerformance                      |
| bwReqs           | array(BwRequirement)          | O | 1..N | Represents the bandwidth requirement for each application.                                                                                                                                                                                                                                                                                          | ServiceExperience                  |
| ratFreqs         | array(RatFreqInformation)     | O | 1..N | Identification(s) of the RAT type and/or frequencies of UE's serving cell(s) which the subscription applies. (NOTE 8)                                                                                                                                                                                                                               | ServiceExperience                  |
| appServerAddrs   | array(AddrFqdn)               | C | 1..N | Each of the element represents the Application Server Instance (IP address/FQDN of the Application Server) (NOTE 9)                                                                                                                                                                                                                                 | ServiceExperience<br>DnPerformance |
| wlanReqs         | array(WlanPerformanceReq)     | O | 1..N | Represents WLAN performance analytics requirements.                                                                                                                                                                                                                                                                                                 | WlanPerformance_A IML              |
| listOfAnaSubsets | array(AnalyticsSubset)        | O | 1..N | The list of analytics subsets can be used to indicate the content of the analytics. (NOTE 12)                                                                                                                                                                                                                                                       | EneNA                              |
| extraReportReq   | EventReportingRequirement     | O | 0..1 | The extra event reporting requirement information. (NOTE 6)                                                                                                                                                                                                                                                                                         |                                    |
| maxNumOfTopAppUl | Uinteger                      | O | 0..1 | Indicates the requested maximum number of top applications that contribute the most to the traffic in Uplink direction. Minimum = 1. May be included when one of the element in the "listOfAnaSubsets" attribute is set to LIST_OF_TOP_APP_UL.                                                                                                      | CongestionExt                      |
| maxNumOfTopAppDl | Uinteger                      | O | 0..1 | Indicates the requested maximum number of top applications that contribute the most to the traffic in Downlink direction. Minimum = 1. May be included when one of the element in the "listOfAnaSubsets"                                                                                                                                            | CongestionExt                      |

|                     |                       |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                     |
|---------------------|-----------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
|                     |                       |   |      | attribute is set to LIST_OF_TOP_APP_DL.                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                     |
| visitedLocAreas     | array(LocationArea5G) | O | 1..N | Identifications of network areas which the UEs had previously been in at least one of the Visited Area(s) of Interest. (NOTE 10)                                                                                                                                                                                                                                                                                                               | Ue_Mobility                                                         |
| ueCommReqs          | array(UeCommReq)      | O | 1..N | Represents the UE communication requirements. This attribute may be included when the subscribed event is "UE_COMM".                                                                                                                                                                                                                                                                                                                           | UeCommunicationExt_eNA                                              |
| userDataConOrderCri | UserDataConOrderCrit  | O | 0..1 | The ordering criterion for the list of User Data Congestion analytics. (NOTE 11)                                                                                                                                                                                                                                                                                                                                                               | CongestionExt_eNA                                                   |
| locGranularity      | LocInfoGranularity    | O | 0..1 | The preferred granularity of UE location information.                                                                                                                                                                                                                                                                                                                                                                                          | ServiceExperienceExt_eNA<br>Ue_MobilityExt_eNA<br>DispersionExt_eNA |
| locOrientation      | LocationOrientation   | O | 0..1 | Indicates the preferred orientation of location information.                                                                                                                                                                                                                                                                                                                                                                                   | Ue_MobilityExt_eNA<br>MovementBehaviour                             |
| ueMobilityReqs      | array(UeMobilityReq)  | O | 1..N | Represents the UE mobility requirements. This attribute may be included when the subscribed event is "UE_MOBILITY".                                                                                                                                                                                                                                                                                                                            | Ue_MobilityExt_eNA                                                  |
| movBehavReqs        | array(MovBehavReq)    | O | 1..N | Represents the Movement Behaviour analytics requirements.                                                                                                                                                                                                                                                                                                                                                                                      | MovementBehaviour                                                   |
| relProxReqs         | array(RelProxReq)     | O | 1..N | Represents the Relative Proximity analytics requirements.                                                                                                                                                                                                                                                                                                                                                                                      | RelativeProximity                                                   |
| pduSesInfos         | array(PduSessionInfo) | O | 1..N | Represents combination of PDU Session parameters information. (NOTE 13)                                                                                                                                                                                                                                                                                                                                                                        | ServiceExperienceExt_eNA                                            |
| useCaseCxt          | string                | O | 0..1 | Indicates the context of usage of the analytics. The value and format of this parameter are not standardized.                                                                                                                                                                                                                                                                                                                                  | ENAEExt                                                             |
| accuReq             | AccuracyReq           | O | 0..1 | Represents the analytics accuracy requirement information.                                                                                                                                                                                                                                                                                                                                                                                     | AnalyticsAccuracy                                                   |
| pauseFlg            | boolean               | O | 0..1 | Pause analytics consumption flag and is applicable on analytics ID level. Set to "true" to indicate the NWDAF to stop including analytics of this event type in its notifications (without cancelling the subscription), because the accuracy level needs to be increased. Default value is "false" if omitted.<br><br>This attribute may be present in a update request message if the "pauseInd" attribute was provided in the notification. | AnalyticsAccuracy                                                   |
| resumeFlg           | boolean               | O | 0..1 | Resume analytics consumption flag and is applicable on analytics ID level. Set to "true" to indicate the NWDAF to resume sending the notifications of analytics because the accuracy has been improved. Default value is "false" if omitted.<br><br>This attribute may be present in a update request message if the "resumeInd" attribute was provided in the notification.                                                                   | AnalyticsAccuracy                                                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |   |      |                                                                                                                                                                  |                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| temporalGranSize                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DurationSec                | O | 0..1 | Indicates the minimum duration of each time slot for which the analytics are provided.                                                                           | NetworkPerfExt_eNA<br>Ue_MobilityExt_eNA<br>CongestionExt_eNA<br>QoS_SustainabilityExt_eNA<br>DispersionExt_eNA<br>DnPerformanceExt_eNA      |
| spatialGranSizeTa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | UInteger                   | O | 0..1 | Indicates the maximum number of TAs used to define an area for which the analytics are provided. May be included when the "locArea" attribute is provided.       | NetworkPerfExt_eNA<br>Ue_MobilityExt_eNA<br>UeCommunicationExt_eNA<br>QoS_SustainabilityExt_eNA<br>DispersionExt_eNA<br>DnPerformanceExt_eNA |
| spatialGranSizeCell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | UInteger                   | O | 0..1 | Indicates the maximum number of cells used to define an area for which the analytics are provided. May be included when the "locArea" attribute is provided.     | NetworkPerfExt_eNA<br>Ue_MobilityExt_eNA<br>UeCommunicationExt_eNA<br>QoS_SustainabilityExt_eNA<br>DispersionExt_eNA<br>DnPerformanceExt_eNA |
| feedback                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | AnalyticsFeedbackInfo      | O | 0..1 | Analytics feedback information. It may only be provided in requests to update an existing analytics subscription for predictions.                                | AnalyticsAccuracy                                                                                                                            |
| sigStormReqs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | array(SignalStormReq)      | O | 1..N | Represents the signalling storm analytics requirements.<br><br>(NOTE 17)                                                                                         | SignallingStorm                                                                                                                              |
| nfInstancelds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | array(NfInstanceId)        | O | 1..N | Identification(s) of NF instance(s).<br>(NOTE 18)                                                                                                                | SignallingStorm                                                                                                                              |
| nfSetlds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | array(NfSetId)             | O | 1..N | Identification(s) of NF instance set(s).<br>(NOTE 18)                                                                                                            | SignallingStorm                                                                                                                              |
| lastUeLocs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | array(TimestampedLocation) | O | 1..N | Contains the last known location of target UE(s). If provided, it shall contain entries only for UE(s) that are targetted as per the provided "tgtUe" attribute. | UeMobilityExt3                                                                                                                               |
| <p>NOTE 1: The NetworkAreaInfo within the "locArea" attribute is not applicable for the untrusted AF. For "NETWORK_PERFORMANCE" or "CONGESTION" or "E2E_DATA_VOL_TRANS_TIME" event, the "locArea" attribute shall be provided if the event applied for all UEs (i.e. "anyUeInd" attribute set to true within the TargetUeId data). For "QOS_SUSTAINABILITY" or "MOVEMENT_BEHAVIOUR" event, at least one of the "locArea" attribute and "fineGranAreas" attribute shall be provided.</p> <p>NOTE 2: Only "exceptId" and "exceptLevel" within the Exception data type apply to the "exceptReques" attribute.</p> <p>NOTE 3: Either "exceptReques" or "exptAnaType" shall be provided if the subscribed event is "ABNORMAL_BEHAVIOR".</p> <p>NOTE 4: If the subscribed event is "CONGESTION" or "DN_PERFORMANCE", this attribute shall be provided if "notifMethod" within "analyRepInfo" sets to "ON_EVENT_DETECTION" or omitted.</p> <p>NOTE 5: For "QOS_SUSTAINABILITY", this property is only provided if the "notifMethod" in "analyRepInfo" is set to "ON_EVENT_DETECTION" or omitted.</p> <p>NOTE 6: The "sampRatio" attribute and the "histAnaTimePeriod" attribute within EventReportingRequirement data type is not applicable for the present API. The attributes "accPerSubset", "offsetPeriod", and "timeAnaNeeded" within the EventReportingRequirement data type are applicable only if the "EneNA" feature is supported.</p> <p>NOTE 7: For "ABNORMAL_BEHAVIOR" event with "anyUeInd" attribute in "tgtUe" attribute sets to true,</p> <ul style="list-style-type: none"> <li>- at least one of the "locArea" and the "snssai" attribute should be included, if the expected analytics type via the "exptAnaType" attribute or the list of Exception Ids via the "exceptReques" attribute is mobility related;</li> <li>- at least one of the "locArea", "appIds", "dnn", "dnns", "snssai" and "snssais" attribute should be included, if the expected analytics type via the "exptAnaType" attribute or the list of Exception Ids via the "exceptReques" attribute is communication related;</li> </ul> |                            |   |      |                                                                                                                                                                  |                                                                                                                                              |

|          |                                                                                                                                                                                                                                                                                                                              |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | - the expected analytics type via the "exptAnaType" attribute or the list of Exception Ids via "excepRequs" attribute shall not be requested for both mobility and communication related analytics at the same time.                                                                                                         |
|          | - "dnns" and "snssais" is mutually exclusive for "dnn" and "snssai". "dnn" and "snssai" are available for the backward compatibility to the previous release of this specification.                                                                                                                                          |
| NOTE 8:  | If both the "allFreq" attribute and the "allRat" attribute within the "ratFreqs" attribute are present, then the cardinality shall be 1 as the "all" indication for all the RAT type and Frequency value the NWDAF has received for the application.                                                                         |
| NOTE 9:  | This parameter shall be provided when a consumer requires analytics for an edge application over a UP path.                                                                                                                                                                                                                  |
| NOTE 10: | The NetworkAreaInfo within the "visitedLocAreas" attribute is not applicable for the untrusted AF. If this attribute is provided, the analytics target period shall be a past time period (i.e. only statistics is supported).                                                                                               |
| NOTE 11: | If the the value of "userDataConOrderCri" attribute is "APPLICABLE_TIME_WINDOW", the "ASCENDING" direction indicates that the list of User Data Congestion analytics are in chronological order and the "DESCENDING" direction indicates that the list of User Data Congestion analytics are in reverse chronological order. |
| NOTE 12: | The "AGG_TRAFFIC_RATE", "VAR_TRAFFIC_RATE", "VAR_PACKET_DELAY", "MAX_PACKET_LOSS_RATE" and "VAR_PACKET_LOSS_RATE" enumeration value(s) within the AnalyticsSubset data type is applicable only if the "DnPerformanceExt_AIML" feature is supported.                                                                          |
| NOTE 13: | When the "pduSesInfos" attribute is provided, the associated "applds" attribute shall also be provided for the NWDAF to be able to compute the service experience per application.                                                                                                                                           |
| NOTE 14: | If both "locArea" and "fineGranAreas" attributes are provided, the Area of Interest is interpreted as the intersection area indicated by these two attributes.                                                                                                                                                               |
| NOTE 15: | When the "NSLoad" feature is supported, only the "snssai" attribute of the NsildInfo data structure is applicable for the "NS_LOAD_LEVEL" event within each array element of this attribute.                                                                                                                                 |
| NOTE 16: | When the "NSLoad" feature is supported, this attribute shall be present only if the "analyRepInfo" attribute of the parent AnalyticsExposureSubsc data structure indicates that the "ON_EVENT_DETECTION" reporting type is to be used.                                                                                       |
| NOTE 17: | The "supis" and "intGroupIds" attributes inside the SignalStormReq data type are not applicable in this release of the specification and only the "gpsis" and "exterGroupIds" attributes can be used.                                                                                                                        |
| NOTE 18: | When the subscribed event is "SIGNALLING_STORM", the "nfInstancelds" and "nfSetIds" attributes indicate the NF instances and NF sets that may cause the signalling storm to the target NF.                                                                                                                                   |

### 5.6.3.3.7 Type TargetUeld

**Table 5.6.3.3.7-1: Definition of type TargetUeld**

| Attribute name | Data type | P | Cardinality | Description                                                                                                                                                                                                                                                                                   | Applicability                                                                                                                                                                                                                   |
|----------------|-----------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| anyUeInd       | boolean   | C | 0..1        | Identifies whether the AF request applies to any UE.<br><br><ul style="list-style-type: none"> <li>- Set to "true": the AF request is applicable to any UE.</li> <li>- Set to "false": the AF request is not applicable to any UE.</li> <li>- Default value is "false" if omitted.</li> </ul> | Abnormal_Behavior<br>Congestion<br>Network_Performance<br>QoS_Sustainability<br>Dispersion<br>DnPerformance<br>ServiceExperience<br>WlanPerformance_AIML<br>MovementBehaviour<br>MovementBehaviourExt<br>QoS_SustainabilityExt2 |
| gpsi           | Gpsi      | C | 0..1        | Identifies a GPSI for an UE.                                                                                                                                                                                                                                                                  | Abnormal_Behavior<br>Congestion<br>Ue_Mobility<br>Ue_Communication<br>Network_Performance<br>Dispersion<br>DnPerformance<br>ServiceExperience<br>WlanPerformance_AIML<br>RelativeProximity                                      |

|                                                                                                  |                 |   |      |                                                                        |                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------|-----------------|---|------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| exterGroupld                                                                                     | ExternalGroupld | C | 0..1 | Represents an external group identifier and identifies a group of UEs. | Abnormal_Behavior<br>Ue_Mobility<br>Ue_Communication<br>Network_Performance<br>Dispersion<br>DnPerformance<br>ServiceExperience<br>WlanPerformance_A<br>IML<br>RelativeProximity |
| NOTE: For an applicable feature, only one attribute identifying the target UE shall be provided. |                 |   |      |                                                                        |                                                                                                                                                                                  |

5.6.3.3.8 Void

5.6.3.3.9 Type UeMobilityExposure

**Table 5.6.3.3.9-1: Definition of type UeMobilityExposure**

| Attribute name                                                                                                                                                                                                                                                                       | Data type                  | P | Cardinality | Description                                                                                                                                                                                              | Applicability      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| ts                                                                                                                                                                                                                                                                                   | DateTime                   | O | 0..1        | This attribute identifies the timestamp when the UE arrives the location. (NOTE 1)                                                                                                                       |                    |
| recurringTime                                                                                                                                                                                                                                                                        | ScheduledCommunicationTime | O | 0..1        | Identifies time of the day and day of the week which are valid within the observation period when the UE moves. (NOTE 1, NOTE 2)                                                                         |                    |
| duration                                                                                                                                                                                                                                                                             | DurationSec                | M | 1           | This attribute identifies the time duration the UE stays in the location.<br>If the analytics result applies for a group of UEs, it indicates the average duration for the group of UEs.<br><br>(NOTE 3) |                    |
| durationVariance                                                                                                                                                                                                                                                                     | Float                      | C | 0..1        | This attribute indicates the variance of the analysed durations for the group of UEs. It shall be provided if the analytics result applies for a group of UEs.                                           |                    |
| locInfo                                                                                                                                                                                                                                                                              | array(UeLocationInfo)      | M | 1..N        | This attribute includes a list of UE location information during the time duration.<br><br>(NOTE 4)                                                                                                      |                    |
| directionInfos                                                                                                                                                                                                                                                                       | array(DirectionInfo)       | O | 1..N        | This attribute includes a list of UE direction information.                                                                                                                                              | UeMobilityExt_AIML |
| NOTE 1: Either ts or recurringTime shall be provided.                                                                                                                                                                                                                                |                            |   |             |                                                                                                                                                                                                          |                    |
| NOTE 2: If this attribute is present, it indicates the UE movement is periodic. This attribute is suitable to be present for a recurring mobility in a long observation time.                                                                                                        |                            |   |             |                                                                                                                                                                                                          |                    |
| NOTE 3: If the "temporalGranSize" attribute is provided in the request, the duration indicated by the "duration" attribute shall be greater than or equal to the value of the "temporalGranSize" attribute.                                                                          |                            |   |             |                                                                                                                                                                                                          |                    |
| NOTE 4: If the "spatialGranSizeTa" and/or "spatialGranSizeCell" attributes are provided in the request, the number of TAs or cells contained in "locInfo" attribute shall be smaller than or equal to the values of the "spatialGranSizeTa" and/or "spatialGranSizeCell" attributes. |                            |   |             |                                                                                                                                                                                                          |                    |

5.6.3.3.10 Type UeLocationInfo

**Table 5.6.3.3.10-1: Definition of type UeLocationInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
|----------------|-----------|---|-------------|-------------|---------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |   |      |                                                                                                                                                                                                                                                            |                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| loc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | LocationArea5G             | M | 1    | This attribute contains the detailed location.<br><br>(NOTE 3)                                                                                                                                                                                             |                    |
| geoLoc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | GeographicalArea           | C | 0..1 | This attribute contains the geographical location in a fine granularity (e.g. smaller than a cell).<br><br>Shall be present if one of the elements in the "listOfAnaSubsets" attribute in the request was set to "USER_LOCATION".<br><br>(NOTE 2) (NOTE 3) | Ue_MobilityExt_eNA |
| ratio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SamplingRatio              | C | 0..1 | This attribute contains the percentage of UEs in the group. Shall be present if the analytics result applies for a group of UEs.                                                                                                                           |                    |
| confidence                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | UInteger                   | C | 0..1 | Indicates the confidence of the prediction. (NOTE 1)<br>Shall be present if the analytics result is a prediction.<br>Minimum = 0. Maximum = 100.                                                                                                           |                    |
| geoDistrInfos                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | array(GeoDistributionInfo) | O | 1..N | Indicates the geographical distribution of the UEs that may be selected by the AF for application service.                                                                                                                                                 | UeMobilityExt_AIML |
| <p>NOTE: If the requested period identified by the "startTs" and "endTs" attributes in the "EventReportingRequirement" type is a future time period, which means the analytics result is a prediction. If no sufficient data is collected to provide the confidence of the prediction before the time deadline, a zero confidence shall be returned.</p> <p>NOTE 2: When possible and applicable to the access type, the UE location is provided according to the preferred granularity subscribed or requested in the "locGranularity" attribute.</p> <p>NOTE 3: When the "geoLoc" attribute is present, the "loc" attribute shall be ignored.</p> |                            |   |      |                                                                                                                                                                                                                                                            |                    |

5.6.3.3.11 Void

5.6.3.3.12 Type: AnalyticsRequest

**Table 5.6.3.3.12-1: Definition of type AnalyticsRequest**

| Attribute name                                                                                                                                                                          | Data type                 | P | Cardinality | Description                                                                                          | Applicability |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---|-------------|------------------------------------------------------------------------------------------------------|---------------|
| analyEvent                                                                                                                                                                              | AnalyticsEvent            | M | 1           | Identifies the analytics type.                                                                       |               |
| analyEventFilter                                                                                                                                                                        | AnalyticsEventFilter      | C | 0..1        | Shall be included to identify the analytics when filter information is needed for the related event. |               |
| analyRep                                                                                                                                                                                | EventReportingRequirement | O | 0..1        | Identifies the analytics reporting requirement information. (NOTE)                                   |               |
| tgtUe                                                                                                                                                                                   | TargetUeId                | O | 0..1        | Identifies the target UE information.                                                                |               |
| suppFeat                                                                                                                                                                                | SupportedFeatures         | M | 1           | Represents the list of supported features.                                                           |               |
| <p>NOTE: The attributes "accPerSubset", "offsetPeriod", and "timeAnaNeeded" within the EventReportingRequirement data type are applicable only if the "EneNA" feature is supported.</p> |                           |   |             |                                                                                                      |               |

5.6.3.3.13 Type AnalyticsEventFilter

**Table 5.6.3.3.13-1: Definition of type AnalyticsEventFilter**

| Attribute name | Data type      | P | Cardinality | Description                                                        | Applicability                   |
|----------------|----------------|---|-------------|--------------------------------------------------------------------|---------------------------------|
| locArea        | LocationArea5G | C | 0..1        | Contains the network area where the analytics result is requested. | Ue_Mobility<br>Ue_Communication |



|                     |                         |   |      |                                                                                                                                                              |                                                                                                                                                                                                                                |
|---------------------|-------------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     |                         |   |      | (NOTE 2, NOTE 3, NOTE 10)                                                                                                                                    | Network_Performance<br>QoS_Sustainability<br>Abnormal_Behavior<br>Congestion<br>Dispersion<br>DnPerformance<br>ServiceExperience<br>E2eDataVolTransTime<br>MovementBehaviour<br>RelativeProximity<br>NSLoad<br>SignallingStorm |
| fineGranAreas       | array(GeographicalArea) | O | 1..N | Indicates the fine granularity areas to which the request applies. (i.e. with a finer granularity than cell). (NOTE 2, NOTE 10)                              | ServiceExperienceExt_eNA<br>Ue_MobilityExt_eNA<br>QoS_SustainabilityExt_eNA                                                                                                                                                    |
| temporalGranSize    | DurationSec             | O | 0..1 | Indicates the minimum duration of each time slot for which the analytics are provided.                                                                       | NetworkPerfExt_eNA<br>Ue_MobilityExt_eNA<br>CongestionExt_eNA<br>QoS_SustainabilityExt_eNA<br>DispersionExt_eNA<br>DnPerformanceExt_eNA                                                                                        |
| spatialGranSizeTa   | UInteger                | O | 0..1 | Indicates the maximum number of TAs used to define an area for which the analytics are provided. May be included when the "locArea" attribute is provided.   | NetworkPerfExt_eNA<br>Ue_MobilityExt_eNA<br>UeCommunicationExt_eNA<br>QoS_SustainabilityExt_eNA<br>DispersionExt_eNA<br>DnPerformanceExt_eNA                                                                                   |
| spatialGranSizeCell | UInteger                | O | 0..1 | Indicates the maximum number of cells used to define an area for which the analytics are provided. May be included when the "locArea" attribute is provided. | NetworkPerfExt_eNA<br>Ue_MobilityExt_eNA<br>UeCommunicationExt_eNA<br>QoS_SustainabilityExt_eNA<br>DispersionExt_eNA<br>DnPerformanceExt_eNA                                                                                   |
| dnn                 | Dnn                     | O | 0..1 | Identifies the DNN. (NOTE 3)                                                                                                                                 | Ue_Communication<br>Abnormal_Behavior<br>DnPerformance<br>ServiceExperience                                                                                                                                                    |
| dnns                | array(Dnn)              | O | 1..N | Identifies the DNN. (NOTE 3)                                                                                                                                 | UeCommunicationExt_eNA<br>Abnormal_BehaviorExt_eNA<br>DnPerformanceExt_eNA<br>ServiceExperienceExt_eNA<br>E2eDataVolTransTime<br>RelativeProximity                                                                             |

|                  |                               |   |      |                                                                                                                                                                                                          |                                                                                                                                                                                                                           |
|------------------|-------------------------------|---|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| dnais            | array(Dnai)                   | O | 1..N | Identification(s) of user plane access to DN(s) which the subscription applies.                                                                                                                          | DnPerformance<br>ServiceExperience<br>E2eDataVolTransTime                                                                                                                                                                 |
| nwPerfTypes      | array(NetworkPerfType)        | C | 1..N | Represents the network performance requirements. This attribute shall be included when requested event is "NETWORK_PERFORMANCE".                                                                         | Network_Performance                                                                                                                                                                                                       |
| dataVITrnsTmReqs | array(E2eDataVolTransTimeReq) | O | 1..N | Represents the E2E data volume transfer time requirements                                                                                                                                                | E2eDataVolTransTime                                                                                                                                                                                                       |
| applds           | array(ApplicationId)          | O | 1..N | Each element identifies an application. The absence of applds means all applications. (NOTE 3) (NOTE 9)                                                                                                  | Ue_Communication<br>Abnormal_Behavior<br>DnPerformance<br>ServiceExperience<br>Dispersion<br>E2eDataVolTransTime                                                                                                          |
| exceptlds        | array(ExceptionId)            | O | 1..N | Represents a list of Exception Ids. (NOTE 1)                                                                                                                                                             | Abnormal_Behavior                                                                                                                                                                                                         |
| exptAnaType      | ExpectedAnalyticsType         | O | 0..1 | Represents expected UE analytics type. (NOTE 1)                                                                                                                                                          | Abnormal_Behavior                                                                                                                                                                                                         |
| exptUeBehav      | ExpectedUeBehaviourData       | O | 0..1 | Represents expected UE behaviour.                                                                                                                                                                        | Abnormal_Behavior                                                                                                                                                                                                         |
| snssai           | Snssai                        | O | 0..1 | Identifies the network slice information. (NOTE 3)                                                                                                                                                       | Ue_Communication<br>QoS_Sustainability<br>Abnormal_Behavior<br>Congestion<br>Dispersion<br>DnPerformance<br>ServiceExperience<br>SignallingStorm                                                                          |
| snssais          | array(Snssai)                 | O | 1..N | Identifies the network slice information. (NOTE 3)                                                                                                                                                       | UeCommunicationExt_eNA<br>QoS_SustainabilityExt_eNA<br>Abnormal_BehaviorExt_eNA<br>CongestionExt_eNA<br>DispersionExt_eNA<br>ServiceExperienceExt_eNA<br>DnPerformanceExt_eNA<br>E2eDataVolTransTime<br>RelativeProximity |
| nsildInfos       | array(NsildInfo)              | O | 1..N | Each element identifies the S-NSSAI and the optionally associated network slice instance(s). May be included when requested event is "SERVICE_EXPERIENCE" "DN_PERFORMANCE" or "NS_LOAD_LEVEL". (NOTE 12) | ServiceExperience<br>DnPerformance<br>NSLoad                                                                                                                                                                              |
| qosReq           | QosRequirement                | C | 0..1 | Represents the QoS requirements. This attribute shall be included when requested event is "QOS_SUSTAINABILITY".                                                                                          | QoS_Sustainability<br>E2eDataVolTransTime                                                                                                                                                                                 |
| listOfAnaSubsets | array(AnalyticsSubset)        | O | 1..N | The list of analytics subsets can be used to indicate the content of the analytics. (NOTE 8)                                                                                                             | EneNA                                                                                                                                                                                                                     |
| dnPerfReqs       | array(DnPerformanceReq)       | O | 1..N | Represents the DN performance analytics requirements.                                                                                                                                                    | DnPerformance                                                                                                                                                                                                             |

|                      |                                      |   |      |                                                                                                                                                                                                                                                   |                                                                             |
|----------------------|--------------------------------------|---|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| bwReqs               | array(BwReq<br>uirement)             | O | 1..N | Represents the media/application bandwidth requirement for each application. It may only be present if "applds" attribute is provided.                                                                                                            | ServiceExperience                                                           |
| ratFreqs             | array(RatFreq<br>Information)        | O | 1..N | Identification(s) of the RAT type and/or frequencies of UE's serving cell(s) which the subscription applies. (NOTE 4)                                                                                                                             | ServiceExperience                                                           |
| appServerAddr        | array(AddrFq<br>dn)                  | C | 1..N | Each of the element represents the Application Server Instance (IP address/FQDN of the Application Server). (NOTE 5)                                                                                                                              | ServiceExperience<br>DnPerformance                                          |
| wlanReqs             | array(WlanPe<br>rformanceRe<br>q)    | O | 1..N | Represents other WLAN performance analytics requirements. If the attribute contains no content, may take default handling action.                                                                                                                 | WlanPerformance_<br>AIDL                                                    |
| disperReqs           | array(Dispersi<br>onRequireme<br>nt) | O | 1..N | Represents the requirements of dispersion analytics.                                                                                                                                                                                              | Dispersion                                                                  |
| maxNumOfTopApp<br>UL | UInteger                             | O | 0..1 | Indicates the requested maximum number of top applications that contribute the most to the traffic in Uplink direction. Minimum = 1. May be included when one of the elements in the "listOfAnaSubsets" attribute is set to LIST_OF_TOP_APP_UL.   | CongestionExt                                                               |
| maxNumOfTopApp<br>DL | UInteger                             | O | 0..1 | Indicates the requested maximum number of top applications that contribute the most to the traffic in Downlink direction. Minimum = 1. May be included when one of the elements in the "listOfAnaSubsets" attribute is set to LIST_OF_TOP_APP_DL. | CongestionExt                                                               |
| visitedLocAreas      | array(Locatio<br>nArea5G)            | O | 1..N | Identifications of network areas which the UEs had previously been in at least one of the Visited Area(s) of Interest. (NOTE 6)                                                                                                                   | Ue_Mobility                                                                 |
| ueCommReqs           | array(UeCom<br>mReq)                 | O | 1..N | Represents the UE communication requirements. This attribute may be included when the requested event is "UE_COMM".                                                                                                                               | UeCommunicationE<br>xt_eNA                                                  |
| userDataConReq       | UserDataCon<br>gestReq               | O | 0..1 | The ordering criterion for the list of User Data Congestion analytics. (NOTE 7)                                                                                                                                                                   | CongestionExt_eNA                                                           |
| locGranularity       | LocInfoGranul<br>arity               | O | 0..1 | The preferred granularity of UE location information.                                                                                                                                                                                             | ServiceExperienceE<br>xt_eNA<br>Ue_MobilityExt_eN<br>A<br>DispersionExt_eNA |
| locOrientation       | LocationOrien<br>tation              | O | 0..1 | Indicates the preferred orientation of location information.                                                                                                                                                                                      | Ue_MobilityExt_eN<br>A<br>MovementBehaviour                                 |
| ueMobilityReqs       | array(UeMobil<br>ityReq)             | O | 1..N | Represents the UE mobility requirements. This attribute may be included when the requested event is "UE_MOBILITY".                                                                                                                                | Ue_MobilityExt_eN<br>A                                                      |
| movBehavReqs         | array(MovBeh<br>avReq)               | O | 1..N | Represents the Movement Behaviour analytics requirements.                                                                                                                                                                                         | MovementBehaviour                                                           |
| relProxReqs          | array(RelProx<br>Req)                | O | 1..N | Represents the Relative Proximity analytics requirements.                                                                                                                                                                                         | RelativeProximity                                                           |

|                |                                    |   |      |                                                                                                                                                                           |                              |
|----------------|------------------------------------|---|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| pduSesInfos    | array(PduSes<br>sionInfo)          | O | 1..N | Represents combination of PDU<br>Session parameters information.<br>(NOTE 9)                                                                                              | ServiceExperienceE<br>xt_eNA |
| useCaseCxt     | string                             | O | 0..1 | Indicates the context of usage of the<br>analytics.<br>The value and format of this parameter<br>are not standardized.                                                    | ENAEExt                      |
| accuReq        | AccuracyReq                        | O | 0..1 | Represents the analytics accuracy<br>requirement information.<br><br>(NOTE 11)                                                                                            | AnalyticsAccuracy            |
| sigStormReqs   | array(SignalS<br>tormReq)          | O | 1..N | Represents the signalling storm<br>analytics requirements.<br><br>(NOTE 13)                                                                                               | SignallingStorm              |
| nflInstanceIds | array(NflInsta<br>nceld)           | O | 1..N | Identification(s) of NF instance(s).<br>(NOTE 14)                                                                                                                         | SignallingStorm              |
| nfSetIds       | array(NfSetId)                     | O | 1..N | Identification(s) of NF instance set(s).<br>(NOTE 14)                                                                                                                     | SignallingStorm              |
| lastUeLocs     | array(Timesta<br>mpedLocation<br>) | O | 1..N | Contains the last known location of<br>target UE(s). If provided, it shall contain<br>entries only for UE(s) that are targetted<br>as per the provided "tgtUe" attribute. | UeMobilityExt3               |

NOTE 1: Either "exceptIds" or "exptAnaType" shall be provided if the requested event is "ABNORMAL\_BEHAVIOR".

NOTE 2: The NetworkAreaInfo within the "locArea" attribute is not applicable for the untrusted AF. For "NETWORK\_PERFORMANCE" or "CONGESTION" event, the "locArea" attribute shall be provided if the event applied for all UEs (i.e. "anyUeInd" attribute set to true within the TargetUeId data). For "QOS\_SUSTAINABILITY" or "MOVEMENT\_BEHAVIOUR" event, at least one of "locArea" attribute and "fineGranAreas" attribute shall be provided.

NOTE 3: For "ABNORMAL\_BEHAVIOR" event with "anyUeInd" attribute in "tgtUe" attribute sets to true,

- at least one of the "locArea" and the "snssai" attribute should be included, if the expected analytics type via the "exptAnaType" attribute or the list of Exception Ids via the "exceptIds" attribute is mobility related;
- at least one of the "locArea", "applIds", "dnn" and "snssai" attribute should be included, if the expected analytics type via the "exptAnaType" attribute or the list of Exception Ids via the "exceptIds" attribute is communication related;
- the expected analytics type via the "exptAnaType" attribute or the list of Exception Ids via "exceptIds" attribute shall not be requested for both mobility and communication related analytics at the same time.
- "dnns" and "snssais" is mutually exclusive for "dnn" and "snssai". "dnn" and "snssai" are available for the backward compatibility to the previous release of this specification.

NOTE 4: If both the "allFreq" attribute and the "allRat" attribute within the "ratFreqs" attribute are present, then the cardinality shall be 1 as the "all" indication for all the RAT type and Frequency value the NWDAF has received for the application.

NOTE 5: This parameter shall be provided when a consumer requires analytics for an edge application over a UP path.

NOTE 6: The NetworkAreaInfo within the "visitedLocAreas" attribute is not applicable for the untrusted AF. If this attribute is provided, the analytics target period shall be a past time period (i.e. only statistics is supported).

NOTE 7: If the the value of "orderCriterion" attribute contained in "userDataConReq" attribute is "APPLICABLE\_TIME\_WINDOW", the "ASCENDING" direction indicates that the list of User Data Congestion analytics are in chronological order and the "DESCENDING" direction indicates that the list of User Data Congestion analytics are in reverse chronological order.

NOTE 8: The "AGG\_TRAFFIC\_RATE", "VAR\_TRAFFIC\_RATE", "VAR\_PACKET\_DELAY", "MAX\_PACKET\_LOSS\_RATE" and "VAR\_PACKET\_LOSS\_RATE" enumeration value(s) within the AnalyticsSubset data type is applicable only if the "DnPerformanceExt\_AIML" feature is supported.

NOTE 9: When the "pduSesInfos" attribute is provided, the associated "applIds" attribute shall also be provided for the NWDAF to be able to compute the service experience per application.

NOTE 10: If both "locArea" and "fineGranAreas" attributes are provided, the Area of Interest is interpreted as the intersection area indicated by these two attributes.

NOTE 11: Only the "accuTimeWin" and "minNum" attributes within the AccuracyReq data type are applicable.

NOTE 12: When the "NSLoad" feature is supported, only the "snssai" attribute of the NsildInfo data structure is applicable for the "NS\_LOAD\_LEVEL" event within each array element of this attribute.

NOTE 13: The "supis" and "intGroupIds" attributes inside the SignalStormReq data type are not applicable in this release of the specification and only the "gpsis" and "exterGroupIds" attributes can be used.

NOTE 14: When the requested event is "SIGNALLING\_STORM", the "nflInstanceIds" and "nfSetIds" attributes indicate the NF instances and NF sets that may cause the signalling storm to the target NF.

## 5.6.3.3.14 Type AnalyticsData

Table 5.6.3.3.14-1: Definition of type AnalyticsData

| Attribute name       | Data type                        | P | Cardinality | Description                                                                                                                                 | Applicability                             |
|----------------------|----------------------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| start                | DateTime                         | O | 0..1        | It defines the start time of which the analytics information will become valid. (NOTE 1)                                                    | EneNA                                     |
| expiry               | DateTime                         | O | 0..1        | Defines the expiration time after which the analytics information will become invalid. (NOTE 1)                                             |                                           |
| timeStampGen         | DateTime                         | O | 0..1        | It defines the timestamp of analytics generation.                                                                                           | EneNA                                     |
| ueMobilityInfos      | array(UeMobilityExposure)        | C | 1..N        | Contains the UE mobility information. Shall be present if the "analyEvent" attribute sets to "UE_MOBILITY". (NOTE 4)                        | Ue_Mobility                               |
| ueCommInfos          | array(UeCommunication)           | C | 1..N        | Contains the application communication information. Shall be present if the "analyEvent" attribute sets to "UE_COMM"                        | Ue_Communication                          |
| nwPerfInfos          | array(NetworkPerfExposure)       | C | 1..N        | Contains the network performance information. Shall be present if the "analyEvent" attribute is set to "NETWORK_PERFORMANCE".               | Network_Performance                       |
| abnormalInfos        | array(AbnormalExposure)          | C | 1..N        | Contains the user's abnormal behavior information. Shall be present if the "analyEvent" attribute sets to "ABNORMAL_BEHAVIOR".              | Abnormal_Behavior                         |
| congestInfos         | array(CongestInfo)               | C | 1..N        | Contains the UE's user data congestion information. Shall be present if the "analyEvent" attribute sets to "CONGESTION".                    | Congestion                                |
| dataVITransTimeInfos | array(E2eDataVolTransTimeInfo)   | C | 1..N        | Contains the E2E data volume transfer time information. Shall be present if the "analyEvent" attribute is set to "E2E_DATA_VOL_TRANS_TIME". | E2eDataVolTransTime                       |
| qosSustainInfos      | array(QoSSustainabilityExposure) | C | 1..N        | Contains the QoS sustainability information. Shall be present if the "analyEvent" attribute is set to "QOS_SUSTAINABILITY". (NOTE 2)        | QoS_Sustainability<br>E2eDataVolTransTime |
| disperInfos          | array(DispersionInfo)            | C | 1..N        | Contains the Dispersion information. Shall be present if the "analyEvent" attribute is set to "DISPERSION".                                 | Dispersion                                |
| dnPerfInfos          | array(DnPerfInfo)                | C | 1..N        | Contains the DN performance information. Shall be present if the "analyEvent" attribute is set to "DN_PERFORMANCE". (NOTE 3)                | DnPerformance                             |
| movBehavInfos        | array(MovBehavInfo)              | C | 1..N        | The Movement Behaviour information.                                                                                                         | MovementBehaviour                         |

|                 |                              |   |      |                                                                                                                                                                                                                                                                                                                           |                      |
|-----------------|------------------------------|---|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
|                 |                              |   |      | <p>Shall be present if the "analyEvent" attribute is set to "MOVEMENT_BEHAVIOUR".</p> <p>(NOTE 6)</p>                                                                                                                                                                                                                     |                      |
| relProxInfos    | array(RelProxInfo)           | C | 1..N | <p>The Relative Proximity information.</p> <p>Shall be present if the "analyEvent" attribute is set to "RELATIVE_PROXIMITY". The "supis" and "intGroupIds" attributes inside the RelProxInfo data type are not applicable in this API and only the "gpsis" and "exterGroupIds" attribute can be used.</p> <p>(NOTE 7)</p> | RelativeProximity    |
| svcExps         | array(ServiceExperienceInfo) | C | 1..N | <p>Contains the service experience information.</p> <p>Shall be present if the "analyEvent" attribute is set to "SERVICE_EXPERIENCE".</p>                                                                                                                                                                                 | ServiceExperience    |
| wlanInfos       | array(WlanPerformanceInfo)   | C | 1..N | <p>The WLAN performance related information.</p> <p>Shall be present if the "analyEvent" attribute is set to "WLAN_PERFORMANCE".</p>                                                                                                                                                                                      | WlanPerformance_AIML |
| accuInfo        | AccuracyInfo                 | C | 0..1 | <p>The analytics accuracy information. It shall be provided when "accuReq" attribute was provided in the request and the "cancelAccuInd" attribute is set to "false" or omitted.</p>                                                                                                                                      | AnalyticsAccuracy    |
| cancelAccuInd   | boolean                      | O | 0..1 | <p>Indicates cancelled request of the analytics accuracy information.</p> <p>Set to "true" indicates the NWDAF cancelled request of analytics accuracy information as the NWDAF does not support the accuracy checking capability.</p> <p>Otherwise set to "false". Default value is "false" if omitted.</p>              | AnalyticsAccuracy    |
| nsLoadLevelData | array(NsiLoadLevelInfo)      | C | 1..N | <p>Contains the network slice load level analytics information for each S-NSSAI.</p> <p>This attribute shall be present only if the "analyEvent" attribute is set to "NS_LOAD_LEVEL" within the corresponding request.</p> <p>(NOTE 5)</p>                                                                                | NSLoad               |
| signalStorms    | array(SignalStormInfo)       | C | 1..N | <p>The signalling storm information.</p> <p>Shall be present if the "analyEvent" attribute is set to "SIGNALLING_STORM".</p> <p>(NOTE 8)</p>                                                                                                                                                                              | SignallingStorm      |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |   |   |                                                               |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---|---|---------------------------------------------------------------|--|
| suppFeat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SupportedFeatures | M | 1 | Represents the features supported by both the AF and the NEF. |  |
| <p>NOTE 1: If the "start" attribute and the "expiry" attribute are both provided, the DateTime of the "expiry" attribute shall not be earlier than the DateTime of the "start" attribute.</p> <p>NOTE 2: The "qosFlowRetThd", "ranUeThrouThd" and "e2eDelayThd" attributes within the QosSustainabilityExposure data type are not applicable.</p> <p>NOTE 3: The "minTrafficRate", "aggTrafficRate", "varTrafficRate", "trafRateUelds", "avePacketDelay", "maxPacketDelay", "varPacketDelay", "packDelayUelds", "maxPacketLossRate", "varPacketLossRate" and "packetLossUelds" attribute(s) within the DnPerfInfo data type is applicable only if the "DnPerformanceExt_AIML" feature is supported.</p> <p>NOTE 4: If the "Ue_MobilityExt_eNA" feature is supported and the "locGranularity" attribute value "LON_AND_LAT_LEVEL" is requested, the "geoLoc" attribute within the "locInfo" attribute contained in the UeMobilityExposure data type may be provided to report the geographical location (longitude and latitude level).</p> <p>NOTE 5: When the "NSLoad" feature is supported, the "nsild" attribute and NSI related analytics information within the NsiLoadLevelInfo data structure are not applicable for the "NS_LOAD_LEVEL" event within each array element of this attribute.</p> <p>NOTE 6: When the "MovementBehaviourExt" feature is supported, the "supis" attribute inside the MovBehavInfo data type is not applicable in this API and only the "gpsis" attribute can be used, and the "gpsis" attribute is the subset of the "gpsis" attribute provided within the "tgtUe" attribute in the request.</p> <p>NOTE 7: When the "RelativeProximityExt" feature is supported:</p> <ul style="list-style-type: none"> <li>- the "TIME_TO_COLLISION" value within the "listOfAnaSubsets" attribute is provided in the request, the "collisionSpace" attribute with optionally "colSpcConfidence" attribute, and/or the "colliDirection" attribute with optionally "colDirConfidence" or "colDirAccuracy" attributes within the "ttcInfo" attribute may be provided;</li> <li>- the "exterGroupIds" within the RelProxInfo data type may be provided.</li> </ul> <p>NOTE 8: The "supis" and "intGroupIds" attributes inside the SignalStormInfo data type are not applicable in this release of the specification and only the "gpsis" and "exterGroupIds" attributes can be used.</p> |                   |   |   |                                                               |  |

### 5.6.3.3.15 Type AbnormalExposure

**Table 5.6.3.3.15-1: Definition of type AbnormalExposure**

| Attribute name                                                                                                                                                                                                                                                                                                                                           | Data type             | P | Cardinality | Description                                                                                                                                                                            | Applicability         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| gpsis                                                                                                                                                                                                                                                                                                                                                    | array(Gpsi)           | C | 1..N        | Each element identifies a UE which is affected with the Exception. Shall be present if the subscription request applies to more than one UE.                                           |                       |
| excep                                                                                                                                                                                                                                                                                                                                                    | Exception             | M | 1           | Contains the exception information.                                                                                                                                                    |                       |
| appld                                                                                                                                                                                                                                                                                                                                                    | ApplicationId         | O | 0..1        | Identifies an application. May only be present if the "applds" attribute was provided within AnalyticsEventFilter during the subscription for event notification procedure.            |                       |
| dnn                                                                                                                                                                                                                                                                                                                                                      | Dnn                   | O | 0..1        | Identifies DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.                                                        | Abnormal_Behavior_Ext |
| snssai                                                                                                                                                                                                                                                                                                                                                   | Snssai                | O | 0..1        | Identifies the network slice information.                                                                                                                                              | Abnormal_Behavior_Ext |
| ratio                                                                                                                                                                                                                                                                                                                                                    | SamplingRatio         | C | 0..1        | This attribute contains the percentage of UEs with same analytics result in the group or among all UEs. Shall be present if the analytics result applies for a group of UEs or any UE. |                       |
| confidence                                                                                                                                                                                                                                                                                                                                               | UInteger              | C | 0..1        | Indicates the confidence of the prediction. (NOTE)<br>Shall be present if the analytics result is a prediction.<br>Minimum = 0. Maximum = 100.                                         |                       |
| addtMeasInfo                                                                                                                                                                                                                                                                                                                                             | AdditionalMeasurement | O | 0..1        | Additional measurement.                                                                                                                                                                |                       |
| <p>NOTE: If the requested period identified by the "startTs" and "endTs" attributes in the "EventReportingRequirement" type is a future time period, which means the analytics result is a prediction. If no sufficient data is collected to provide the confidence of the prediction before the time deadline, a zero confidence shall be returned.</p> |                       |   |             |                                                                                                                                                                                        |                       |

## 5.6.3.3.16 Type CongestInfo

Table 5.6.3.3.16-1: Definition of type CongestInfo

| Attribute name                                                                   | Data type                  | P | Cardinality | Description                                                                                          | Applicability |
|----------------------------------------------------------------------------------|----------------------------|---|-------------|------------------------------------------------------------------------------------------------------|---------------|
| locArea                                                                          | LocationArea5G             | M | 1           | Network area of interest. (NOTE)                                                                     |               |
| cngAnas                                                                          | array(CongestionAnalytics) | M | 1..N        | Represents data congestion analytics for transfer over the user plane, control plane or both planes. |               |
| NOTE: The NetworkAreaInfo data within the LocationArea5G data is not applicable. |                            |   |             |                                                                                                      |               |

## 5.6.3.3.17 Type CongestionAnalytics

Table 5.6.3.3.17-1: Definition of type CongestionAnalytics

| Attribute name                                                                                                                                                                                                                                                                                                                                      | Data type             | P | Cardinality | Description                                                                                                                                        | Applicability |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| cngType                                                                                                                                                                                                                                                                                                                                             | CongestionType        | M | 1           | Represents congestion type.                                                                                                                        |               |
| tmWdw                                                                                                                                                                                                                                                                                                                                               | TimeWindow            | M | 1           | Represents a start time and a stop time observed for the congestion information.<br><br>(NOTE 2)                                                   |               |
| nsi                                                                                                                                                                                                                                                                                                                                                 | ThresholdLevel        | M | 1           | Represents network congestion level.                                                                                                               |               |
| confidence                                                                                                                                                                                                                                                                                                                                          | UInteger              | C | 0..1        | Indicates the confidence of the prediction. (NOTE 1)<br>Shall be present if the analytics result is a prediction.<br>Minimum = 0. Maximum = 100.   |               |
| topAppListUl                                                                                                                                                                                                                                                                                                                                        | array(TopApplication) | C | 1..N        | List of top applications in Uplink.<br>Shall be present if one of the element in the "listOfAnaSubsets" attribute was set to LIST_OF_TOP_APP_UL.   | CongestionExt |
| topAppListDl                                                                                                                                                                                                                                                                                                                                        | array(TopApplication) | C | 1..N        | List of top applications in Downlink.<br>Shall be present if one of the element in the "listOfAnaSubsets" attribute was set to LIST_OF_TOP_APP_DL. | CongestionExt |
| NOTE 1: If the requested period identified by the "startTs" and "endTs" attributes in the "EventReportingRequirement" type is a future time period, which means the analytics result is a prediction. If no sufficient data is collected to provide the confidence of the prediction before the time deadline, a zero confidence shall be returned. |                       |   |             |                                                                                                                                                    |               |
| NOTE 2: If the "temporalGranSize" attribute is provided in the request, the duration indicated by the "tmWdw" attribute shall be greater than or equal to the value of the "temporalGranSize" attribute.                                                                                                                                            |                       |   |             |                                                                                                                                                    |               |

## 5.6.3.3.18 Type QoS\_SustainabilityExposure

Table 5.6.3.3.18-1: Definition of type QoS\_SustainabilityExposure

| Attribute name | Data type               | P | Cardinality | Description                                                                                                                                                                         | Applicability             |
|----------------|-------------------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| locArea        | LocationArea5G          | M | 1           | Identification(s) of applicable location areas where the analytics result applies. (NOTE 3, NOTE 5)                                                                                 |                           |
| fineAreaInfos  | array(GeographicalArea) | O | 1..N        | This attribute contains the geographical locations in a fine granularity (e.g. smaller than a cell). May be provided when the "fineGranAreas" attribute is provided in the request. | QoS_SustainabilityExt_eNA |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                        |   |      |                                                                                                                                                  |                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| startTs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | DateTime               | M | 1    | Represents the start time of the applicable observing period.<br>(NOTE 4)                                                                        |                        |
| endTs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DateTime               | M | 1    | Represents the end time of the applicable observing period.<br>(NOTE 4)                                                                          |                        |
| qosFlowRetThd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | RetainabilityThreshold | O | 0..1 | The reporting QoS Flow Retainability Threshold that is met or crossed for 5QI of GBR resource type.<br>(NOTE 1)                                  |                        |
| ranUeThrouThd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | BitRate                | O | 0..1 | The reporting RAN UE Throughput Threshold that is met or crossed for 5QI of non-GBR resource type.<br>(NOTE 1)                                   |                        |
| e2eDelayThd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PacketDelBudget        | O | 0..1 | The reporting end-to-end delay Threshold that is met or crossed for 5QI of non-GBR resource type.<br>(NOTE 1)                                    | QoSSustainabilityExt2  |
| snssai                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Snssai                 | O | 0..1 | Identifies the network slice information.                                                                                                        | QoS_Sustainability_Ext |
| confidence                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | UInteger               | C | 0..1 | Indicates the confidence of the prediction. (NOTE 2)<br>Shall be present if the analytics result is a prediction.<br>Minimum = 0. Maximum = 100. |                        |
| <p>NOTE 1: Either "qosFlowRetThd" or "ranUeThrouThd" or "e2eDelayThd" attribute shall be provided.</p> <p>NOTE 2: If the requested period identified by the "startTs" and "endTs" attributes in the EventReportingRequirement data type is a future time period, which means the analytics result is a prediction. If no sufficient data is collected to provide the confidence of the prediction before the time deadline, a zero confidence shall be returned.</p> <p>NOTE 3: The NetworkAreaInfo data type within the LocationArea5G data is not applicable.</p> <p>NOTE 4: If the "temporalGranSize" attribute is provided in the request, the duration indicated by the "startTs" and "endTs" attributes shall be greater than or equal to the value of the "temporalGranSize" attribute.</p> <p>NOTE 5: If the "spatialGranSizeTa" and/or "spatialGranSizeCell" attributes are provided in the request, the number of TAs or cells contained in "locArea" attribute shall be smaller than or equal to the values of the "spatialGranSizeTa" and/or "spatialGranSizeCell" attributes.</p> |                        |   |      |                                                                                                                                                  |                        |

### 5.6.3.3.19 Type NetworkPerfExposure

**Table 5.6.3.3.19-1: Definition of type NetworkPerfExposure**

| Attribute name | Data type                | P | Cardinality | Description                                                                                                                                             | Applicability              |
|----------------|--------------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| locArea        | LocationArea5G           | M | 1           | Identification of network area to which the subscription applies.<br>(NOTE 3, NOTE 6)                                                                   |                            |
| nwPerfType     | NetworkPerfType          | M | 1           | The type of the network performance                                                                                                                     |                            |
| anaPeriod      | TimeWindow               | O | 0..1        | Indicates the analytics target period subset within the requested analytics target period.<br>(NOTE 5)                                                  | NetworkPerfExt_eNA         |
| relativeRatio  | SamplingRatio            | O | 0..1        | The reported relative ratio expressed in percentage. (NOTE 1)                                                                                           |                            |
| absoluteNum    | UInteger                 | O | 0..1        | The reported absolute number<br>(NOTE 1)                                                                                                                |                            |
| rscUsgReq      | ResourceUsageRequirement | O | 0..1        | Indicates more information when providing resource usage information for the network performance type indicated by the "nwPerfType" attribute. (NOTE 4) | NetworkPerformanceExt_AIML |
| confidence     | UInteger                 | C | 0..1        | Indicates the confidence of the prediction. (NOTE 2)<br>Shall be present if the analytics result is a prediction.                                       |                            |

|                                                                                                                                                                                                                                                                                                                                                     |  |  |  |                             |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-----------------------------|--|
|                                                                                                                                                                                                                                                                                                                                                     |  |  |  | Minimum = 0. Maximum = 100. |  |
| NOTE 1: Either relativeRatio or absoluteNum shall be provided.                                                                                                                                                                                                                                                                                      |  |  |  |                             |  |
| NOTE 2: If the requested period identified by the "startTs" and "endTs" attributes in the "EventReportingRequirement" type is a future time period, which means the analytics result is a prediction. If no sufficient data is collected to provide the confidence of the prediction before the time deadline, a zero confidence shall be returned. |  |  |  |                             |  |
| NOTE 3: The NetworkAreaInfo data within the LocationArea5G data is not applicable.                                                                                                                                                                                                                                                                  |  |  |  |                             |  |
| NOTE 4: The "rscUsgReq" value is only applicable when the "nwPerfType" attribute is set to "GNB_RSC_USAGE_OVERALL_TRAFFIC", "GNB_RSC_USAGE_GBR_TRAFFIC" or "GNB_RSC_USAGE_DELAY_CRIT_GBR_TRAFFIC".                                                                                                                                                  |  |  |  |                             |  |
| NOTE 5: If the "temporalGranSize" attribute is provided in the request, the duration indicated by the "anaPeriod" attribute is greater than or equal to the value of the "temporalGranSize" attribute.                                                                                                                                              |  |  |  |                             |  |
| NOTE 6: If the "spatialGranSizeTa" and/or "spatialGranSizeCell" attributes are provided in the request, the number of TAs or cells contained in "locArea" attribute shall be smaller than or equal to the values of the "spatialGranSizeTa" and/or "spatialGranSizeCell" attributes.                                                                |  |  |  |                             |  |

### 5.6.3.3.20 Type AnalyticsFailureEventInfo

**Table 5.6.3.3.20-1: Definition of type AnalyticsFailureEventInfo**

| Attribute name | Data type            | P | Cardinality | Description                   | Applicability |
|----------------|----------------------|---|-------------|-------------------------------|---------------|
| event          | AnalyticsEvent       | M | 1           | Event that is subscribed.     |               |
| failureCode    | AnalyticsFailureCode | M | 1           | Identifies the failure reason |               |

### 5.6.3.3.21 Type WlanPerformInfo

**Table 5.6.3.3.21-1: Definition of type WlanPerformInfo**

| Attribute name                                                                                                             | Data type                         | P | Cardinality | Description                                                                                                                                                                                                                          | Applicability |
|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| locArea                                                                                                                    | LocationArea5G                    | C | 0..1        | Identification of location area to which the notification applies within the subscribed location area.<br><br>This attribute shall be present if the "locArea" attribute is included in the event subscription or analytics request. |               |
| wlanPerSsidInfos                                                                                                           | array(WlanPerSsidPerformanceInfo) | M | 1..N        | WLAN performance information for SSID(s) of WLAN access points deployed in the Area of Interest.                                                                                                                                     |               |
| wlanPerUeIdInfos                                                                                                           | array(WlanPerUeIdPerformanceInfo) | O | 1..N        | WLAN performance information for UE Id(s) of WLAN access points deployed in the Area of Interest.<br><br>(NOTE)                                                                                                                      |               |
| NOTE: The "supi" attribute within the WlanPerUeIdPerformanceInfo data type is not applicable to the current specification. |                                   |   |             |                                                                                                                                                                                                                                      |               |

## 5.6.3.4 Simple data types and enumerations

### 5.6.3.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.6.3.4.2 Simple data types

The simple data types defined in table 5.6.3.4.2-1 shall be supported.

**Table 5.6.3.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

#### 5.6.3.4.3 Enumeration: AnalyticsEvent

The enumeration represents the type of analytics events of which the AF requests to be notified. It shall comply with the provisions defined in table 5.6.3.4.3-1.

**Table 5.6.3.4.3-1: Enumeration AnalyticsEvent**

| Enumeration value             | Description                                                                                     | Applicability        |
|-------------------------------|-------------------------------------------------------------------------------------------------|----------------------|
| UE_MOBILITY                   | The AF requests to be notified about analytics information of UE mobility.                      | Ue_Mobility          |
| UE_COMM                       | The AF requests to be notified about analytics information of UE communication.                 | Ue_Communication     |
| ABNORMAL_BEHAVIOR             | The AF requests to be notified about analytics information of UE's abnormal behavior.           | Abnormal_Behavior    |
| CONGESTION                    | The AF requests to be notified about analytics information of user data congestion information. | Congestion           |
| NETWORK_PERFORMANCE           | The AF requests to be notified about analytics information of network performance information.  | Network_Performance  |
| QOS_SUSTAINABILITY            | The AF requests to be notified about analytics information of QoS sustainability.               | QoS_Sustainability   |
| DISPERSION                    | The AF requests to be notified about analytics information of Dispersion information.           | Dispersion           |
| DN_PERFORMANCE                | The AF requests to be notified about analytics information of DN performance information.       | DnPerformance        |
| SERVICE_EXPERIENCE            | The AF requests to be notified about analytics information of service experience.               | ServiceExperience    |
| E2E_DATA_VOLUME_TRANSFER_TIME | The AF requests to be notified about analytics information of E2E data volume transfer time.    | E2eDataVolTransTime  |
| MOVEMENT_BEHAVIOUR            | The AF requests to be notified about analytics information of Movement Behaviour.               | MovementBehaviour    |
| WLAN_PERFORMANCE              | Indicates that the event subscribed is WLAN performance.                                        | WlanPerformance_AIML |
| NS_LOAD_LEVEL                 | Indicates that the event subscribed is Network Slice load level information.                    | NSLoad               |
| RELATIVE_PROXIMITY            | The AF requests to be notified about analytics information of Relative Proximity.               | RelativeProximity    |
| SIGNALLING_STORM              | The AF requests to be notified about analytics information of Signalling Storm.                 | SignallingStorm      |

#### 5.6.3.4.4 Enumeration: AnalyticsFailureCode

**Table 5.6.3.4.4-1: Enumeration AnalyticsFailureCode**

| Enumeration value                    | Description                                                                                                                                                                                                                        | Applicability |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| BOTH_STAT_PRED_NOT_ALLOWED           | The event is rejected since the start time is in the past and the end time is in the future, which means the AF requested both statistics and prediction for the analytics.                                                        |               |
| UNAVAILABLE_DATA                     | The event is rejected since necessary data to perform the service is unavailable.                                                                                                                                                  |               |
| UNSATISFIED_REQUESTED_ANALYTICS_TIME | Indicates that the requested event is rejected since the analytics information is not ready when the time indicated by the "timeAnaNeeded" attribute (as provided during the creation or modification of subscription) is reached. | EneNA         |

|                        |                                                                                                                                                                                                                         |                  |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| NO_ROAMING_SUPPORT     | Indicates that the request is rejected because roaming analytics or data are required and they could not be collected because the NWDAF(s) that were invoked by the NEF do not support the roaming exchange capability. | RoamingAnalytics |
| PREDICTION_NOT_ALLOWED | Indicates that the request for the prediction of the analytics event is not allowed.                                                                                                                                    | ENAEExt2         |
| OTHER                  | The event is rejected due to other reasons.                                                                                                                                                                             |                  |

## 5.6.4 Used Features

The table below defines the features applicable to the AnalyticsExposure API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.6.4-1: Features used by AnalyticsExposure API**

| Feature number | Feature Name              | Description                                                                                                                                                                                                                                                                                                                                                                      |
|----------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | Ue_Mobility               | This feature indicates support for the analytics event related to UE mobility.                                                                                                                                                                                                                                                                                                   |
| 2              | Ue_Communication          | This feature indicates support for the analytics event related to UE communication information.                                                                                                                                                                                                                                                                                  |
| 3              | Abnormal_Behavior         | This feature indicates support for the analytics event related to UE's abnormal behaviour.                                                                                                                                                                                                                                                                                       |
| 4              | Congestion                | This feature indicates support for the analytics event related to UE's user data congestion information.                                                                                                                                                                                                                                                                         |
| 5              | Network_Performance       | This feature indicates support for the analytics event related to network performance.                                                                                                                                                                                                                                                                                           |
| 6              | QoS_Sustainability        | This feature indicates support for the analytics event related to QoS sustainability.                                                                                                                                                                                                                                                                                            |
| 7              | Notification_websocket    | The delivery of notifications over Websocket is supported as described in 3GPP TS 29.122 [4]. This feature requires that the Notification_test_event feature is also supported.                                                                                                                                                                                                  |
| 8              | Notification_test_event   | The testing of notification connection is supported as described in 3GPP TS 29.122 [4].                                                                                                                                                                                                                                                                                          |
| 9              | Dispersion                | This feature indicates support for the analytics event related to Dispersion analytics.                                                                                                                                                                                                                                                                                          |
| 10             | EneNA                     | This feature indicates support for the enhancements of network data analytics requirements.                                                                                                                                                                                                                                                                                      |
| 11             | DnPerformance             | This feature indicates the support of the analytics event related to DN performance.                                                                                                                                                                                                                                                                                             |
| 12             | ServiceExperience         | This feature indicates support for the event related to service experience.                                                                                                                                                                                                                                                                                                      |
| 13             | CongestionExt             | This feature indicates support for the extensions to the event related to user data congestion, including support of GPSI and/or list of Top applications. Supporting this feature also requires the support of feature Congestion.                                                                                                                                              |
| 14             | Abnormal_Behavior_Ext     | This feature indicates support for the extensions to the event related to abnormal behavior, including support of exposing DNN and S-NSSAI information. Supporting this feature also requires the support of feature Abnormal_Behavior.                                                                                                                                          |
| 15             | QoS_Sustainability_Ext    | This feature indicates support for the extensions to the event related to QoS sustainability, including support of exposing S-NSSAI information. Supporting this feature also requires the support of feature QoS_Sustainability.                                                                                                                                                |
| 16             | TermRequest               | This feature indicates support for Analytics Exposure Subscription termination requests sent by the NEF to the AF.                                                                                                                                                                                                                                                               |
| 17             | QoS_SustainabilityExt_eNA | This feature indicates support for the extensions to the event related to QoS sustainability, including: <ul style="list-style-type: none"> <li>- Support of multiple S-NSSAIs.</li> <li>- Support of deriving the QoS sustainability analytics in an AoI with fine granularity.</li> </ul> Supporting this feature also requires the support of feature QoS_Sustainability_Ext. |

|    |                            |                                                                                                                                                                                                                                                                                                                                                                                       |
|----|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18 | ServiceExperienceExt_eNA   | This feature indicates support for the extensions to the event related to service experience supporting eNA, including support for DNN, S-NSSAI, Location Area, PDU Session parameters information for service experience analytics. Supporting this feature also requires the support of feature ServiceExperience.                                                                  |
| 19 | Abnormal_BehaviorExt_eNA   | This feature indicates support for the extensions to the event related to abnormal behavior related to eNA, including support of exposing DNN and S-NSSAI information. Supporting this feature also requires the support of feature Abnormal_Behavior.                                                                                                                                |
| 20 | CongestionExt_eNA          | This feature indicates support for the extensions to the event related to user data congestion related to eNA, including support of GPSI and/or list of Top applications. Supporting this feature also requires the support of feature Congestion.                                                                                                                                    |
| 21 | DispersionExt_eNA          | This feature indicates support for the extensions associated with analytics event related to Dispersion analytics. Supporting this feature also requires the support of feature Congestion.                                                                                                                                                                                           |
| 22 | DnPerformanceExt_eNA       | This feature indicates the support of the analytics event related to DN performance. Supporting this feature also requires the support of the "Dispersion" feature.                                                                                                                                                                                                                   |
| 23 | UeCommunicationExt_eNA     | This feature indicates the support of the analytics event related to UE communication related to eNA. Supporting this feature also requires the support of feature Ue_Communication.                                                                                                                                                                                                  |
| 24 | Ue_MobilityExt_eNA         | This feature indicates the support of the analytics event related to UE Mobility supporting eNA, including ordering criterion and preferred granularity of location. Supporting this feature also requires the support of feature Ue_Mobility.                                                                                                                                        |
| 25 | DnPerformanceExt_AIML      | This feature indicates support for extensions to the event related to DN Performance supporting AIML, including support of extended DN Performance Analytics for group of UEs. Supporting this feature also requires the support of feature DnPerformance.                                                                                                                            |
| 26 | UeMobilityExt_AIML         | This feature indicates support for further extensions to the event related to UE mobility supporting AIML, including support of UE's geographical distribution and direction analytics. Supporting this feature also requires the support of feature "Ue_Mobility".                                                                                                                   |
| 27 | NetworkPerformanceExt_AIML | This feature indicates support of the network performance enhancements for AI/ML-based Services. Within this feature the following enhancements are covered:<br>- support of providing gNB resource usage for GBR traffic and Delay-critical GBR traffic.<br><br>Supporting this feature also requires the support of Network_Performance feature.                                    |
| 28 | E2eDataVolTransTime        | This feature indicates support for E2E data volume transfer time analytics                                                                                                                                                                                                                                                                                                            |
| 29 | ENAEExt                    | This feature indicates support for the general enhancements of analytics exposure requirements, including support for use case context sent by the AF to the NEF.                                                                                                                                                                                                                     |
| 30 | NetworkPerfExt_eNA         | This feature indicates support for the enhancements of network performance. Within this feature the following enhancements are covered:<br>- support of providing target period subset in the analytics.<br><br>Supporting this feature also requires the support of Network_Performance feature.                                                                                     |
| 31 | MovementBehaviour          | This feature indicates support for the Movement Behaviour information.                                                                                                                                                                                                                                                                                                                |
| 32 | WlanPerformance_AIML       | This feature indicates support for the WLAN Performance information supporting AIML.                                                                                                                                                                                                                                                                                                  |
| 33 | NSLoad                     | This feature indicates the support of Network Slice load level information reporting subscription/notification functionality as part of the support of network slice capability exposure application layer framework.<br><br>The following functionalities are supported:<br>- support to subscribe and get notified of (or retrieve) Network Slice load level analytics information. |
| 34 | AnalyticsAccuracy          | This feature indicates support for the Analytics Accuracy information.                                                                                                                                                                                                                                                                                                                |
| 35 | RelativeProximity          | This feature indicates support for the Relative Proximity analytics.                                                                                                                                                                                                                                                                                                                  |

|    |                        |                                                                                                                                                                                                                                                                                                                                                                         |
|----|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 36 | StatisticsFailure      | This feature indicates support for partial failure report for statistics during event notification.<br><br>This feature requires the support of the "EneNA" feature.                                                                                                                                                                                                    |
| 37 | RoamingAnalytics       | This feature indicates support for forwarding errors related to roaming analytics.                                                                                                                                                                                                                                                                                      |
| 38 | MovementBehaviourExt   | This feature indicates support for the enhancement of Movement Behaviour information.<br><br>The following functionalities are supported:<br>- Support targeting list of UEs in Movement Behaviour Analytics.<br><br>Supporting this feature also requires the support of MovementBehaviour feature.                                                                    |
| 39 | QoS_SustainabilityExt2 | This feature indicates support for the enhancements of QoS Sustainability Analytics.<br><br>The following functionalities are supported:<br>- Support targeting list of UEs in QoS Sustainability Analytics.<br>- Providing the end-to-end delay reporting thresholds.<br><br>Supporting this feature also requires the support of "QoS_SustainabilityExt_eNA" feature. |
| 40 | SignallingStorm        | This feature indicates support for the Signalling Storm Analytics.                                                                                                                                                                                                                                                                                                      |
| 41 | RelativeProximityExt   | This feature indicates support for the enhancements of Relative Proximity Analytics.<br><br>The following functionalities are supported:<br>- Support enhancement of TTC prediction in Relative Proximity Analytics.<br><br>Supporting this feature also requires the support of the "RelativeProximity" feature.                                                       |
| 42 | ENAEExt2               | This feature indicates support for the general enhancements of analytics exposure requirements in Rel-19.<br><br>The following functionalities are supported:<br>- Prediction Error handling.                                                                                                                                                                           |
| 43 | UeMobilityExt3         | This feature indicates support for the following enhancements of UE mobility analytics:<br>- Providing last known UE location.<br><br>Supporting this feature also requires the support of the Ue_Mobility feature.                                                                                                                                                     |

## 5.6.5 Error handling

### 5.6.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.6.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the AnalyticsExposure API.

### 5.6.5.3 Application Errors

The application errors defined for the AnalyticsExposure API are listed in table 5.6.5.3-1.

**Table 5.6.5.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|-------------------|------------------|-------------|---------------|

|                                      |                           |                                                                                                                                                                                                                         |                  |
|--------------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| BOTH_STAT_PRED_NOT_ALLOWED           | 400 Bad Request           | For the requested observation period, the start time is in the past and the end time is in the future, which means the AF requested both statistics and prediction for the analytics.                                   |                  |
| USER_CONSENT_NOT_GRANTED             | 403 Forbidden             | Indicates that the request shall be rejected because an impacted user has not provided the required user consent.                                                                                                       |                  |
| NO_ROAMING_SUPPORT                   | 403 Forbidden             | Indicates that the request is rejected because roaming analytics or data are required and they could not be collected because the NWDAF(s) that were invoked by the NEF do not support the roaming exchange capability. | RoamingAnalytics |
| DATA_NOT_FOUND                       | 404 Not Found             | The requested UE subscription data is not found/does not exist.                                                                                                                                                         |                  |
| USER_NOT_FOUND                       | 404 Not Found             | The user does not exist.                                                                                                                                                                                                |                  |
| GROUP_IDENTIFIER_NOT_FOUND           | 404 Not Found             | The requested Group Identifier does not exist.                                                                                                                                                                          |                  |
| SUBSCRIPTION_NOT_FOUND               | 404 Not Found             | The subscription does not exist.                                                                                                                                                                                        |                  |
| UNAVAILABLE_DATA                     | 500 Internal Server Error | Indicates the requested statistics in the past is rejected since necessary data to perform the service is unavailable.                                                                                                  |                  |
| UNSATISFIED_REQUESTED_ANALYTICS_TIME | 500 Internal Server Error | Indicates that the requested event is rejected since the analytics information is not ready when the time indicated by the "timeAnaNeeded" attribute (as provided during the request) is reached.                       | EneNA            |
| PREDICTION_NOT_ALLOWED               | 400 Bad Request           | Indicates that the request shall be rejected because the prediction for the analytics event is not allowed.                                                                                                             | ENAEvt2          |

## 5.7 5GLANParameterProvision API

### 5.7.0 Introduction

The Nnef\_ParameterProvision service shall use the 5GLANParameterProvision API for 5G LAN parameters provisioning.

The API URI of 5GLANParameterProvision API shall be:

**{apiRoot}/3gpp-5glan-pp/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-5glan-pp".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.7.1 Resources

#### 5.7.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.7.1.1-1 and the resources and HTTP methods used for the 5GLANParameterProvision API.

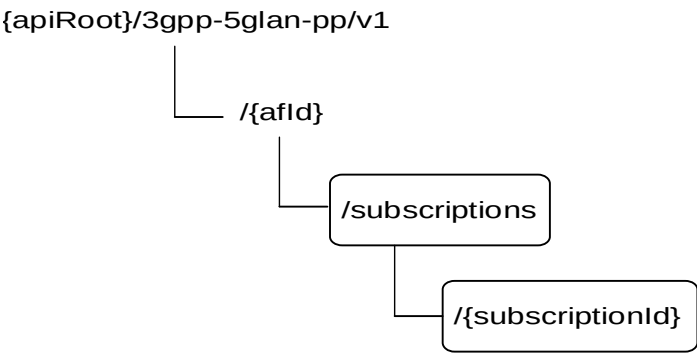


Figure 5.7.1.1-1: Resource URI structure of the 5GLANParameterProvision API

Table 5.7.1.1-1 provides an overview of the resources and HTTP methods applicable for the 5GLANParameterProvision API.

Table 5.7.1.1-1: Resources and methods overview

| Resource name                                      | Resource URI                           | HTTP method | Description                                                     |
|----------------------------------------------------|----------------------------------------|-------------|-----------------------------------------------------------------|
| 5GLAN Parameters Provision Subscriptions           | /{afId}/subscriptions                  | GET         | Read all subscriptions for a given AF.                          |
|                                                    |                                        | POST        | Create a new subscription to provision parameters.              |
| Individual 5GLAN Parameters Provision Subscription | /{afId}/subscriptions/{subscriptionId} | GET         | Read an existing subscription identified by {subscriptionId}.   |
|                                                    |                                        | PUT         | Update an existing subscription identified by {subscriptionId}. |
|                                                    |                                        | PATCH       | Modify an existing subscription identified by {subscriptionId}. |
|                                                    |                                        | DELETE      | Delete a subscription identified by {subscriptionId}.           |

5.7.1.2 Resource: 5GLAN Parameters Provision Subscriptions

5.7.1.2.1 Introduction

This resource allows a AF to read all active 5GLAN parameters provision subscriptions for the given AF, or create an new individual 5GLAN parameters provision subscription to provision parameters to the NEF.

5.7.1.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-5glan-pp/v1/{afId}/subscriptions

This resource shall support the resource URI variables defined in table 5.7.1.2.2-1.

Table 5.7.1.2.2-1: Resource URI variables for this resource

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

5.7.1.2.3 Resource Methods

5.7.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.7.1.2.2.



## 5.7.1.2.3.2 GET

The GET method allows to read all active subscriptions for a given AF. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.7.1.2.3.2-1.

**Table 5.7.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.7.1.2.3.2-2 and the response data structures and response codes specified in table 5.7.1.2.3.2-3.

**Table 5.7.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.7.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(5G LAN parameters Provision)                                                                                       | M | 0..N        | 200 OK                 | All the subscription information for the AF in the request URI are returned.                                                                                                                                                                                    |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                 |

**Table 5.7.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.7.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.7.1.2.3.3 POST

The POST method creates a new resource to individual 5GLAN parameters provision subscription for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.7.1.2.3.3-1 and the response data structures and response codes specified in table 5.7.1.2.3.3-2.

**Table 5.7.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type                | P | Cardinality | Description                                                  |
|--------------------------|---|-------------|--------------------------------------------------------------|
| 5GLanParametersProvision | M | 1           | Parameters to create a subscription to provision parameters. |

**Table 5.7.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------|
| 5GLanParametersProvision                                                                                                  | M | 1           | 201 Created    | The subscription was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                |

**Table 5.7.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                  |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-5glan-pp/v1/{afId}/subscriptions/{subscriptionId} |

### 5.7.1.3 Resource: Individual 5GLAN Parameters Provision Subscription

#### 5.7.1.3.1 Introduction

This resource allows a AF to read, update or delete an existing subscription to provision 5GLAN parameters.

#### 5.7.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-5glan-pp/v1/{afId}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.7.1.3.2-1.

**Table 5.7.1.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                               |
|----------------|-----------|------------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].      |
| afId           | string    | Identifier of the AF.                    |
| subscriptionId | string    | Identifier of the subscription resource. |

#### 5.7.1.3.3 Resource Methods

##### 5.7.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.7.1.3.2.

##### 5.7.1.3.3.2 GET

The GET method allows to read the active subscription for a given AF and subscription Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.7.1.3.3.2-1.

**Table 5.7.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|     |  |  |  |  |
|-----|--|--|--|--|
| N/A |  |  |  |  |
|-----|--|--|--|--|

This method shall support the request data structures specified in table 5.7.1.3.3.2-2 and the response data structures and response codes specified in table 5.7.1.3.3.2-3.

**Table 5.7.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.7.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5GlanParametersProvision                                                                                                 | M | 1           | 200 OK                 | The information for the subscription in the request URI are returned.                                                                                                                                                                                           |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                 |

**Table 5.7.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.7.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.7.1.3.3.3 PUT

The PUT method modifies an existing resource to update a subscription. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.7.1.3.3.3-1 and the response data structures and response codes specified in table 5.7.1.3.3.3-2.

**Table 5.7.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type                | P | Cardinality | Description                                              |
|--------------------------|---|-------------|----------------------------------------------------------|
| 5GlanParametersProvision | M | 1           | Modify an existing subscription to provision parameters. |

**Table 5.7.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5GLanParametersProvision                                                                                                 | M | 1           | 200 OK                 | The subscription was updated successfully.                                                                                                                                                                                                                         |
| n/a                                                                                                                      |   |             | 204 No Content         | The subscription was updated successfully.                                                                                                                                                                                                                         |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                    |

**Table 5.7.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.7.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.7.1.3.3.4 DELETE

The DELETE method deletes an existing individual 5GLAN parameters provision subscription for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.7.1.3.3.4-1.

**Table 5.7.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.7.1.3.3.4-2 and the response data structures and response codes specified in table 5.7.1.3.3.4-3.

**Table 5.7.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.7.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
|-----------|---|-------------|----------------|-------------|

|                                                                                                                             |  |  |                        |                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |  |  | 204 No Content         | The subscription was terminated successfully.                                                                                                                                                                                                                     |
| N/A                                                                                                                         |  |  | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |  |  | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                                                   |

**Table 5.7.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.7.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.7.1.3.3.5 PATCH

The PATCH method allows to change some properties of an existing resource to update a subscription. The AF shall initiate the HTTP PATCH request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.7.1.3.3.5-1 and the response data structures and response codes specified in table 5.7.1.3.3.5-2.

**Table 5.7.1.3.3.5-1: Data structures supported by the PATCH Request Body on this resource**

| Data type                     | P | Cardinality | Description                                              |
|-------------------------------|---|-------------|----------------------------------------------------------|
| 5GlanParametersProvisionPatch | M | 1           | Modify an existing subscription to provision parameters. |

**Table 5.7.1.3.3.5-2: Data structures supported by the PATCH Response Body on this resource**

| Data type                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|--------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5GlanParametersProvision | M | 1           | 200 OK                 | The subscription was updated successfully.                                                                                                                                                                                                                         |
| n/a                      |   |             | 204 No Content         | The subscription was updated successfully.                                                                                                                                                                                                                         |
| N/A                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.                                                                           |

|                                                                                                                            |  |  |  |                                                                           |
|----------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------|
|                                                                                                                            |  |  |  | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |  |                                                                           |

**Table 5.7.1.3.3.5-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.7.1.3.3.5-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.7.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.7.1B Notifications

### 5.7.1B.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.7.1B.1-1: Notifications overview**

| Notification                                     | Callback URI | HTTP method or custom operation | Description (service operation)                                                                                      |
|--------------------------------------------------|--------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 5G LAN Parameter Provisioning Event Notification | {notifUri}   | POST                            | This operation enables the NEF to notify a previously subscribed AF on 5G LAN Parameter Provisioning related Events. |

### 5.7.1B.2 5G LAN Parameter Provisioning Event Notification

#### 5.7.1B.2.1 Description

The 5G LAN Parameter Provisioning Event Notification is used by the NEF to report 5G LAN Parameter Provisioning related Events to a previously subscribed AF.

#### 5.7.1B.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 5.7.1B.2.2-1.

**Table 5.7.1B.2.2-1: Callback URI variables**

| Name     | Definition                                                                                                                   |
|----------|------------------------------------------------------------------------------------------------------------------------------|
| notifUri | Callback reference provided by the AF during the creation/update/modification of the related 5G LAN Parameters Provisioning. |

### 5.7.1B.2.3 Operation Definition

#### 5.7.1B.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.7.1B.2.3.1-1 and the response data structures and response codes specified in table 5.7.1B.2.3.1-2.

**Table 5.7.1B.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type               | P | Cardinality | Description                                                                           |
|-------------------------|---|-------------|---------------------------------------------------------------------------------------|
| 5GLanParamProv<br>Notif | M | 1           | Provides information about the observed 5G LAN Parameter Provisioning related Events. |

**Table 5.7.1B.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                       |   |             | 204 No Content         | The 5G LAN Parameter Provisioning Event Notification is successfully received.                                                                                                                                                                                                  |
| n/a                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                 |

**Table 5.7.1B.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.7.1B.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

#### 5.7.1B.2.3.2 Void

### 5.7.2 Data Model

#### 5.7.2.1 General

This clause specifies the application data model supported by the 5GLANParameterProvision API.

Table 5.7.2.1-1 specifies the data types defined for the 5GLANParameterProvision API.

**Table 5.7.2.1-1: 5GLANParameterProvision API specific Data Types**

| Data type                     | Clause defined | Description                                                                                             | Applicability |
|-------------------------------|----------------|---------------------------------------------------------------------------------------------------------|---------------|
| 5GLanParameters               | 5.7.2.3.3      | Represents 5G LAN service related parameters that need to be provisioned.                               |               |
| 5GLanParametersPatch          | 5.7.2.3.6      | Represents 5G LAN service related parameters that need to be modified.                                  |               |
| 5GLanParametersProvision      | 5.7.2.3.2      | Represents an individual 5G LAN parameters provision subscription resource.                             |               |
| 5GLanParametersProvisionPatch | 5.7.2.3.5      | Represents the 5G LAN parameters to request the modification of a subscription to provision parameters. |               |
| 5GLanParamProvNotif           | 5.7.3.15       | Represents a 5G LAN Parameters Provisioning Event Notification.                                         | GMEC          |
| AaaUsage                      | 5.7.2.4.3      | Represents the usage of the DN-AAA server.                                                              |               |
| AcsParams                     | 5.7.3.12       | Represents ACS configuration parameters.                                                                | GMEC          |
| AppDescriptor                 | 5.7.2.3.4      | Represents an operation system and the corresponding applications.                                      |               |
| AppDescriptorRm               | 5.7.2.3.7      | Represents the same as the AppDescriptor data type but with the "nullable: true" property.              |               |
| CpParams                      | 5.7.3.9        | Represents Communication Pattern parameters.                                                            | GMEC          |
| DnnSnssaiParams               | 5.7.3.14       | Represents DNN and S-NSSAI specific group parameters.                                                   | GMEC          |
| ECSAddrParams                 | 5.7.3.13       | Represents ECS address configuration parameters.                                                        | GMEC          |
| LpiParams                     | 5.7.3.11       | Represents Location Privacy Indication parameters.                                                      | GMEC          |
| NpConfigNotif                 | 5.7.3.16       | Represents a Network Parameters Configuration related notification.                                     | GMEC          |
| NpConfigParams                | 5.7.3.10       | Represents Network Parameters Configuration information.                                                | GMEC          |
| MaxGrpDataRateInfo            | 5.7.2.3.17     | Represents the Maximum Group Data Rate related information.                                             | GMEC          |

### 5.7.2.2 Reused data types

The data types reused by the 5GLANParameterProvision API from other specifications are listed in table 5.7.2.2-1.

**Table 5.7.2.2-1: Re-used Data Types**

| Data type                     | Reference           | Comments                                                              | Applicability  |
|-------------------------------|---------------------|-----------------------------------------------------------------------|----------------|
| 5GVnGroupCommunicationType    | 3GPP TS 29.503 [17] | Represents the 5G VN group communication type.                        |                |
| AfReqDefaultQoS               | Clause 5.33.5.2.5   | Represents the AF requested default QoS.                              |                |
| AppliedParameterConfiguration | 3GPP TS 29.122 [4]  | Represents the parameter configuration applied in the network.        |                |
| ApplicationId                 | 3GPP TS 29.571 [8]  | Represents the identifier of an application.                          |                |
| AcsInfo                       | 3GPP TS 29.571 [8]  | Contains the ACS information.                                         |                |
| BitRate                       | 3GPP TS 29.571 [8]  | Represents a bit rate.                                                |                |
| CpParameterSet                | 3GPP TS 29.122 [4]  | Represents an offered Communication Pattern parameter set.            |                |
| CpReport                      | 3GPP TS 29.122 [4]  | Represents a CP report.                                               |                |
| ConfigResult                  | 3GPP TS 29.122 [4]  | Represents one configuration processing result for a group's members. |                |
| DateTime                      | 3GPP TS 29.122 [4]  | Represents a data and a time.                                         |                |
| Dnn                           | 3GPP TS 29.571 [8]  | Identifies a DNN.                                                     |                |
| DurationSec                   | 3GPP TS 29.122 [4]  | Indicates a time duration.                                            |                |
| EcsAuthMethod                 | 3GPP TS 29.503 [17] | Represents the ECS Authentication Methods.                            | ECSAuthMethods |



|                        |                     |                                                                                                           |               |
|------------------------|---------------------|-----------------------------------------------------------------------------------------------------------|---------------|
| EcsServerAddr          | 3GPP TS 29.571 [8]  | Represents the Edge Configuration Server (ECS) address configuration information.                         |               |
| ExternalGroupId        | 3GPP TS 29.122 [4]  | External Group Identifier for a user group.                                                               |               |
| Gpsi                   | 3GPP TS 29.571 [8]  | Identifies a GPSI.                                                                                        |               |
| Ipv4Addr               | 3GPP TS 29.571 [8]  | Identifies an IPv4 address.                                                                               |               |
| Ipv6Addr               | 3GPP TS 29.571 [8]  | Identifies an IPv6 address.                                                                               |               |
| LadnServArea           | Clause 5.33.5.2.6   | Represents an LADN Service Area.                                                                          |               |
| Link                   | 3GPP TS 29.122 [4]  | Represents a referenced resource.                                                                         |               |
| Lpi                    | 3GPP TS 29.503 [17] | Represents the Location Privacy Indication information.                                                   |               |
| MtcProviderInformation | 3GPP TS 29.571 [8]  | Indicates MTC provider information for 5G VN Group Configuration authorization.                           |               |
| OsId                   | 3GPP TS 29.519 [23] | Operating System.                                                                                         |               |
| PduSessionType         | 3GPP TS 29.571 [8]  | PDU session type.                                                                                         |               |
| Snssai                 | 3GPP TS 29.571 [8]  | Identifies the S-NSSAI.                                                                                   |               |
| SpatialValidityCond    | 3GPP TS 29.571 [8]  | Represents the Spatial Validity Condition.                                                                |               |
| SupportedFeatures      | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features.                                             |               |
| SupportedPlmn          | 3GPP TS 29.503 [17] | Represents the ID of the PLMN supported by the ECS along with the list of ECSPs associated with the PLMN. | ECSSuppPlmns  |
| UpSecurity             | 3GPP TS 29.571 [8]  | Contains User Plane Security Policy information.                                                          | UpSecurityPol |

### 5.7.2.3 Structured data types

#### 5.7.2.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.7.2.3.2 Type: 5GLanParametersProvision

**Table 5.7.2.3.2-1: Definition of type 5GLanParametersProvision**

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                   | Applicability |
|----------------|-------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| self           | Link              | C | 0..1        | Identifies the individual parameters provision subscription resource. Shall be present in the HTTP GET response when reading all the subscriptions for an AF. |               |
| 5gLanParams    | 5GLanParameters   | M | 1           | Represents the 5G LAN service related parameters.                                                                                                             |               |
| suppFeat       | SupportedFeatures | M | 1           | Indicates the negotiated supported features.                                                                                                                  |               |

#### 5.7.2.3.3 Type: 5GLanParameters

This type represents the 5G LAN service related parameters need to be provisioned.

**Table 5.7.2.3.3-1: Definition of type 5GLanParameters**

| Attribute name | Data type       | P | Cardinality | Description                             | Applicability |
|----------------|-----------------|---|-------------|-----------------------------------------|---------------|
| exterGroupId   | ExternalGroupId | M | 1           | Identifies an 5G Virtual Network Group. |               |

|                 |                            |   |      |                                                                                                                                                                                                                                                                                                                            |                      |
|-----------------|----------------------------|---|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| gpsis           | map(Gpsi)                  | M | 1..N | Represents the list of 5G VN Group members, each member is identified by GPSI.<br>Any string value can be used as a key of the map.                                                                                                                                                                                        |                      |
| dnn             | Dnn                        | M | 1    | DNN for the 5G VN group, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.                                                                                                                                                                                   |                      |
| aaalpv4Addr     | Ipv4Addr                   | O | 1    | Identifies the DN-AAA server IPv4 address provided by AF, for the secondary authentication/authorization and/or UE IP address allocation by DN-AAA server.                                                                                                                                                                 |                      |
| aaalpv6Addr     | Ipv6Addr                   | O | 1    | Identifies the DN-AAA server IPv6 address provided by AF, for the secondary authentication/authorization and/or UE IP address allocation by DN-AAA server.                                                                                                                                                                 |                      |
| aaaUsgs         | array(AaaUsage)            | O | 1..N | Identifies the usage needs for secondary authentication/authorization and/or UE IP address allocation from the DN-AAA server. (NOTE 3)                                                                                                                                                                                     |                      |
| mtcProviderId   | MtcProviderInformation     | O | 0..1 | Indicates MTC provider information for 5G VN Group Configuration authorization. (NOTE 1)                                                                                                                                                                                                                                   |                      |
| snssai          | Snssai                     | M | 1    | S-NSSAI for the 5G VN group.                                                                                                                                                                                                                                                                                               |                      |
| sessionType     | PduSessionType             | M | 1    | PDU Session Type allowed for 5G VN group.                                                                                                                                                                                                                                                                                  |                      |
| sessionTypes    | array(PduSessionType)      | O | 1..N | If further PDU Session Types (in addition to the PDU Session Type indicated in the "sessionType" attribute) are allowed for the 5G VN group, they are provided in this attribute. (NOTE 2)                                                                                                                                 | multipleSessionTypes |
| appDesps        | map(AppDescriptor)         | M | 1..N | Describes the operation systems and the corresponding applications for each operation systems. The key of map is osId.                                                                                                                                                                                                     |                      |
| vnGroupCommInd  | boolean                    | O | 0..1 | Indicates whether the 5G VN group is associated with 5G VN group communication.<br><br>- "true" indicates that the 5G VN group is associated with 5G VN group communication.<br>- "false" indicates that the 5G VN group is not associated with 5G VN group communication.<br>- The default value when omitted is "false". | GMEC                 |
| vnGroupCommType | 5GVnGroupCommunicationType | O | 0..1 | Contains the 5G VN group communication type.<br><br>This attribute shall be present only when the                                                                                                                                                                                                                          | GMEC                 |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |   |      |                                                                                                                                                                                                                                                                                               |               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |   |      | "vnGroupCommInd" is present and set to "true".                                                                                                                                                                                                                                                |               |
| maxGrpDataRateInfo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MaxGrpDataRateInfo | O | 0..1 | Represents the Maximum Group Data Rate related information.                                                                                                                                                                                                                                   | GMEC          |
| cpParams                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CpParams           | O | 0..1 | Contains Communication Pattern Parameters for the 5G VN group.                                                                                                                                                                                                                                | GMEC          |
| npConfigParams                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | NpConfigParams     | O | 0..1 | Contains Network Parameters Configuration information for the 5G VN group.                                                                                                                                                                                                                    | GMEC          |
| lpiParams                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | LpiParams          | O | 0..1 | Contains Location Privacy Indication parameters for the 5G VN group.                                                                                                                                                                                                                          | GMEC          |
| acsParams                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | AcsParams          | O | 0..1 | Contains ACS configuration parameters for the 5G VN group.                                                                                                                                                                                                                                    | GMEC          |
| ecsAddrParams                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ECSAddrParams      | O | 0..1 | Contains ECS address configuration parameters for the 5G VN group.                                                                                                                                                                                                                            | GMEC          |
| dnnSnssaiParams                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DnnSnssaiParams    | O | 0..1 | Contains DNN and S-NSSAI specific group parameters for the 5G VN group.                                                                                                                                                                                                                       | GMEC          |
| notifUri                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Link               | O | 0..1 | Contains a URI indicating the notification destination where notification requests shall be delivered.<br><br>This attribute may be present only when 5G LAN Parameters Provisioning Event notifications (e.g., Network Parameters Configuration related notifications) need to be delivered. | GMEC          |
| upSecurity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | UpSecurity         | O | 0..1 | Contains user plane security policy information for PDU session(s) associated with the 5G VN group.                                                                                                                                                                                           | UpSecurityPol |
| <p>NOTE 1: The NEF should check received MTC Provider information and then the NEF may:</p> <ul style="list-style-type: none"> <li>- override it with local configured value and send it to UDM;</li> <li>- send it directly to the UDM; or</li> <li>- reject the 5G VN Group Configuration request.</li> </ul> <p>NOTE 2: Only one PDU Session type is applied for a PDU Session of a VN group at a time.</p> <p>NOTE 3: This attribute shall contain at most 2 array elements. It is however kept defined as it is (i.e. with a cardinality of "1..N") for backward compatibility considerations.</p> |                    |   |      |                                                                                                                                                                                                                                                                                               |               |

#### 5.7.2.3.4 Type: AppDescriptor

**Table 5.7.2.3.4-1: Definition of type AppDescriptor**

| Attribute name | Data type          | P | Cardinality | Description                                                                                                                | Applicability |
|----------------|--------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------|---------------|
| osId           | OsId               | M | 1           | Identifies an operating system supported by the UE.                                                                        |               |
| appIds         | map(ApplicationId) | M | 1..N        | Identifies applications that is running on the UE's operating system.<br>Any string value can be used as a key of the map. |               |

## 5.7.2.3.5 Type: 5GLanParametersProvisionPatch

**Table 5.7.2.3.5-1: Definition of type 5GLanParametersProvisionPatch**

| Attribute name   | Data type            | P | Cardinality | Description                                                                                                                                | Applicability |
|------------------|----------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 5gLanParamsPatch | 5GLanParametersPatch | O | 0..1        | Represents the 5G LAN service related parameters.<br><br>This attribute is deprecated. The "5gLanParams" attribute should be used instead. |               |
| 5gLanParams      | 5GLanParameters      | O | 0..1        | Represents the updated 5G LAN service related parameters.                                                                                  |               |

## 5.7.2.3.6 Type: 5GLanParametersPatch

This data type is deprecated.

**Table 5.7.2.3.6-1: Definition of type 5GLanParametersPatch**

| Attribute name      | Data type            | P | Cardinality | Description                                                                                                                      | Applicability |
|---------------------|----------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|---------------|
| gpsis               | map(GpsiRm)          | O | 1..N        | Represents the list of 5G VN Group members, each member is identified by GPSI. Any string value can be used as a key of the map. |               |
| appDesps            | map(AppDescriptorRm) | O | 1..N        | Describes the operation systems and the corresponding applications for each operation system. The key of map is osId.            |               |
| cpParams            | CpParams             | O | 0..1        | Contains the updated Communication Pattern Parameters for the 5G VN group.                                                       | GMEC          |
| npConfigParams      | NpConfigParams       | O | 0..1        | Contains the updated Network Parameters Configuration information for the 5G VN group.                                           | GMEC          |
| lpiParams           | LpiParams            | O | 0..1        | Contains the updated Location Privacy Indication parameters for the 5G VN group.                                                 | GMEC          |
| acsParams           | AcsParams            | O | 0..1        | Contains the updated ACS configuration parameters for the 5G VN group.                                                           | GMEC          |
| ecsAddrParams       | ECSAddrParams        | O | 0..1        | Contains the updated ECS address parameters for the 5G VN group.                                                                 | GMEC          |
| dnnSnssaiParameters | DnnSnssaiParams      | O | 0..1        | Contains the updated DNN and S-NSSAI specific parameters for the 5G VN group.                                                    | GMEC          |
| notifUri            | Link                 | O | 0..1        | Contains the updated URI indicating the notification destination where notification requests shall be delivered.                 | GMEC          |

## 5.7.2.3.7 Type: AppDescriptorRm

**Table 5.7.2.3.7-1: Definition of type AppDescriptorRm**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
|----------------|-----------|---|-------------|-------------|---------------|

|        |                      |   |      |                                                                                                              |  |
|--------|----------------------|---|------|--------------------------------------------------------------------------------------------------------------|--|
| applds | map(ApplicationIdRm) | O | 1..N | Identifies application(s) on the UE's operating system.<br>Any string value can be used as a key of the map. |  |
|--------|----------------------|---|------|--------------------------------------------------------------------------------------------------------------|--|

5.7.2.3.8 Void

5.7.2.3.9 Type: CpParams

**Table 5.7.2.3.9-1: Definition of type CpParams**

| Attribute name  | Data type           | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                                                                                                                      | Applicability |
|-----------------|---------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| cpParameterSets | map(CpParameterSet) | M | 1..N        | Represents one or more set(s) of CP parameters information for the 5G VN group.<br><br>Any string value may be used as a key of the map.                                                                                                                                                                                                                                                                                                         |               |
| cpReports       | map(CpReport)       | C | 1..N        | Contains the identifier(s) of the set(s) of CP parameters for which the provided CP parameters are not added or modified successfully with the corresponding failure reason.<br><br>Each element provides the related information for one or more CP set identifier(s).<br><br>The key of the map is a string representing the failure identifier.<br><br>This attribute may only be present in responses from the NEF to the AF.<br><br>(NOTE). |               |

NOTE: At least one of these attributes shall be present.

5.7.2.3.10 Type: NpConfigParams

**Table 5.7.2.3.10-1: Definition of type NpConfigParams**

| Attribute name             | Data type   | P | Cardinality | Description                                                                                                                                                                                | Applicability |
|----------------------------|-------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| maximumLatency             | DurationSec | O | 0..1        | Contains the maximum delay acceptable for downlink data transfers.                                                                                                                         |               |
| maximumResponseTime        | DurationSec | O | 0..1        | Contains the time duration that the UE stays reachable to allow the AF to reliably deliver the required downlink data.                                                                     |               |
| suggestedNumberOfDIPackets | integer     | O | 0..1        | Contains the number of packets that the serving gateway shall buffer in case the UE is not reachable.                                                                                      |               |
| groupReportingGuardTime    | DurationSec | O | 0..1        | Identifies the group reporting aggregation time duration that the NEF shall use when aggregating the reports detected for the UE(s) in the 5G VN group and report them together to the AF. |               |
| validityTime               | DateTime    | O | 0..1        | Identifies when the network parameter expires and shall be deleted locally if it expires.<br><br>(NOTE)                                                                                    |               |

NOTE: If this attribute is omitted, no expiry time applies for the provisioned network parameter configuration.

## 5.7.2.3.11 Type: LpiParams

Table 5.7.2.3.11-1: Definition of type LpiParams

| Attribute name | Data type | P | Cardinality | Description                                                              | Applicability |
|----------------|-----------|---|-------------|--------------------------------------------------------------------------|---------------|
| lpi            | Lpi       | M | 1           | Contains the Location Privacy Indication parameters for the 5G VN group. |               |

## 5.7.2.3.12 Type: AcsParams

Table 5.7.2.3.12-1: Definition of type AcsParams

| Attribute name | Data type | P | Cardinality | Description                                      | Applicability |
|----------------|-----------|---|-------------|--------------------------------------------------|---------------|
| acsInfo        | AcsInfo   | M | 1           | Contains the ACS parameters for the 5G VN group. |               |

## 5.7.2.3.13 Type: ECSAddrParams

Table 5.7.2.3.13-1: Definition of type ECSAddrParams

| Attribute name      | Data type            | P | Cardinality | Description                                                                                                         | Applicability  |
|---------------------|----------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------|----------------|
| ecsServerAddr       | EcsServerAddr        | M | 1           | Represents the ECS address(es).                                                                                     |                |
| spatialValidityCond | SpatialValidityCond  | O | 0..1        | Contains the spatial validity conditions.                                                                           |                |
| ecsAuthMethods      | array(EcsAuthMethod) | O | 1..N        | Contains the supported ECS Authentication Method(s).                                                                | ECSAuthMethods |
| supportedPlmns      | array(SupportedPlmn) | O | 1..N        | Contains the List of PLMNs and associated ECSPs for which EDN configuration information can be provided by the ECS. | ECSSuppPlmns   |

## 5.7.2.3.14 Type: DnnSnssaiParams

Table 5.7.2.3.14-1: Definition of type DnnSnssaiParams

| Attribute name | Data type       | P | Cardinality | Description                                                                                      | Applicability |
|----------------|-----------------|---|-------------|--------------------------------------------------------------------------------------------------|---------------|
| defQos         | AfReqDefaultQoS | C | 0..1        | Represents the AF-requested default QoS parameters applicable to each UE within the 5G VN group. |               |
| ladnServArea   | LadnServArea    | C | 0..1        | Represents the AF-requested LADN Service Area applicable to each UE within the 5G VN group.      |               |

NOTE: At least one of these attributes shall be present.

## 5.7.2.3.15 Type: 5GLanParamProvNotif

Table 5.7.2.3.15-1: Definition of type 5GLanParamProvNotif

| Attribute name | Data type     | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                        | Applicability |
|----------------|---------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| npConfigNotif  | NpConfigNotif | C | 0..1        | Represents a configuration result notification related to the provisioned Network Parameters Configuration information.<br><br>This attribute shall be present only if Network Parameters Configuration information was provisioned within the associated 5G LAN Parameters Provisioning and a configuration result notification needs to be sent. |               |

## 5.7.2.3.16 Type: NpConfigNotif

**Table 5.7.2.3.16-1: Definition of type NpConfigNotif**

| Attribute name | Data type                     | P | Cardinality | Description                                                                                                                                                                                                  | Applicability |
|----------------|-------------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| configResults  | array(ConfigResult)           | O | 1..N        | Each element identifies a notification of grouping configuration result.                                                                                                                                     |               |
| appliedParam   | AppliedParameterConfiguration | O | 0..1        | Indicates the applied parameter configuration in the network. The "maximumDetectionTime" attribute within the AppliedParameterConfiguration data type is not applicable for Network Parameter configuration. |               |

## 5.7.2.3.17 Type: MaxGrpDataRateInfo

**Table 5.7.2.3.17-1: Definition of type MaxGrpDataRateInfo**

| Attribute name   | Data type | P | Cardinality | Description                                                                                                      | Applicability |
|------------------|-----------|---|-------------|------------------------------------------------------------------------------------------------------------------|---------------|
| maxGrpDataRateUL | BitRate   | C | 0..1        | Contains the maximum allowed aggregate UL data rate across all GBR and Non-GBR QoS Flows within the 5G VN group. |               |
| maxGrpDataRateDL | BitRate   | C | 0..1        | Contains the maximum allowed aggregate DL data rate across all GBR and Non-GBR QoS Flows within the 5G VN group. |               |

NOTE: At least one of these attributes shall be provided.

## 5.7.2.4 Simple data types and enumerations

## 5.7.2.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.7.2.4.2 Simple data types

The simple data types defined in table 5.7.2.4.2-1 shall be supported.

**Table 5.7.2.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.7.2.4.3 Enumeration: AaaUsage

**Table 5.7.2.4.3-1: Enumeration AaaUsage**

The enumeration AaaUsage represents the usage of the DN-AAA server.

| Enumeration value | Description                                             |
|-------------------|---------------------------------------------------------|
| "AUTH"            | Secondary authentication/authorization by DN-AAA server |
| "IP_ALLOC"        | UE IP address allocation by DN-AAA server               |

### 5.7.3 Used Features

The table below defines the features applicable to the 5GLANParameterProvision API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.7.3-1: Features used by 5GLANParameterProvision API**

| Feature number | Feature Name         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | multipleSessionTypes | Indicates that multiple allowed PDU Session Types can be provided for a 5G VN group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2              | GMEC                 | <p>This feature indicates the support of Generic Group Management, Exposure and Communication Enhancements.</p> <p>The following functionalities are supported:</p> <ul style="list-style-type: none"> <li>- Support the provisioning of the Maximum Group Data Rate related information for 5G VN groups.</li> <li>- Support the simultaneous provisioning of 5G VN group information and 5G VN group parameters.</li> <li>- Support the provisioning of the indication on whether the 5G VN group is associated with 5G VN group communications or not.</li> </ul> |
| 3              | Void                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4              | Void                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 5              | ECSAuthMethods       | This feature indicates the support of ECS authentication methods for 5G VN group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6              | ECSSuppPlmns         | This feature indicates the support of ECS supported PLMNs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 7              | UpSecurityPol        | <p>This feature indicates the support of Parameter Provisioning Enhancements.</p> <p>The following functionalities are supported:</p> <ul style="list-style-type: none"> <li>- Support the user plane security policy for PDU session(s) associated with the 5G VN group.</li> </ul>                                                                                                                                                                                                                                                                                 |

### 5.7.4 Error handling

#### 5.7.4.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

#### 5.7.4.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the 5GLANParameterProvision API.

#### 5.7.4.3 Application Errors

The application errors defined for 5GLANParameterProvision API are listed in table 5.7.4.3-1.

**Table 5.7.4.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |



# 5.8 ApplyingBdtPolicy API

## 5.8.0 Introduction

The Nnef\_ApplyingBdtPolicy service shall use the ApplyingBdtPolicy API.

The API URI of ApplyingBdtPolicy API shall be:

**{apiRoot}/3gpp-applying-bdt-policy/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-applying-bdt-policy".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

## 5.8.1 Resources

### 5.8.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.8.1.1-1 and the resources and HTTP methods used for the ApplyingBdtPolicy API.

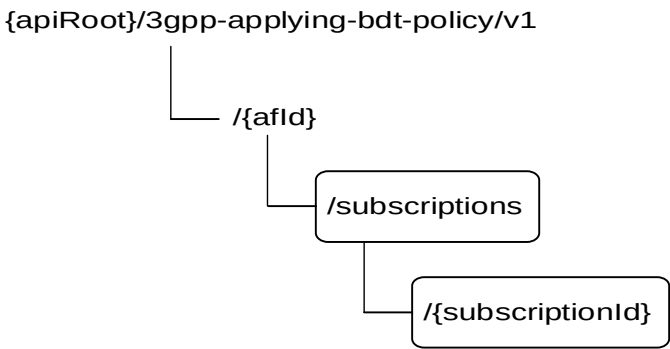


**Figure 5.8.1.1-1: Resource URI structure of the ApplyingBdtPolicy API**

Table 5.8.1.1-1 provides an overview of the resources and HTTP methods applicable for the ApplyingBdtPolicy API.

**Table 5.8.1.1-1: Resources and methods overview**

| Resource name                              | Resource URI                           | HTTP method | Description                                                                   |
|--------------------------------------------|----------------------------------------|-------------|-------------------------------------------------------------------------------|
| Applied BDT Policy Subscriptions           | /{afId}/subscriptions                  | GET         | Read all applied BDT policy subscriptions for a given AF.                     |
|                                            |                                        | POST        | Create a new applied BDT policy subscription.                                 |
| Individual Applied BDT Policy Subscription | /{afId}/subscriptions/{subscriptionId} | GET         | Read an applied BDT policy subscription.                                      |
|                                            |                                        | PATCH       | Modify BDT Reference ID of an existing subscription to an applied BDT policy. |

|  |  |        |                                           |
|--|--|--------|-------------------------------------------|
|  |  | DELETE | Delete an applied BDT policy subscription |
|--|--|--------|-------------------------------------------|

### 5.8.1.2 Resource: Applied BDT Policy Subscriptions

#### 5.8.1.2.1 Introduction

This resource allows a AF to read all applied BDT policy subscriptions for the given AF.

#### 5.8.1.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-applying-bdt-policy/v1/{afId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.8.1.2.2-1.

**Table 5.8.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

#### 5.8.1.2.3 Resource Methods

##### 5.8.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.8.1.2.2.

##### 5.8.1.2.3.2 GET

The GET method allows to read all active applied BDT policy subscriptions for a given AF. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.8.1.2.3.2-1.

**Table 5.8.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.8.1.2.3.2-2 and the response data structures and response codes specified in table 5.8.1.2.3.2-3.

**Table 5.8.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.8.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type               | P | Cardinality | Response codes         | Description                                                                                                                                                                           |
|-------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(AppliedBdtPolicy) | M | 0..N        | 200 OK                 | The applied BDT Policy subscriptions for the AF in the request URI are returned.                                                                                                      |
| N/A                     |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. |

|                                                                                                                          |  |  |                        |                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                          |  |  |                        | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                                                                                                       |
| N/A                                                                                                                      |  |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                                                 |

**Table 5.8.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.8.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**5.8.1.2.3.3 POST**

The POST method creates an applied BDT policy subscription for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.8.1.2.3.3-1 and the response data structures and response codes specified in table 5.8.1.2.3.3-2.

**Table 5.8.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type        | P | Cardinality | Description                                                    |
|------------------|---|-------------|----------------------------------------------------------------|
| AppliedBdtPolicy | M | 1           | Parameters to create a subscription of the applied BDT policy. |

**Table 5.8.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------|
| AppliedBdtPolicy                                                                                                          | M | 1           | 201 Created    | The subscription was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                |

**Table 5.8.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                             |
|----------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-applying-bdt-policy/v1/{afId}/subscriptions/{SubscriptionId} |

### 5.8.1.3 Resource: Individual Applied BDT Policy Subscription

#### 5.8.1.3.1 Introduction

This resource allows a AF to read or delete an active subscription of applied BDT policy.

#### 5.8.1.3.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-applying-bdt-policy/v1/{afId}/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 5.8.1.3.2-1.

**Table 5.8.1.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                               |
|----------------|-----------|------------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].      |
| afId           | string    | Identifier of the AF.                    |
| subscriptionId | string    | Identifier of the subscription resource. |

#### 5.8.1.3.3 Resource Methods

##### 5.8.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.8.1.3.2.

##### 5.8.1.3.3.2 GET

The GET method allows to read the active applied BDT policy for a given AF and subscription Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.8.1.3.3.2-1.

**Table 5.8.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.8.1.3.3.2-2 and the response data structures and response codes specified in table 5.8.1.3.3.2-3.

**Table 5.8.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.8.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type        | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                     |
|------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AppliedBdtPolicy | M | 1           | 200 OK                 | The subscription information for the AF in the request URI are returned.                                                                                                                                                                                        |
| N/A              |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A              |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.                                                                           |

|                                                                                                                          |  |  |  |                                                                           |
|--------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------|
|                                                                                                                          |  |  |  | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |  |                                                                           |

**Table 5.8.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.8.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.8.1.3.3.3 PATCH

The PATCH method allows to change some properties of an existing applied BDT policy subscription. The AF shall initiate the HTTP PATCH request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.8.1.3.3.3-1 and the response data structures and response codes specified in table 5.8.1.3.3.3-2.

**Table 5.8.1.3.3.3-1: Data structures supported by the PATCH Request Body on this resource**

| Data type             | P | Cardinality | Description                                                           |
|-----------------------|---|-------------|-----------------------------------------------------------------------|
| AppliedBdtPolicyPatch | M | 1           | Partial update of a subscription to applying BDT policy subscription. |

**Table 5.8.1.3.3.3-2: Data structures supported by the PATCH Response Body on this resource**

| Data type        | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AppliedBdtPolicy | M | 1           | 200 OK                 | The subscription was modified successfully.                                                                                                                                                                                                                        |
| n/a              |   |             | 204 No Content         | The subscription was modified successfully.                                                                                                                                                                                                                        |
| N/A              |   |             | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A              |   |             | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

**Table 5.8.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.8.1.3.3.4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**5.8.1.3.3.4 DELETE**

The DELETE method deletes an existing applied BDT policy subscription for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.8.1.3.3.4-1.

**Table 5.8.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.8.1.3.3.4-2 and the response data structures and response codes specified in table 5.8.1.3.3.4-3.

**Table 5.8.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.8.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |   |             | 204 No Content         | The subscription was terminated successfully.                                                                                                                                                                                                                     |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                   |

**Table 5.8.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.8.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.8.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.8.2 Notifications

Notifications are not applicable to this API.

## 5.8.3 Data Model

### 5.8.3.1 General

This clause specifies the application data model supported by the ApplyingBdtPolicy API.

Table 5.8.3.1-1 specifies the data types defined for the ApplyingBdtPolicy API.

**Table 5.8.3.1-1: ApplyingBdtPolicy API specific Data Types**

| Data type             | Clause defined | Description                                                                                    | Applicability |
|-----------------------|----------------|------------------------------------------------------------------------------------------------|---------------|
| AppliedBdtPolicy      | 5.8.3.3.2      | Represents an applied BDT policy.                                                              |               |
| AppliedBdtPolicyPatch | 5.8.3.3.3      | Represents the parameters to request the modification of a subscription to applied BDT policy. |               |

### 5.8.3.2 Reused data types

The data types reused by the ApplyingBdtPolicy API from other specifications are listed in table 5.8.3.2-1.

**Table 5.8.3.2-1: Re-used Data Types**

| Data type         | Reference          | Comments                                                                               |
|-------------------|--------------------|----------------------------------------------------------------------------------------|
| BdtReferenceId    | 3GPP TS 29.122 [4] | Identifier of a selected BDT policy.                                                   |
| Gpsi              | 3GPP TS 29.571 [8] | Identifies a GPSI.                                                                     |
| ExternalGroupId   | 3GPP TS 29.122 [4] | External Group Identifier for a user group.                                            |
| SupportedFeatures | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features defined in table 5.8.4-1. |

### 5.8.3.3 Structured data types

#### 5.8.3.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.8.3.3.2 Type: AppliedBdtPolicy

This type represents an applied BDT policy which is sent from the AF to the NEF.

**Table 5.8.3.3.2-1: Definition of type AppliedBdtPolicy**

| Attribute name  | Data type       | P | Cardinality | Description                                               | Applicability |
|-----------------|-----------------|---|-------------|-----------------------------------------------------------|---------------|
| bdtRefId        | BdtReferenceId  | M | 1           | Identifies a selected policy of background data transfer. |               |
| gpsi            | Gpsi            | C | 0..1        | Identifies a user.<br>(NOTE)                              |               |
| externalGroupId | ExternalGroupId | C | 0..1        | Identifies a user group.<br>(NOTE)                        |               |

|                                                                                 |                   |   |      |                                                                                                                                                             |  |
|---------------------------------------------------------------------------------|-------------------|---|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| supFeat                                                                         | SupportedFeatures | M | 1    | Indicates the list of Supported features used as described in clause 5.8.4.                                                                                 |  |
| self                                                                            | Link              | C | 0..1 | Identifies the Individual Applied BDT Policy Subscription resource. Shall be present in the HTTP GET response when reading all the subscriptions for an AF. |  |
| NOTE: Only one of the properties "gpsi" or "externalGroupid" shall be included. |                   |   |      |                                                                                                                                                             |  |

#### 5.8.3.3.3 Type: AppliedBdtPolicyPatch

This type represents a subscription of applied BDT policy parameters provided by the AF to the NEF. The structure is used for HTTP PATCH request.

**Table 5.8.3.3.2-1: Definition of type AppliedBdtPolicyPatch**

| Attribute name | Data type      | P | Cardinality | Description                                               | Applicability |
|----------------|----------------|---|-------------|-----------------------------------------------------------|---------------|
| bdtRefId       | BdtReferenceId | M | 1           | Identifies a selected policy of background data transfer. |               |

### 5.8.3.4 Simple data types and enumerations

#### 5.8.3.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.8.3.4.2 Simple data types

The simple data types defined in table 5.8.3.4.2-1 shall be supported.

**Table 5.8.3.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.8.4 Used Features

The table below defines the features applicable to the ApplyingBdtPolicy API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.8.4-1: Features used by ApplyingBdtPolicy API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

### 5.8.5 Error handling

#### 5.8.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].



In addition, the requirements in the following clauses shall apply.

5.8.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the ApplyingBdtPolicy API.

5.8.5.3 Application Errors

The application errors defined for ApplyingBdtPolicy API are listed in table 5.8.5.3-1.

Table 5.8.5.3-1: Application errors

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

5.9 IPTVConfiguration API

5.9.0 Introduction

The Nnef\_IPTVConfiguration service shall use the IPTVConfiguration API.

The API URI of IPTVConfiguration API shall be:

**{apiRoot}/3gpp-iptvconfiguration/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-iptvconfiguration".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

5.9.1 Resources

5.9.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.9.1.1-1 and the resources and HTTP methods used for the IPTVConfiguration API.

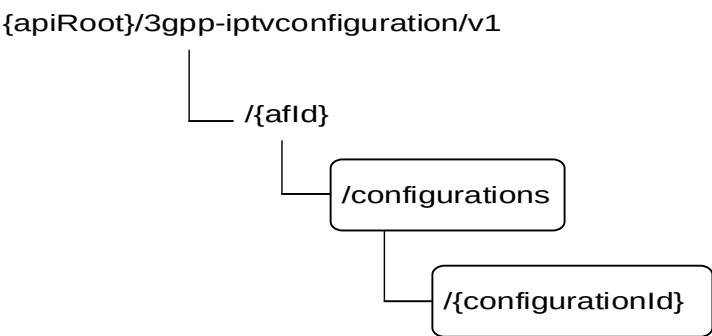


Figure 5.9.1.1-1: Resource URI structure of the IPTVConfiguration API

Table 5.9.1.1-1 provides an overview of the resources and HTTP methods applicable for the IPTVConfiguration API.

**Table 5.9.1.1-1: Resources and methods overview**

| Resource name                 | Resource URI                             | HTTP method | Description                                                       |
|-------------------------------|------------------------------------------|-------------|-------------------------------------------------------------------|
| IPTV Configurations           | /{afId}/configurations                   | GET         | Read all configurations for a given AF.                           |
|                               |                                          | POST        | Create a new IPTV configuration.                                  |
| Individual IPTV Configuration | /{afId}/configurations/{configurationId} | GET         | Read an existing configuration identified by {configurationId}.   |
|                               |                                          | PUT         | Update an existing configuration identified by {configurationId}. |
|                               |                                          | PATCH       | Modify an existing configuration identified by {configurationId}. |
|                               |                                          | DELETE      | Delete a configuration identified by {configurationId}.           |

## 5.9.1.2 Resource: IPTV Configurations

### 5.9.1.2.1 Introduction

This resource allows a AF to read all active IPTV configurations for the given AF, or create a new individual IPTV configuration in the NEF.

### 5.9.1.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-iptvconfiguration/v1/{afId}/configurations**

This resource shall support the resource URI variables defined in table 5.9.1.2.2-1.

**Table 5.9.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

### 5.9.1.2.3 Resource Methods

#### 5.9.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.9.1.2.2.

#### 5.9.1.2.3.2 GET

The GET method allows to read all active configurations for a given AF. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.9.1.2.3.2-1.

**Table 5.9.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.9.1.2.3.2-2 and the response data structures and response codes specified in table 5.9.1.2.3.2-3.

**Table 5.9.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
|-----------|---|-------------|-------------|

|     |  |  |  |
|-----|--|--|--|
| N/A |  |  |  |
|-----|--|--|--|

**Table 5.9.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(IptvConfigData)                                                                                                    | M | 0..N        | 200 OK                 | All the configuration information for the AF in the request URI are returned.                                                                                                                                                                               |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                             |

**Table 5.9.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.9.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.9.1.2.3.3 POST

The POST method creates a new resource to individual IPTV configuration for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.9.1.2.3.3-1 and the response data structures and response codes specified in table 5.9.1.2.3.3-2.

**Table 5.9.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type      | P | Cardinality | Description                                          |
|----------------|---|-------------|------------------------------------------------------|
| IptvConfigData | M | 1           | Parameters to create an IPTV Configuration resource. |

**Table 5.9.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------|
| IptvConfigData                                                                                                            | M | 1           | 201 Created    | The configuration resource was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                          |

**Table 5.9.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                             |
|----------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-iptvconfiguration/v1/{afId}/configurations/{configurationId} |

### 5.9.1.3 Resource: Individual IPTV Configuration

#### 5.9.1.3.1 Introduction

This resource allows a AF to read, update or delete an existing IPTV Configuration.

#### 5.9.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-iptvconfiguration/v1/{afId}/configurations/{configurationId}

This resource shall support the resource URI variables defined in table 5.9.1.3.2-1.

**Table 5.9.1.3.2-1: Resource URI variables for this resource**

| Name            | Data type | Definition                                |
|-----------------|-----------|-------------------------------------------|
| apiRoot         | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].       |
| afId            | string    | Identifier of the AF.                     |
| configurationId | string    | Identifier of the configuration resource. |

#### 5.9.1.3.3 Resource Methods

##### 5.9.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.9.1.3.2.

##### 5.9.1.3.3.2 GET

The GET method allows to read the active configuration for a given AF and subscription Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.9.1.3.3.2-1.

**Table 5.9.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.9.1.3.3.2-2 and the response data structures and response codes specified in table 5.9.1.3.3.2-3.

**Table 5.9.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.9.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type      | P | Cardinality | Response codes | Description                                                            |
|----------------|---|-------------|----------------|------------------------------------------------------------------------|
| IptvConfigData | M | 1           | 200 OK         | The information for the configuration in the request URI are returned. |

|                                                                                                                          |  |  |                              |                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                      |  |  | 307<br>Temporary<br>Redirect | Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |  |  | 308<br>Permanent<br>Redirect | Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                              |                                                                                                                                                                                                                                                             |

**Table 5.9.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.9.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.9.1.3.3.3 PUT

The PUT method modifies an existing resource to update a configuration. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.9.1.3.3.3-1 and the response data structures and response codes specified in table 5.9.1.3.3.3-2.

**Table 5.9.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type      | P | Cardinality | Description                       |
|----------------|---|-------------|-----------------------------------|
| IptvConfigData | M | 1           | Modify an existing configuration. |

**Table 5.9.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes               | Description                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IptvConfigData                                                                                                           | M | 1           | 200 OK                       | The configuration resource was updated successfully.                                                                                                                                                                                                           |
| n/a                                                                                                                      |   |             | 204 No Content               | The configuration resource was updated successfully.                                                                                                                                                                                                           |
| N/A                                                                                                                      |   |             | 307<br>Temporary<br>Redirect | Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308<br>Permanent<br>Redirect | Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                              |                                                                                                                                                                                                                                                                |

**Table 5.9.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.9.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.9.1.3.3.4 DELETE

The DELETE method deletes an existing individual configuration for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.9.1.3.3.4-1.

**Table 5.9.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.9.1.3.3.4-2 and the response data structures and response codes specified in table 5.9.1.3.3.4-3.

**Table 5.9.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.9.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |   |             | 204 No Content         | The configuration resource was terminated successfully.                                                                                                                                                                                                       |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                               |

**Table 5.9.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.9.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.9.1.3.3.5 PATCH

The PATCH method allows to change some properties of an existing resource to update a configuration. The AF shall initiate the HTTP PATCH request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.9.1.3.3.5-1 and the response data structures and response codes specified in table 5.9.1.3.3.5-2.

**Table 5.9.1.3.3.5-1: Data structures supported by the PATCH Request Body on this resource**

| Data type           | P | Cardinality | Description                               |
|---------------------|---|-------------|-------------------------------------------|
| IptvConfigDataPatch | M | 1           | Partial update an existing configuration. |

**Table 5.9.1.3.3.5-2: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IptvConfigData                                                                                                             | M | 1           | 200 OK                 | The configuration resource was updated successfully.                                                                                                                                                                                                           |
| n/a                                                                                                                        |   |             | 204 No Content         | The configuration resource was updated successfully.                                                                                                                                                                                                           |
| N/A                                                                                                                        |   |             | 307 Temporary Redirect | Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                        |   |             | 308 Permanent Redirect | Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                |

**Table 5.9.1.3.3.5-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.9.1.3.3.5-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.9.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.9.1B Notifications

There are no notifications defined for this API in this release of the specification.

## 5.9.2 Data Model

### 5.9.2.1 General

This clause specifies the application data model supported by the IPTVConfiguration API.

Table 5.9.2.1-1 specifies the data types defined for the IPTVConfiguration API.

**Table 5.9.2.1-1: IPTVConfiguration API specific Data Types**

| Data type              | Clause defined | Description                                                                              | Applicability |
|------------------------|----------------|------------------------------------------------------------------------------------------|---------------|
| AccessRightStatus      | 5.9.2.4.3      | Represents the access right status for parameter provision.                              |               |
| IptvConfigData         | 5.9.2.3.2      | Represents an individual IPTV Configuration resource.                                    |               |
| IptvConfigDataPatch    | 5.9.2.3.4      | Represents the parameters to request the modification of an IPTV Configuration resource. |               |
| MulticastAccessControl | 5.9.2.3.3      | Represents multicast address access control information.                                 |               |

### 5.9.2.2 Reused data types

The data types reused by the IPTVConfiguration API from other specifications are listed in table 5.9.2.2-1.

**Table 5.9.2.2-1: Re-used Data Types**

| Data type              | Reference          | Comments                                                                               |
|------------------------|--------------------|----------------------------------------------------------------------------------------|
| Dnn                    | 3GPP TS 29.571 [8] | Identifies a DNN.                                                                      |
| ExternalGroupId        | 3GPP TS 29.122 [4] | External Group Identifier for a user group.                                            |
| Gpsi                   | 3GPP TS 29.571 [8] | Identifies a GPSI.                                                                     |
| Ipv4Addr               | 3GPP TS 29.571 [8] | Identifies an IPv4 address.                                                            |
| Ipv6Addr               | 3GPP TS 29.571 [8] | Identifies an IPv6 address.                                                            |
| Link                   | 3GPP TS 29.122 [4] | Represents a referenced resource.                                                      |
| MtcProviderInformation | 3GPP TS 29.571 [8] | Indicates MTC provider information.                                                    |
| Snssai                 | 3GPP TS 29.571 [8] | Identifies the S-NSSAI.                                                                |
| SupportedFeatures      | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features defined in table 5.9.3-1. |

### 5.9.2.3 Structured data types

#### 5.9.2.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.9.2.3.2 Type: IptvConfigData

**Table 5.9.2.3.2-1: Definition of type IptvConfigData**

| Attribute name | Data type | P | Cardinality | Description                                                                                                                                         | Applicability |
|----------------|-----------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| self           | Link      | C | 0..1        | Identifies the individual IPTV configuration resource URI. Shall be present in the HTTP GET response when reading all the configurations for an AF. |               |
| gpsi           | Gpsi      | C | 0..1        | Identifies GPSI. (NOTE)                                                                                                                             |               |



|                                                                             |                             |   |      |                                                                                                                                   |  |
|-----------------------------------------------------------------------------|-----------------------------|---|------|-----------------------------------------------------------------------------------------------------------------------------------|--|
| exterGroupld                                                                | ExternalGroupld             | C | 0..1 | Represents a group of users.<br>(NOTE)                                                                                            |  |
| afAppld                                                                     | string                      | M | 1    | Identifies an application.                                                                                                        |  |
| dnn                                                                         | Dnn                         | O | 0..1 | Identifies a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. |  |
| snssai                                                                      | Snssai                      | O | 0..1 | Identifies an S-NSSAI.                                                                                                            |  |
| multiAccCtrls                                                               | map(MulticastAccessControl) | M | 1..N | Identifies a list of multicast address access control information.<br>Any string value can be used as a key of the map.           |  |
| mtcProviderId                                                               | MtcProviderInformation      | O | 0..1 | Indicates MTC provider information.                                                                                               |  |
| suppFeat                                                                    | SupportedFeatures           | M | 1    | Indicates the negotiated supported features.                                                                                      |  |
| NOTE: Only one of the "gpsi" or "exterGroupld" attribute shall be provided. |                             |   |      |                                                                                                                                   |  |

#### 5.9.2.3.3 Type: MulticastAccessControl

**Table 5.9.2.3.3-1: Definition of type MulticastAccessControl**

| Attribute name                                                                                | Data type         | P | Cardinality | Description                                                                | Applicability |
|-----------------------------------------------------------------------------------------------|-------------------|---|-------------|----------------------------------------------------------------------------|---------------|
| srcIpv4Addr                                                                                   | Ipv4Addr          | O | 0..1        | Identifies the source IPv4 address of IPTV multicast channel.              |               |
| srcIpv6Addr                                                                                   | Ipv6Addr          | O | 0..1        | Identifies the source IPv6 address of IPTV multicast channel.              |               |
| multicastV4Addr                                                                               | Ipv4Addr          | O | 0..1        | Identifies the multicast IPv4 address of IPTV multicast channel.<br>(NOTE) |               |
| multicastV6Addr                                                                               | Ipv6Addr          | O | 0..1        | Identifies the multicast IPv6 address of IPTV multicast channel.<br>(NOTE) |               |
| accStatus                                                                                     | AccessRightStatus | M | 1           | Represents access right status of the multicast channel.                   |               |
| NOTE: At least one of the "multicastV4Addr" or "multicastV6Addr" attribute shall be provided. |                   |   |             |                                                                            |               |

#### 5.9.2.3.4 Type: IptvConfigDataPatch

**Table 5.9.2.3.4-1: Definition of type IptvConfigDataPatch**

| Attribute name | Data type                   | P | Cardinality | Description                                                                                                             | Applicability |
|----------------|-----------------------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|---------------|
| multiAccCtrls  | map(MulticastAccessControl) | O | 1..N        | Identifies a list of multicast address access control information.<br>Any string value can be used as a key of the map. |               |

### 5.9.2.4 Simple data types and enumerations

#### 5.9.2.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.9.2.4.2 Simple data types

The simple data types defined in table 5.9.2.4.2-1 shall be supported.

**Table 5.9.2.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

#### 5.9.2.4.3 Enumeration: AccessRightStatus

The enumeration AccessRightStatus represents the parameters provision type of which the AF requests to provision. It shall comply with the provisions defined in table 5.9.2.4.3-1.

**Table 5.9.2.4.3-1: Enumeration AccessRightStatus**

| Enumeration value | Description                                           |
|-------------------|-------------------------------------------------------|
| FULLY_ALLOWED     | The User is fully allowed to access to the channel.   |
| PREVIEW_ALLOWED   | The User is preview allowed to access to the channel. |
| NO_ALLOWED        | The User is not allowed to access to the channel.     |

### 5.9.3 Used Features

The table below defines the features applicable to the IPTVConfiguration API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.9.3-1: Features used by IPTVConfiguration API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

### 5.9.4 Error handling

#### 5.9.4.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

#### 5.9.4.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the IPTVConfiguration API.

#### 5.9.4.3 Application Errors

The application errors defined for IPTVConfiguration API are listed in table 5.9.4.3-1.

**Table 5.9.4.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.10 LpiParameterProvision API

### 5.10.0 Introduction

The Nnef\_ParameterProvision service shall use the LpiParameterProvision API for LPI parameters provisioning.

The API URI of LpiParameterProvision API shall be:

**{apiRoot}/3gpp-lpi-pp/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-lpi-pp".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.10.1 Resources

#### 5.10.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.10.1.1-1 and the resources and HTTP methods used for the LpiParameterProvision API.

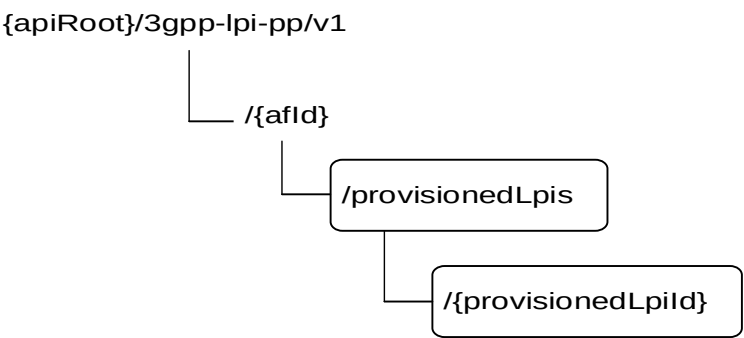


**Figure 5.10.1.1-1: Resource URI structure of the LpiParameterProvision API**

Table 5.10.1.1-1 provides an overview of the resources and HTTP methods applicable for the LpiParameterProvision API.

**Table 5.10.1.1-1: Resources and methods overview**

| Resource name                          | Resource URI                                         | HTTP method | Description                                                                                          |
|----------------------------------------|------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------|
| LPI Parameters Provisionings           | /{afld}/provisionedLpis<br>(NOTE)                    | GET         | Read all LPI Parameters Provisioning resources for a given AF.                                       |
|                                        |                                                      | POST        | Create a new Individual LPI Parameters Provisioning resource.                                        |
| Individual LPI Parameters Provisioning | /{afld}/provisionedLpis/{provisionedLpild}<br>(NOTE) | GET         | Read an existing Individual LPI Parameters Provisioning resource identified by {provisionedLpild}.   |
|                                        |                                                      | PUT         | Update an existing Individual LPI Parameters Provisioning resource identified by {provisionedLpild}. |

|       |                                                                                                                                                                                                                                |        |                                                                                                      |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------|
|       |                                                                                                                                                                                                                                | PATCH  | Modify an existing Individual LPI Parameters Provisioning resource identified by {provisionedLpild}. |
|       |                                                                                                                                                                                                                                | DELETE | Delete an existing Individual LPI Parameters Provisioning resource identified by {provisionedLpild}. |
| NOTE: | The path segment "provisionedLpis" does not follow the related naming convention defined in clause 5.2. The path segment is however kept as currently defined in this specification for backward compatibility considerations. |        |                                                                                                      |

### 5.10.1.2 Resource: LPI Parameters Provisionings

#### 5.10.1.2.1 Introduction

This resource allows a AF to read all active LPI Parameters Provisionings for the given AF, or create an new individual LPI Parameters Provisioning resource to provision parameters to the NEF.

#### 5.10.1.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-lpi-pp/v1/{afld}/provisionedLpis

This resource shall support the resource URI variables defined in table 5.10.1.2.2-1.

**Table 5.10.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afld    | string    | Identifier of the AF.               |

#### 5.10.1.2.3 Resource Methods

##### 5.10.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.10.1.2.3.

##### 5.10.1.2.3.2 GET

The GET method allows to read all active LPI Parameters Provisioning resources for a given AF. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.10.1.2.3.2-1.

**Table 5.10.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.10.1.2.3.2-2 and the response data structures and response codes specified in table 5.10.1.2.3.2-3.

**Table 5.10.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.10.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(LpiParametersProvision)                                                                                            | M | 0..N        | 200 OK                 | All the LPI Parameters Provisioning information for the AF in the request URI are returned.                                                                                                                                                                 |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                             |

**Table 5.10.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.10.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.10.1.2.3.3 POST

The POST method creates a new resource to LPI Parameters Provisionings for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.10.1.2.3.3-1 and the response data structures and response codes specified in table 5.10.1.2.3.3-2.

**Table 5.10.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type              | P | Cardinality | Description                                                                                      |
|------------------------|---|-------------|--------------------------------------------------------------------------------------------------|
| LpiParametersProvision | M | 1           | Parameters to create an Individual LPI Parameters Provisioning resource to provision parameters. |

**Table 5.10.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|----------------------------------------------------------------------------------------------------------------------------|
| LpiParametersProvision                                                                                                    | M | 1           | 201 Created    | The resource was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                            |

**Table 5.10.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                                                                                                |
|----------|--------|---|---|------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-lpi-pp/v1/{afld}/provisionedLpis/{provisionedLpild} |
|----------|--------|---|---|------------------------------------------------------------------------------------------------------------------------------------------------|

### 5.10.1.3 Resource: Individual LPI Parameters Provisioning

#### 5.10.1.3.1 Introduction

This resource allows a AF to read, update or delete an existing Individual LPI Parameters Provisioning resource.

#### 5.10.1.3.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-lpi-pp/v1/{afld}/provisionedLpis/{provisionedLpId}**

This resource shall support the resource URI variables defined in table 5.10.1.3.2-1.

**Table 5.10.1.3.2-1: Resource URI variables for this resource**

| Name             | Data type | Definition                               |
|------------------|-----------|------------------------------------------|
| apiRoot          | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].      |
| afld             | string    | Identifier of the AF.                    |
| provisionedLpild | string    | Identifier of the provisioning resource. |

#### 5.10.1.3.3 Resource Methods

##### 5.10.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.10.1.3.3.

##### 5.10.1.3.3.2 GET

The GET method allows to read an active Individual LPI Parameters Provisioning resource for a given AF and provisionedLpId. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.10.1.3.3.2-1.

**Table 5.10.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.10.1.3.3.2-2 and the response data structures and response codes specified in table 5.10.1.3.3.2-3.

**Table 5.10.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.10.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type              | P | Cardinality | Response codes | Description                                                     |
|------------------------|---|-------------|----------------|-----------------------------------------------------------------|
| LpiParametersProvision | M | 1           | 200 OK         | The information for the source in the request URI are returned. |

|                                                                                                                          |  |  |                              |                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                      |  |  | 307<br>Temporary<br>Redirect | Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |  |  | 308<br>Permanent<br>Redirect | Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                              |                                                                                                                                                                                                                                                             |

**Table 5.10.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.10.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.10.1.3.3.3 PUT

The PUT method updates an existing resource to update an existing Individual LPI Parameters Provisioning resource. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.10.1.3.3.3-1 and the response data structures and response codes specified in table 5.10.1.3.3.3-2.

**Table 5.10.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type              | P | Cardinality | Description                                                                                 |
|------------------------|---|-------------|---------------------------------------------------------------------------------------------|
| LpiParametersProvision | M | 1           | Update an existing individual LPI Parameters Provisioning resource to provision parameters. |

**Table 5.10.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type              | P | Cardinality | Response codes               | Description                                                                                                                                                                                                                                                    |
|------------------------|---|-------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LpiParametersProvision | M | 1           | 200 OK                       | The resource was updated successfully and a representation of the updated resource is returned.                                                                                                                                                                |
| n/a                    |   |             | 204 No Content               | The resource was updated successfully and no additional content is sent in the response message.                                                                                                                                                               |
| n/a                    |   |             | 307<br>Temporary<br>Redirect | Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                    |   |             | 308<br>Permanent<br>Redirect | Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

**Table 5.10.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.10.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.10.1.3.3.3A PATCH

The PATCH method modifies an existing resource to update an existing individual LPI Parameters Provisioning resource. The AF shall initiate the HTTP PATCH request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.10.1.3.3.3A-1 and the response data structures and response codes specified in table 5.10.1.3.3.3A-2.

**Table 5.10.1.3.3.3A-1: Data structures supported by the PATCH Request Body on this resource**

| Data type                   | P | Cardinality | Description                                                                                 |
|-----------------------------|---|-------------|---------------------------------------------------------------------------------------------|
| LpiParametersProvisionPatch | M | 1           | Modify an existing individual LPI Parameters Provisioning resource to provision parameters. |

**Table 5.10.1.3.3.3A-2: Data structures supported by the PATCH Response Body on this resource**

| Data type              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                      |
|------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LpiParametersProvision | M | 1           | 200 OK                 | The resource was updated successfully and a representation of the updated resource is returned.                                                                                                                                  |
| n/a                    |   |             | 204 No Content         | The resource was updated successfully and no additional content is sent in the response message.                                                                                                                                 |
| n/a                    |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                    |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

**Table 5.10.1.3.3.3A-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |



**Table 5.10.1.3.3A-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.10.1.3.3.4 DELETE

The DELETE method deletes an existing individual LPI Parameters Provisioning resource for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.10.1.3.3.4-1.

**Table 5.10.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.10.1.3.3.4-2 and the response data structures and response codes specified in table 5.10.1.3.3.4-3.

**Table 5.10.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.10.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |   |             | 204 No Content         | The resource was removed successfully.                                                                                                                                                                                                                        |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                               |

**Table 5.10.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.10.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.10.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.10.1B Notifications

There are no notifications defined for this API in this release of the specification.

## 5.10.2 Data Model

### 5.10.2.1 General

This clause specifies the application data model supported by the LpiParameterProvision API.

Table 5.10.2.1-1 specifies the data types defined for the LpiParameterProvision API.

**Table 5.10.2.1-1: LpiParameterProvision API specific Data Types**

| Data type                   | Clause defined | Description                                                               | Applicability |
|-----------------------------|----------------|---------------------------------------------------------------------------|---------------|
| LpiParametersProvision      | 5.10.2.3.2     | Represents an individual LPI Parameters Provisioning resource.            |               |
| LpiParametersProvisionPatch | 5.10.2.3.3     | Represents the requested modifications to an LPI Parameters Provisioning. | PatchUpdate   |

### 5.10.2.2 Reused data types

The data types reused by the LpiParameterProvision API from other specifications are listed in table 5.10.2.2-1.

**Table 5.10.2.2-1: Re-used Data Types**

| Data type              | Reference           | Comments                                                                                  |
|------------------------|---------------------|-------------------------------------------------------------------------------------------|
| ExternalGroupId        | 3GPP TS 29.122 [4]  | External Group Identifier for a user group.                                               |
| Gpsi                   | 3GPP TS 29.571 [8]  | Identifies a GPSI.                                                                        |
| Link                   | 3GPP TS 29.122 [4]  | Identifies a referenced resource.                                                         |
| Lpi                    | 3GPP TS 29.503 [17] | Identifies the Location Privacy Indication information.                                   |
| MtcProviderInformation | 3GPP TS 29.571 [8]  | Indicates MTC provider information for LCS privacy parameter configuration authorization. |
| SupportedFeatures      | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features defined in table 5.10.3-1.   |

### 5.10.2.3 Structured data types

#### 5.10.2.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.10.2.3.2 Type: LpiParametersProvision

**Table 5.10.2.3.2-1: Definition of type LpiParametersProvision**

| Attribute name | Data type | P | Cardinality | Description                                                                                                                  | Applicability |
|----------------|-----------|---|-------------|------------------------------------------------------------------------------------------------------------------------------|---------------|
| self           | Link      | C | 0..1        | Identifies the individual parameters provisioning resource.<br>This attribute shall be supplied by the NEF in HTTP responses |               |

|                                                                                                                                                                                                                      |                        |   |      |                                                                                                     |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---|------|-----------------------------------------------------------------------------------------------------|--|
|                                                                                                                                                                                                                      |                        |   |      | that include an object of LpiParametersProvision type.                                              |  |
| exterGroupId                                                                                                                                                                                                         | ExternalGroupId        | O | 0..1 | Identifies a group of UEs. (NOTE 1)                                                                 |  |
| gpsi                                                                                                                                                                                                                 | Gpsi                   | O | 0..1 | Identifies an UE with GPSI. (NOTE 1))                                                               |  |
| lpi                                                                                                                                                                                                                  | Lpi                    | M | 1    | Location Privacy Indication parameters                                                              |  |
| mtcProviderId                                                                                                                                                                                                        | MtcProviderInformation | O | 0..1 | Indicates MTC provider information for LCS privacy parameter configuration authorization. (NOTE 2)) |  |
| suppFeat                                                                                                                                                                                                             | SupportedFeatures      | M | 1    | Indicates the negotiated supported features.                                                        |  |
| NOTE 1: Only one of the "gpsi" or "exterGroupId" attribute shall be provided.                                                                                                                                        |                        |   |      |                                                                                                     |  |
| NOTE 2: The NEF should check received MTC Provider information and then the NEF may:                                                                                                                                 |                        |   |      |                                                                                                     |  |
| <ul style="list-style-type: none"> <li>- override it with local configured value and send it to UDM;</li> <li>- send it directly to the UDM; or</li> <li>- reject the LPI Parameter Provisioning request.</li> </ul> |                        |   |      |                                                                                                     |  |

### 5.10.2.3.3 Type: LpiParametersProvisionPatch

**Table 5.10.2.3.3-1: Definition of type LpiParametersProvisionPatch**

| Attribute name                                                                                                                                                                                                                    | Data type              | P | Cardinality | Description                                                                                        | Applicability |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---|-------------|----------------------------------------------------------------------------------------------------|---------------|
| lpi                                                                                                                                                                                                                               | Lpi                    | O | 0..1        | Location Privacy Indication parameters                                                             |               |
| mtcProviderId                                                                                                                                                                                                                     | MtcProviderInformation | O | 0..1        | Indicates MTC provider information for LCS privacy parameter configuration authorization. (NOTE 1) |               |
| NOTE 1: The NEF should check received MTC Provider information and then the NEF may:                                                                                                                                              |                        |   |             |                                                                                                    |               |
| <ul style="list-style-type: none"> <li>- override it with local configured value and send it to UDM;</li> <li>- send it directly to the UDM; or</li> <li>- reject the LPI Parameter Provisioning modification request.</li> </ul> |                        |   |             |                                                                                                    |               |

## 5.10.2.4 Simple data types and enumerations

### 5.10.2.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.10.2.4.2 Simple data types

The simple data types defined in table 5.10.2.4.2-1 shall be supported.

**Table 5.10.2.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.10.3 Used Features

The table below defines the features applicable to the LpiParameterProvision API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.10.3-1: Features used by LpiParameterProvision API**

| Feature number | Feature Name | Description                                                                                                                         |
|----------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1              | PatchUpdate  | Indicates the support of enhancements to the northbound interfaces (e.g. support the partial modification of an existing resource). |

## 5.10.4 Error handling

### 5.10.4.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.10.4.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the LpiParameterProvision API.

### 5.10.4.3 Application Errors

The application errors defined for LpiParameterProvision API are listed in table 5.10.4.3-1.

**Table 5.10.4.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.11 ServiceParameter API

### 5.11.0 Introduction

The Nnef\_ServiceParameter service shall use the ServiceParameter API.

The API URI of ServiceParameter API shall be:

**{apiRoot}/3gpp-service-parameter/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-service-parameter".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.11.1 Resources

#### 5.11.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.11.1.1-1 and the resources and HTTP methods used for the ServiceParameter API.

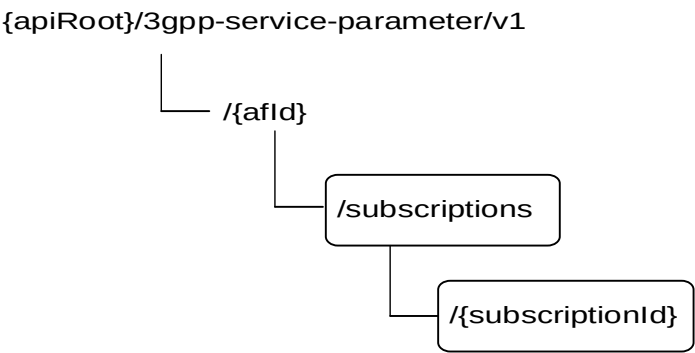


Figure 5.11.1.1-1: Resource URI structure of the ServiceParameter API

Table 5.11.1.1-1 provides an overview of the resources and HTTP methods applicable for the ServiceParameter API.

Table 5.11.1.1-1: Resources and methods overview

| Resource name                             | Resource URI                           | HTTP method | Description                                                                       |
|-------------------------------------------|----------------------------------------|-------------|-----------------------------------------------------------------------------------|
| Service Parameter Subscriptions           | /{afId}/subscriptions                  | GET         | Read all subscriptions for a given AF.                                            |
|                                           |                                        | POST        | Create a new service parameter subscription.                                      |
| Individual Service Parameter Subscription | /{afId}/subscriptions/{subscriptionId} | GET         | Read an existing service parameter subscription identified by {subscriptionId}.   |
|                                           |                                        | PUT         | Update an existing service parameter subscription identified by {subscriptionId}. |
|                                           |                                        | PATCH       | Modify an existing service parameter subscription identified by {subscriptionId}. |
|                                           |                                        | DELETE      | Delete an existing service parameter subscription identified by {subscriptionId}. |

5.11.1.2 Resource: Service Parameter Subscriptions

5.11.1.2.1 Introduction

This resource allows a AF to read all active Service Parameter Subscriptions for the given AF, or create an new individual service parameter subscription in the NEF.

5.11.1.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-service-parameter/v1/{afId}/subscriptions

This resource shall support the resource URI variables defined in table 5.11.1.2.2-1.

Table 5.11.1.2.2-1: Resource URI variables for this resource

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

### 5.11.1.2.3 Resource Methods

#### 5.11.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.11.1.2.3.

#### 5.11.1.2.3.2 GET

The HTTP GET method allows to read all the active subscriptions for a given AF.

This method shall support the URI query parameters specified in table 5.11.1.2.3.2-1.

**Table 5.11.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name                                                                                                                                                 | Data type        | P | Cardinality | Description                                                                                                                                                                                                  | Applicability |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| gpsis                                                                                                                                                | array(Gpsi)      | O | 1..N        | Contains the GPSI(s) of the requested UE(s).<br>(NOTE 1, NOTE 2)                                                                                                                                             | enNB          |
| ip-addr                                                                                                                                              | array(IpAddr)    | O | 1..N        | Contains the IP address(es) of the requested UE(s).<br>(NOTE 1, NOTE 2)                                                                                                                                      | enNB          |
| ip-domain                                                                                                                                            | string           | O | 1           | Contains the IPv4 address domain identifier.<br>This query parameter may be present only if the "ip-addr" query parameter is also present and contains at least one array element including an IPv4 address. | enNB          |
| mac-addr                                                                                                                                             | array(MacAddr48) | O | 1..N        | Contains the MAC address(es) of the requested UE(s).<br>(NOTE 1, NOTE 2)                                                                                                                                     | enNB          |
| NOTE 1: These query parameters are mutually exclusive. Either one of them may be present.                                                            |                  |   |             |                                                                                                                                                                                                              |               |
| NOTE 2: If multiple array elements are provided within this query parameter, then each array element shall be treated as a separate query parameter. |                  |   |             |                                                                                                                                                                                                              |               |

This method shall support the request data structures specified in table 5.11.1.2.3.2-2 and the response data structures and response codes specified in table 5.11.1.2.3.2-3.

**Table 5.11.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.11.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(ServiceParameterData)                                                                                                         | M | 0..N        | 200 OK                 | All the subscription information for the AF in the request URI are returned.                                                                                                                                                                                    |
| N/A                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                                 |

**Table 5.11.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.11.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

### 5.11.1.2.3.3 POST

The POST method creates a new resource to individual service parameter subscription for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.11.1.2.3.3-1 and the response data structures and response codes specified in table 5.11.1.2.3.3-2.

**Table 5.11.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type             | P | Cardinality | Description                                                     |
|-----------------------|---|-------------|-----------------------------------------------------------------|
| ServiceParameter Data | M | 1           | Parameters to create a service parameter subscription resource. |

**Table 5.11.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| ServiceParameter Data                                                                                                     | M | 1           | 201 Created    | The subscription resource was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                         |

**Table 5.11.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                           |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-service-parameter/v1/{afId}/subscriptions/{subscriptionId} |

## 5.11.1.3 Resource: Individual Service Parameter Subscription

### 5.11.1.3.1 Introduction

This resource allows a AF to read, update or delete an existing service parameter subscription.

### 5.11.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-service-parameter/v1/{afId}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.9.1.3.2-1.

**Table 5.11.1.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                               |
|----------------|-----------|------------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].      |
| afId           | string    | Identifier of the AF.                    |
| subscriptionId | string    | Identifier of the subscription resource. |

### 5.11.1.3.3 Resource Methods

#### 5.11.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.11.1.3.3.

#### 5.11.1.3.3.2 GET

The GET method allows to read the active subscription for a given AF and subscription Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.11.1.3.3.2-1.

**Table 5.11.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.11.1.3.3.2-2 and the response data structures and response codes specified in table 5.11.1.3.3.2-3.

**Table 5.11.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.11.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ServiceParameter Data                                                                                                    | M | 1           | 200 OK                 | The information for the subscription in the request URI are returned.                                                                                                                                                                                           |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                 |

**Table 5.11.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |



**Table 5.11.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.11.1.3.3.3 PUT

The PUT method modifies an existing resource to update a configuration. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.9.1.3.3.3-1 and the response data structures and response codes specified in table 5.9.1.3.3.3-2.

**Table 5.11.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type             | P | Cardinality | Description                      |
|-----------------------|---|-------------|----------------------------------|
| ServiceParameter Data | M | 1           | Modify an existing subscription. |

**Table 5.11.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ServiceParameter Data                                                                                                    | M | 1           | 200 OK                 | The subscription resource was updated successfully.                                                                                                                                                                                                                |
| n/a                                                                                                                      |   |             | 204 No Content         | The subscription resource was updated successfully.                                                                                                                                                                                                                |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                    |

**Table 5.11.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.11.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.11.1.3.3.4 DELETE

The DELETE method deletes an existing individual subscription for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.11.1.3.3.4-1.

**Table 5.11.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.11.1.3.3.4-2 and the response data structures and response codes specified in table 5.11.1.3.3.4-3.

**Table 5.11.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.11.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |   |             | 204 No Content         | The subscription resource was terminated successfully.                                                                                                                                                                                                            |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                   |

**Table 5.11.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.11.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.11.1.3.3.5 PATCH

The PATCH method allows to change some properties of an existing resource to update a subscription. The AF shall initiate the HTTP PATCH request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.11.1.3.3.5-1 and the response data structures and response codes specified in table 5.11.1.3.3.5-2.

**Table 5.11.1.3.3.5-1: Data structures supported by the PATCH Request Body on this resource**

| Data type                     | P | Cardinality | Description                              |
|-------------------------------|---|-------------|------------------------------------------|
| ServiceParameter<br>DataPatch | M | 1           | Partial update an existing subscription. |

**Table 5.11.1.3.3.5-2: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ServiceParameter Data                                                                                                      | M | 1           | 200 OK                 | The subscription resource was updated successfully.                                                                                                                                                                                                                |
| N/A                                                                                                                        |   |             | 204 No Content         | The subscription resource was updated successfully.                                                                                                                                                                                                                |
| N/A                                                                                                                        |   |             | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                        |   |             | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                    |

**Table 5.11.1.3.3.5-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.11.1.3.3.5-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.11.1A Notifications

### 5.11.1A.1 Introduction

Upon NEF notify a Service Parameter Authorization Update (e.g. to revoke an authorization) to AF, or forward a notification event related to invocation of service parameter provisioning, e.g. the notification of outcome of UE Policies Delivery to AF, the NEF shall send an HTTP POST message including the notified event to the AF. The NEF and the AF shall support the notification mechanism as described in clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.11.1A.1-1: Notifications overview**

| Notification     | Callback URI              | HTTP method or custom operation | Description (service operation)                                                                                                                              |
|------------------|---------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AF Notifications | {notificationDestination} | POST                            | The notification of service parameter authorization updates and/or notification event related to the result of invocation of service parameter provisioning. |

## 5.11.1A.2 AF Notifications

### 5.11.1A.2.1 Description

The AF Notifications are used by the NEF to send the Service Parameter Authorization Update (e.g. to revoke an authorization) to the AF, and/or to send AF subscribed event notification of the outcome related to the invocation of service parameter provisioning to the AF.

### 5.11.1A.2.2 Target URI

The Callback URI "{notificationDestination}" shall be used with the callback URI variables defined in table 5.11.1A.2.2-1.

**Table 5.11.1A.2.2-1: Callback URI variables**

| Name                    | Data type | Definition                                                                                                                                                                                                                                     |
|-------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| notificationDestination | Link      | Callback reference provided by the AF during creation/modification of the subscription within the ServiceParameterData data type as defined in Table 5.11.2.3.2-1 or the ServiceParameterDataPatch data type as defined in Table 5.11.2.3.3-1. |

## 5.11.1A.3 Operation Definition

### 5.11.1A.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.11.1A.3.1-1 and the response data structure with response codes specified in table 5.11.1A.3.1-2.

**Table 5.11.1A.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type             | P | Cardinality | Description                                                                                                                                                                       |
|-----------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(AfNotification) | M | 1..N        | Notifications upon AF Service Parameter Authorization Update, and/or AF subscribed event notification of the outcome related to the invocation of service parameter provisioning. |

**Table 5.11.1A.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                       |   |             | 204 No Content         | The event notification is received successfully.                                                                                                                                                                                                                                                    |
| N/A                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                     |

**Table 5.11.1A.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                                                                         |
|----------|--------|---|---|-------------------------------------------------------------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |
|----------|--------|---|---|-------------------------------------------------------------------------------------------------------------------------|

**Table 5.11.1A.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

### 5.11.1A.3.2 Notification via Websocket

If supported by both AF and NEF and successfully negotiated, the AF subscribed outcome event notification related to the invocation of service parameter provisioning may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4 of 3GPP TS 29.122 [4].

## 5.11.1B Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.11.2 Data Model

### 5.11.2.1 General

This clause specifies the application data model supported by the ServiceParameter API.

Table 5.11.2.1-1 specifies the data types defined for the ServiceParameter API.

**Table 5.11.2.1-1: ServiceParameter API specific Data Types**

| Data type                | Clause defined | Description                                                                                                                                       | Applicability      |
|--------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| A2xParamsPc5             | 5.11.2.4.2     | Represents the service parameters for A2X communication over PC5 reference point.                                                                 | A2X                |
| A2xParamsPc5Rm           | 5.11.2.4.2     | This data type is defined in the same way as the A2xParamsPc5 data type, but with the OpenAPI nullable property set to true.                      | A2X                |
| A2xParamsUu              | 5.11.2.4.2     | Represents the service parameters for A2X communication over Uu reference point.                                                                  | A2X                |
| A2xParamsUuRm            | 5.11.2.4.2     | This data type is defined in the same way as the A2xParamsUu data type, but with the OpenAPI nullable property set to true.                       | A2X                |
| AfNotification           | 5.11.2.3.6     | Contains the reported event notification or the service parameters authorization update result.                                                   | AfNotifications    |
| AuthorizationResult      | 5.11.2.4.4     | Represents the result of the service parameters authorization.                                                                                    | AfNotifications    |
| ConnectionCapabilities   | 5.11.2.4.6     | UE application requests a network connection with certain capabilities.                                                                           | AfGuideURSP        |
| DetailedEventInfo        | 5.11.2.3.13    | Detailed information about the outcome of Service Parameter provisioning requests.                                                                | ExtDeliveryOutcome |
| Event                    | 5.11.2.4.3     | Identifies the AF subscribed events.                                                                                                              | AfNotifications    |
| EventInfo                | 5.11.2.3.7     | Indicates the event information.                                                                                                                  | AfNotifications    |
| Failure                  | 5.11.2.4.5     | Represents the failure reason for the unsuccessful result.                                                                                        | AfNotifications    |
| NetworkDescription       | 5.11.2.3.9     | Represents the description of a PLMN, by the definition of the PLMN ID, the MCC (and optionally applicable MNC(s)) or the indication of any PLMN. | VPLMNSpecificURSP  |
| Non3gppDeviceInformation | 5.11.2.3.12    | Represents the Non-3GPP device information.                                                                                                       | Non3gppDevice      |

|                              |            |                                                                                                                                                 |                    |
|------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Outcome                      | 5.11.2.4.8 | Represents the detailed outcome of the request for AF provisioned service parameters.                                                           | ExtDeliveryOutcome |
| ParameterOverPc5             | 5.11.2.4.2 | Represents configuration parameters for V2X communications over PC5 reference point.                                                            |                    |
| ParameterOverPc5Rm           | 5.11.2.4.2 | Represents the same as the ParameterOverPc5 data type but with the "nullable: true" property.                                                   |                    |
| ParameterOverUu              | 5.11.2.4.2 | Represents configuration parameters for V2X communications over Uu reference point.                                                             |                    |
| ParameterOverUuRm            | 5.11.2.4.2 | Represents the same as the ParameterOverUu data type but with the "nullable: true" property.                                                    |                    |
| ParamForProSeDc              | 5.11.2.4.2 | Represents the service parameters for 5G ProSe direct communications.                                                                           | ProSe              |
| ParamForProSeDcRm            | 5.11.2.4.2 | This data type is defined in the same way as the ParamForProSeDc data type, but with the OpenAPI nullable property set to "true".               | ProSe              |
| ParamForProSeDd              | 5.11.2.4.2 | Represents the service parameters for 5G ProSe direct discovery.                                                                                | ProSe              |
| ParamForProSeDdRm            | 5.11.2.4.2 | This data type is defined in the same way as the ParamForProSeDd data type, but with the OpenAPI nullable property set to true.                 | ProSe              |
| ParamForProSeEndUe           | 5.11.2.4.2 | Represents the service parameters for 5G ProSe end UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-UE Relay.                                | ProSe_Ph2          |
| ParamForProSeEndUeRm         | 5.11.2.4.2 | This data type is defined in the same way as the ParamForProSeEndUe data type, but with the OpenAPI nullable property set to true.              | ProSe_Ph2          |
| ParamForProSeRemUe           | 5.11.2.4.2 | Represents the service parameters for 5G ProSe remote UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-Network Relay.                        | ProSe              |
| ParamForProSeRemUeRm         | 5.11.2.4.2 | This data type is defined in the same way as the ParamForProSeRemUe data type, but with the OpenAPI nullable property set to "true".            | ProSe              |
| ParamForProSeU2NRelUe        | 5.11.2.4.2 | Represents the service parameters for 5G ProSe UE-to-network relay UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-Network Relay.           | ProSe              |
| ParamForProSeU2NRelUeRm      | 5.11.2.4.2 | This data type is defined in the same way as the ParamForProSeU2NRelUe data type, but with the OpenAPI nullable property set to "true".         | ProSe              |
| ParamForProSeU2URelUe        | 5.11.2.4.2 | Represents the service parameters for 5G ProSe UE-to-UE relay UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-UE Relay.                     | ProSe_Ph2          |
| ParamForProSeU2URelUeRm      | 5.11.2.4.2 | This data type is defined in the same way as the ParamForProSeU2URelUe data type, but with the OpenAPI nullable property set to "true".         | ProSe_Ph2          |
| ParamProSeMultiHopU2NRelUe   | 5.11.2.4.2 | Represents the service parameters for 5G ProSe UE-to-Network Relay UE supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay. | ProSe_Ph3          |
| ParamProSeMultiHopU2NRelUeRm | 5.11.2.4.2 | This data type is defined in the same way as the ParamProSeMultiHopU2NRelUe data type, but with the OpenAPI nullable property set to "true".    | ProSe_Ph3          |

|                              |             |                                                                                                                                                           |                    |
|------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| ParamProSeMultiHopRemUe      | 5.11.2.4.2  | Represents the service parameters for 5G ProSe Remote UE supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay.                        | ProSe_Ph3          |
| ParamProSeMultiHopRemUeRm    | 5.11.2.4.2  | This data type is defined in the same way as the ParamProSeMultiHopRemUe data type, but with the OpenAPI nullable property set to "true".                 | ProSe_Ph3          |
| ParamProSeMultiHopIntermUe   | 5.11.2.4.2  | Represents the service parameters for 5G ProSe Intermediate UE-to-Network Relay supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay. | ProSe_Ph3          |
| ParamProSeMultiHopU2URelUe   | 5.11.2.4.2  | Represents the service parameters for 5G ProSe Layer-3 UE-to-UE Relay UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.                            | ProSe_Ph3          |
| ParamProSeMultiHopU2URelUeRm | 5.11.2.4.2  | This data type is defined in the same way as the ParamProSeMultiHopU2URelUe data type, but with the OpenAPI nullable property set to "true".              | ProSe_Ph3          |
| ParamProSeMultiHopEndUe      | 5.11.2.4.2  | Represents the service parameters for 5G ProSe Layer-3 End UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.                                       | ProSe_Ph3          |
| ParamProSeMultiHopEndUeRm    | 5.11.2.4.2  | This data type is defined in the same way as the ParamProSeMultiHopEndUe data type, but with the OpenAPI nullable property set to "true".                 | ProSe_Ph3          |
| ParamForRangingSIPos         | 5.11.2.4.2  | Represents the service parameters for ranging and sidelink positioning.                                                                                   | Ranging_SL         |
| ParamForRangingSIPosRm       | 5.11.2.4.2  | This data type is defined in the same way as the ParamForRangingSIPos data type, but with the OpenAPI nullable property set to true.                      | Ranging_SL         |
| RouteSelectionParameterSet   | 5.11.2.3.5  | Contains parameters that can be used to guide the Route Selection Descriptors of the URSP.                                                                | AfGuideURSP        |
| ServiceParameterData         | 5.11.2.3.2  | Represents an individual Service Parameter subscription resource.                                                                                         |                    |
| ServiceParameterDataPatch    | 5.11.2.3.3  | Represents the parameters to request the modification of a service parameter subscription resource.                                                       |                    |
| TrafficDescriptorComponents  | 5.11.2.3.8  | Traffic descriptor components for the requested URSP.                                                                                                     | AfGuideURSP        |
| UePolEventInfo               | 5.11.2.3.14 | Event information about the outcome of Service Parameter provisioning requests for the UE policy delivery.                                                | ExtDeliveryOutcome |
| UePolPartType                | 5.11.2.4.7  | Represents the unsuccessfully executed UE policy part type.                                                                                               | ExtDeliveryOutcome |
| UrspRuleRequest              | 5.11.2.3.4  | Contains parameters that can be used to guide the URSP.                                                                                                   | AfGuideURSP        |

### 5.11.2.2 Reused data types

The data types reused by the ServiceParameter API from other specifications are listed in table 5.9.2.2-1.

**Table 5.11.2.2-1: Re-used Data Types**

| Data type            | Reference          | Comments                                                                                                              | Applicability     |
|----------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------|
| AppDescriptor        | 5.7.2.3.4          | Application descriptor describes the operation systems and the corresponding applications for each operation systems. |                   |
| Bytes                | 3GPP TS 29.571 [8] | Represents a string with format "byte".                                                                               | ExtConnCapability |
| Dnn                  | 3GPP TS 29.571 [8] | Identifies a DNN.                                                                                                     |                   |
| DnnSnssaiInformation | 5.18.3.3.5         | Contains DNN and S-NSSAI information.                                                                                 | Non3gppDevice     |
| EthFlowDescription   | 3GPP TS 29.514 [7] | Defines a packet filter for an Ethernet flow.                                                                         |                   |

|                        |                     |                                                                                         |                   |
|------------------------|---------------------|-----------------------------------------------------------------------------------------|-------------------|
| EthFlowInfo            | 3GPP TS 29.122 [4]  | Represents Ethernet flow information.                                                   | Non3gppDevice     |
| ExternalGroupId        | 3GPP TS 29.122 [4]  | External Group Identifier for a user group.                                             |                   |
| FlowInfo               | 3GPP TS 29.122 [4]  | Represents IP flow information                                                          | Non3gppDevice     |
| GeographicalArea       | 5.17.3.3.4          | Identifies the geographical area information.                                           | AfGuideURSP       |
| Gpsi                   | 3GPP TS 29.571 [8]  | Identifies a GPSI.                                                                      |                   |
| IpAddr                 | 3GPP TS 29.571 [8]  | UE IP Address.                                                                          |                   |
| IPv4Addr               | 3GPP TS 29.571 [8]  | Identifies an IPv4 address.                                                             |                   |
| IPv6Addr               | 3GPP TS 29.571 [8]  | Identifies an IPv6 address.                                                             |                   |
| Link                   | 3GPP TS 29.122 [4]  | Represents a referenced resource.                                                       |                   |
| MacAddr48              | 3GPP TS 29.571 [8]  | Identifies an MAC address.                                                              |                   |
| Mcc                    | 3GPP TS 29.571 [8]  | Mobile Country Code.                                                                    |                   |
| Mnc                    | 3GPP TS 29.571 [8]  | Mobile Network Code.                                                                    |                   |
| MtcProviderInformation | 3GPP TS 29.571 [8]  | Indicates MTC provider information.                                                     |                   |
| PduSessionType         | 3GPP TS 29.571 [8]  | Represents the PDU session type.                                                        | PduSessTypeChange |
| PlmnId                 | 3GPP TS 29.571 [8]  | Identifies a PLMN Identifier.                                                           |                   |
| PlmnIdNid              | 3GPP TS 29.571 [8]  | Identifies a PLMN Identifier and optionally the Network Identity.                       | VPLMNSpecificURSP |
| QosParameterSet        | 3GPP TS 29.543 [68] | Represents the QoS requirements expressed as one or more individual QoS parameters.     | Non3gppDevice     |
| Snssai                 | 3GPP TS 29.571 [8]  | Identifies the S-NSSAI.                                                                 |                   |
| SupportedFeatures      | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features defined in table 5.11.3-1. |                   |
| Tai                    | 3GPP TS 29.571 [8]  | Tracking Area Identity information.                                                     |                   |
| TnapId                 | 3GPP TS 29.571 [8]  | Trusted Network Access Point identifier.                                                |                   |
| UInteger               | 3GPP TS 29.571 [8]  | Unsigned integer.                                                                       |                   |

### 5.11.2.3 Structured data types

#### 5.11.2.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.11.2.3.2 Type: ServiceParameterData

**Table 5.11.2.3.2-1: Definition of type ServiceParameterData**

| Attribute name | Data type | P | Cardinality | Description                                                                                                                                                               | Applicability |
|----------------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| self           | Link      | C | 0..1        | Identifies the individual service parameter subscription resource URI. Shall be present by the NEF in HTTP responses that include an object of ServiceParameterData type. |               |
| dnn            | Dnn       | O | 0..1        | Identifies a DNN.<br>(NOTE 2, NOTE 4)                                                                                                                                     |               |
| snssai         | Snssai    | O | 0..1        | Identifies an S-NSSAI.<br>(NOTE 2, NOTE 4)                                                                                                                                |               |
| afServiceId    | string    | O | 0..1        | Identifies a service on behalf of which the AF is issuing the request.<br>(NOTE 2)                                                                                        |               |
| appId          | string    | O | 0..1        | Identifies an application identifier.<br>(NOTE 2)                                                                                                                         |               |
| gpsi           | Gpsi      | O | 0..1        | Identifies GPSI. (NOTE 1)                                                                                                                                                 |               |
| ueIpv4         | Ipv4Addr  | O | 0..1        | The IPv4 address of the served UE.<br>(NOTE 1)                                                                                                                            |               |
| ueIpv6         | Ipv6Addr  | O | 0..1        | The IPv6 address of the served UE.<br>(NOTE 1)                                                                                                                            |               |
| ueMac          | MacAddr48 | O | 0..1        | The MAC address of the served UE.<br>(NOTE 1)                                                                                                                             |               |



|                         |                            |   |      |                                                                                                                                                                                                                                                                                               |                         |
|-------------------------|----------------------------|---|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| externalGroupId         | ExternalGroupId            | O | 0..1 | Represents a group of users.<br>(NOTE 1)                                                                                                                                                                                                                                                      |                         |
| anyUeInd                | boolean                    | O | 0..1 | Identifies whether the service parameters apply to any non-roaming UE.<br><br>- "true": the service parameters are applicable to any non-roaming UE.<br>- "false": the service parameters are not applicable to any non-roaming UE.<br>- Default value is "false" if omitted.<br><br>(NOTE 1) |                         |
| roamUeNetDescs          | array(NetworkDescription)  | O | 1..N | Each element identifies one (e.g., combination of MCC and MNC) or more (e.g. a MCC only) PLMN ID(s). It indicates the PLMN(s) of inbound roamers to which the provided AF guidance on VPLMN-specific URSP rules apply. (NOTE 1)                                                               | VPLMNSpecificURSP       |
| subNotifEvents          | array(Event)               | C | 1..N | Identifies the AF subscribed event(s) notifications related to AF provisioned service parameters.                                                                                                                                                                                             | AfNotifications         |
| notificationDestination | Uri                        | C | 0..1 | Contains the callback URI to receive the notifications from the NEF. Shall be present if "subNotifEvents" attribute is included.                                                                                                                                                              | AfNotifications         |
| requestTestNotification | boolean                    | O | 0..1 | Set to true by the AF to request the NEF to send a test notification as defined in clause 5.2.5.3 of 3GPP TS 29.122 [4]. The default value is "false" if omitted.                                                                                                                             | Notification_test_event |
| websocketNotifConfig    | WebsocketNotifConfig       | O | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol.                                                                                                                                                                                                             | Notification_websocket  |
| paramOverPc5            | ParameterOverPc5           | O | 0..1 | Contains the V2X service parameters used over PC5                                                                                                                                                                                                                                             |                         |
| paramOverUu             | ParameterOverUu            | O | 0..1 | Contains the V2X service parameters used over Uu                                                                                                                                                                                                                                              |                         |
| paramForProSeDd         | ParamForProSeDd            | O | 0..1 | Contains the service parameters for 5G ProSe direct discovery.                                                                                                                                                                                                                                | ProSe                   |
| paramForProSeDc         | ParamForProSeDc            | O | 0..1 | Contains the service parameters for 5G ProSe direct communications.                                                                                                                                                                                                                           | ProSe                   |
| paramForProSeU2NRelUe   | ParamForProSeU2NRelUe      | O | 0..1 | Contains the service parameters for 5G ProSe UE-to-network relay UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-Network Relay.                                                                                                                                                           | ProSe                   |
| paramForProSeRemUe      | ParamForProSeRemUe         | O | 0..1 | Contains the service parameters for 5G ProSe remote UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-Network Relay.                                                                                                                                                                        | ProSe                   |
| paramForProSeU2URelUe   | ParamForProSeU2URelUe      | O | 0..1 | Contains the service parameters for 5G ProSe UE-to-UE relay UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-UE Relay.                                                                                                                                                                     | ProSe_Ph2               |
| paramForProSeEndUe      | ParamForProSeEndUe         | O | 0..1 | Contains the service parameters for 5G ProSe end UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-UE Relay.                                                                                                                                                                                | ProSe_Ph2               |
| multiHopU2NRelUe        | ParamProSeMultiHopU2NRelUe | O | 0..1 | Contains the service parameters for 5G ProSe UE-to-Network Relay UE supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay.                                                                                                                                                 | ProSe_Ph3               |
| multiHopU2NRemUe        | ParamProSeMultiHopRemUe    | O | 0..1 | Contains the service parameters for 5G ProSe Remote UE supporting 5G                                                                                                                                                                                                                          | ProSe_Ph3               |

|                          |                                     |   |      |                                                                                                                                                                              |                       |
|--------------------------|-------------------------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
|                          |                                     |   |      | ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay.                                                                                                                  |                       |
| multiHopU2NInt<br>ermUe  | ParamProSeMultiH<br>opIntermUe      | O | 0..1 | Contains the service parameters for 5G ProSe Intermediate UE-to-Network Relay supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay.                      | ProSe_Ph3             |
| multiHopU2URel<br>IUe    | ParamProSeMultiH<br>opU2URelUe      | O | 0..1 | Contains the service parameters for 5G ProSe Layer-3 UE-to-UE Relay UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.                                                 | ProSe_Ph3             |
| multiHopU2UEnd<br>Ue     | ParamProSeMultiH<br>opEndUe         | O | 0..1 | Contains the service parameters for 5G ProSe Layer-3 End UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.                                                            | ProSe_Ph3             |
| paramForRangi<br>ngSIPos | ParamForRanging<br>SIPos            | O | 0..1 | Contains the service parameters for ranging and sidelink positioning.                                                                                                        | Ranging_SL            |
| urspGuidance             | array(UrspRuleReq<br>uest)          | O | 1..N | Contains the service parameters used to guide the URSP rule(s).<br><br>(NOTE 1)                                                                                              | AfGuideURSP           |
| vpsUrspGuidan<br>ce      | array(UrspRuleReq<br>uest)          | O | 1..N | Contains the service parameters provided by an AF to guide the VPLMN-specific URSP rule(s).                                                                                  | VPLMNSpecifi<br>cURSP |
| a2xParamsPc5             | A2xParamsPc5                        | O | 0..1 | Contains the A2X service parameters used over PC5 reference point.                                                                                                           | A2X                   |
| a2xParamsUu              | A2xParamsUu                         | O | 0..1 | Contains the A2X service parameters used over Uu reference point.                                                                                                            | A2X                   |
| tnaps                    | array(TnapId)                       | O | 1..N | Contains the TNAP ID(s) collocated with the 5G-RG(s) of a specific user.                                                                                                     | AfGuideTNAP<br>s      |
| mtcProviderId            | MtcProviderInform<br>ation          | O | 0..1 | Indicates MTC provider information.                                                                                                                                          |                       |
| non3gppDevIn<br>fos      | array(Non3gppDev<br>iceInformation) | O | 1..N | Contains the non-3GPP device(s) related information.<br><br>(NOTE 1, NOTE 4)                                                                                                 | Non3gppDevic<br>e     |
| suppFeat                 | SupportedFeatures                   | C | 0..1 | Contains the list of supported feature(s) among the ones defined in clause 5.11.3.<br><br>This attribute shall be present only when feature negotiation needs to take place. |                       |

NOTE 1: One of individual UE identifier (i.e. "gpsi", "uelpv4", "uelpv6" or "ueMac" attribute), External Group Identifier (i.e. "externalGroupId" attribute) or any UE indication (i.e. "anyUeInd" attribute), and when the feature "VPLMNSpecificURSP" is supported, or any inbound roaming UE from the indicated PLMN(s) (i.e., "roamUeNetDescs" attribute) shall be included. For V2X, Prose (when the "ProSe" and/or "ProSe\_Ph2" feature is supported), A2X (when the "A2X" feature is supported) and URSP service parameter provisioning for the HPLMN (i.e. via the "urspGuidance" attribute, see also clause 4.4.20), only "anyUeInd", "gpsi" and "externalGroupId" attributes are applicable. For VPLMN-specific URSP service parameter provisioning (i.e. via the "vpsUrspGuidance" attribute, see also clause 4.4.20), when the "VPLMNSpecificURSP" feature is supported, only "gpsi" and "roamUeNetDescs" attributes are applicable. The "roamUeNetDescs" attribute only applies to URSP service parameter provisioning and may be included only when the "vpsUrspGuidance" attribute is provided. When the "AfGuideTNAPS" feature is supported, when TNAP ID(s) is provisioned within the "tnaps" attribute, only "gpsi" shall be provided. When the "Non3gppDevice" feature is supported and the Non-3GPP device identifier(s) information is provisioned within the "non3gppDevInfos" attribute, only "gpsi" attribute is applicable.

NOTE 2: Either the "afServiceId" attribute, "appld" attribute or the combination of "snssai" and "dnn" attributes shall be provided. When the feature "AfGuideURSP" is supported, only the "afServiceId" attribute shall be provided for providing guidance for URSP determination. When the feature "AfGuideTNAPS" is supported, when TNAP ID(s) is provisioned within the "tnaps" attribute, only the "afServiceId" attribute shall be provided.

NOTE 3: Void.

NOTE 4: If the "dnnSnssaiInfo" attribute within the "non3gppDevInfos" attribute is provided, then the information contained in it take precedence to the information contained in the "dnn" and "snssai" attributes of the ServiceParameterData data type.

## 5.11.2.3.3 Type: ServiceParameterDataPatch

Table 5.11.2.3.3-1: Definition of type ServiceParameterDataPatch

| Attribute name        | Data type                    | P | Cardinality | Description                                                                                                                                             | Applicability |
|-----------------------|------------------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| paramOverPc5          | ParameterOverPc5Rm           | O | 0..1        | Contains the V2X service parameters used over PC5                                                                                                       |               |
| paramOverUu           | ParameterOverUuRm            | O | 0..1        | Contains the V2X service parameters used over Uu                                                                                                        |               |
| paramForProSeDd       | ParamForProSeDdRm            | O | 0..1        | Contains the service parameters for 5G ProSe direct discovery.                                                                                          | ProSe         |
| paramForProSeDc       | ParamForProSeDcRm            | O | 0..1        | Contains the service parameters for 5G ProSe direct communications.                                                                                     | ProSe         |
| paramForProSeU2NRelUE | ParamForProSeU2NRelUeRm      | O | 0..1        | Contains the service parameters for 5G ProSe UE-to-network relay UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-Network Relay.                     | ProSe         |
| paramForProSeRemUe    | ParamForProSeRemUeRm         | O | 0..1        | Contains the service parameters for 5G ProSe remote UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-Network Relay.                                  | ProSe         |
| paramForProSeU2UReUE  | ParamForProSeU2UReUeRm       | O | 0..1        | Contains the service parameters for 5G ProSe UE-to-UE relay UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-UE Relay.                               | ProSe_Ph2     |
| paramForProSeEndUe    | ParamForProSeEndUeRm         | O | 0..1        | Contains the service parameters for 5G ProSe end UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-UE Relay.                                          | ProSe_Ph2     |
| multiHopU2NRelUe      | ParamProSeMultiHopU2NRelUeRm | O | 0..1        | Contains the service parameters for 5G ProSe UE-to-Network Relay UE supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay.           | ProSe_Ph3     |
| multiHopU2NRemUe      | ParamProSeMultiHopRemUeRm    | O | 0..1        | Contains the service parameters for 5G ProSe Remote UE supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay.                        | ProSe_Ph3     |
| multiHopU2NIntermUe   | ParamProSeMultiHopIntermUeRm | O | 0..1        | Contains the service parameters for 5G ProSe Intermediate UE-to-Network Relay supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay. | ProSe_Ph3     |
| multiHopU2UReUe       | ParamProSeMultiHopU2UReUeRm  | O | 0..1        | Contains the service parameters for 5G ProSe Layer-3 UE-to-UE Relay UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.                            | ProSe_Ph3     |
| multiHopU2UEndUe      | ParamProSeMultiHopEndUeRm    | O | 0..1        | Contains the service parameters for 5G ProSe Layer-3 End UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.                                       | ProSe_Ph3     |
| paramForRangingSIPoS  | ParamForRangingSIPoSrm       | O | 0..1        | Contains the service parameters for ranging and sidelink positioning.                                                                                   | Ranging_SL    |

|                         |                                 |   |      |                                                                                                                                |                   |
|-------------------------|---------------------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------|-------------------|
| urspGuidance            | array(UrspRuleRequest)          | O | 1..N | Contains the service parameters used to guide the URSP rule(s).                                                                | AfGuideURSP       |
| vpsUrspGuidance         | array(UrspRuleRequest)          | O | 1..N | Contains the service parameters provided by an AF to guide the VPLMN-specific URSP rule(s).                                    | VPLMNSpecificURSP |
| a2xParamsPc5            | A2xParamsPc5Rm                  | O | 0..1 | Contains the A2X service parameters used over PC5 reference point.                                                             | A2X               |
| a2xParamsUu             | A2xParamsUuRm                   | O | 0..1 | Contains the A2X service parameters used over Uu reference point.                                                              | A2X               |
| tnaps                   | array(TnapId)                   | O | 1..N | Contains the TNAP ID(s) collocated with the 5G-RG(s) of a specific user.                                                       | AfGuideTNAPs      |
| subNotifEvents          | array(Event)                    | O | 1..N | Identifies the AF subscribed event(s) notifications related to AF provisioned service parameters.                              | AfNotifications   |
| notificationDestination | Uri                             | O | 0..1 | Contains the callback URI to receive the notifications from the NEF. May be present if "subNotifEvents" attribute is included. | AfNotifications   |
| non3gppDevInfos         | array(Non3gppDeviceInformation) | O | 1..N | Contains the non-3GPP device(s) related information.                                                                           | Non3gppDevice     |

#### 5.11.2.3.4 Type: UrspRuleRequest

**Table 5.11.2.3.4-1: Definition of type UrspRuleRequest**

| Attribute name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Data type                         | P | Cardinality | Description                                                                                                                                                                                                                        | Applicability      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| afReqUrspld                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | string                            | O | 0..1        | Identifier of the requested URSP rule.                                                                                                                                                                                             | ExtDeliveryOutcome |
| trafficDesc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TrafficDescriptorComponents       | O | 0..1        | Traffic descriptor components for the requested URSP. (NOTE 1)                                                                                                                                                                     |                    |
| relatPrecedence                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | UInteger                          | O | 0..1        | Represents the relative precedence of the URSP rule within the same AF request. Lower values take precedence over higher values. Its absence means that the AF has no relative precedence requirement for the provided URSP rules. |                    |
| visitedNetDescs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | array(NetworkDescription)         | O | 1..N        | It indicates the VPLMN(s) to which the provided AF guidance on VPLMN-specific URSP rules apply. (NOTE 3)                                                                                                                           | VPLMNSpecificURSP  |
| routeSelParamSets                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | array(RouteSelectionParameterSet) | O | 1..N        | Route Selection Parameter Sets, i.e. sets of parameters that may be used to guide the Route Selection Descriptors of the URSP. (NOTE 2)                                                                                            |                    |
| <p>NOTE 1: If the "trafficDesc" attribute is not present, the NEF may derive the traffic descriptor components from the AF Service Identifier.</p> <p>NOTE 2: If the "routeSelParamSets" attribute is not present, the NEF may derive S-NSSAI/DNN and/or other related parameters from the AF Service Identifier according to SLA.</p> <p>NOTE 3: Each element of the "visitedNetDescs" attribute may describe one PLMN (the "plmnId" attribute is included) or more than one PLMNs (the "mcc" attribute and, optionally, the "mncs" attribute are included). To indicate any VPLMN, the "visitedNetDescs" attribute shall contain only one entry with the "anyPlmnInd" attribute set to true.</p> |                                   |   |             |                                                                                                                                                                                                                                    |                    |

## 5.11.2.3.5 Type: RouteSelectionParameterSet

Table 5.11.2.3.5-1: Definition of type RouteSelectionParameterSet

| Attribute name                                                                                                                                                                       | Data type               | P | Cardinality | Description                                                                                                                                                                                                         | Applicability     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| dnn                                                                                                                                                                                  | Dnn                     | C | 0..1        | DNN to be matched with the DNN of the PDU Session.<br><br>(NOTE)                                                                                                                                                    |                   |
| snssai                                                                                                                                                                               | Snssai                  | C | 0..1        | S-NSSAI to be matched with the S-NSSAI of the PDU Session.<br><br>(NOTE)                                                                                                                                            |                   |
| precedence                                                                                                                                                                           | UInteger                | O | 0..1        | Determines the order in which the Route Selection Descriptors are to be applied.                                                                                                                                    |                   |
| spatialValidityAreas                                                                                                                                                                 | array(GeographicalArea) | O | 1..N        | Indicates where the route selection parameters apply. It may correspond to a geographical area (e.g. a geographic shape that is known to the AF and is configured by the operator to correspond to a list of TAIs). |                   |
| spatialValidityTais                                                                                                                                                                  | array(Tai)              | O | 1..N        | Indicates the TAIs in which the route selection parameters apply. This attribute is applicable only within the 5GC and it shall not be included in the request messages of untrusted AFs for URSP guidance.         |                   |
| pduSessType                                                                                                                                                                          | PduSessionType          | O | 0..1        | Represents the requested PDU Session type.                                                                                                                                                                          | PduSessTypeChange |
| NOTE: This attribute shall be present when the "PIN" feature is supported and the "trafficDesc" attribute included in UrspRuleRequest data structure includes the "pinId" attribute. |                         |   |             |                                                                                                                                                                                                                     |                   |

## 5.11.2.3.6 Type: AfNotification

Table 5.11.2.3.6-1: Definition of type AfNotification

| Attribute name | Data type           | P | Cardinality | Description                                                                                                                                                                                                                  | Applicability |
|----------------|---------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| subscription   | Link                | M | 1           | Link to the subscription resource to which this notification is related.                                                                                                                                                     |               |
| reportEvent    | Event               | C | 0..1        | Identifies the reported event notification. May be present if the "subNotifEvents" attribute is included in the AF subscription transaction. (NOTE)                                                                          |               |
| authResult     | AuthorizationResult | C | 0..1        | Indicates the service parameters authorization update result. (e.g. to revoke an authorization). (NOTE)                                                                                                                      |               |
| gpsis          | array(Gpsi)         | C | 1..N        | Identifies the list of Gpsi(s) of the reported UE(s). May be present if the "extGroupId" attribute or "anyUeId" attribute is included in the AF subscription transaction and only if the "authResult" attribute is provided. |               |

|                                                                                             |                        |   |      |                                                                                                                                                                                                        |                    |
|---------------------------------------------------------------------------------------------|------------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| dnn                                                                                         | Dnn                    | O | 0..1 | Identifies a DNN.                                                                                                                                                                                      |                    |
| snssai                                                                                      | Snssai                 | O | 0..1 | Identifies an S-NSSAI.                                                                                                                                                                                 |                    |
| eventInfo                                                                                   | EventInfo              | O | 0..1 | Indicates the event information.<br><br>It is not applicable if the "reportEvent" attribute has the value "PARTLY_UNSUCC_UE_POL_DEL_SP".                                                               |                    |
| detEventInfo                                                                                | map(DetailedEventInfo) | O | 1..N | Detailed outcome of the AF service parameter request. The key of the map is the attribute "gpsi".<br>It is only applicable if the "reportEvent" attribute has the value "PARTLY_UNSUCC_UE_POL_DEL_SP". | ExtDeliveryOutcome |
| NOTE: At least one of "reportEvent" attribute and "authResult" attribute shall be included. |                        |   |      |                                                                                                                                                                                                        |                    |

## 5.11.2.3.7 Type: EventInfo

Table 5.11.2.3.7-1: Definition of type EventInfo

| Attribute name | Data type | P | Cardinality | Description                                                                                                                                                                                                                                                      | Applicability     |
|----------------|-----------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| failureCause   | Failure   | O | 0..1        | Identify the failure reason for an unsuccessful result. May be present if the "reportEvent" attribute value is "UNSUCCESS_UE_POL_DEL_SP", or if "PCFSerParAuth" feature is supported, "UNSUCCESS_PCF_SERVICE_AUTHORIZATION".                                     |                   |
| plmnId         | PlmnIdNid | O | 0..1        | Identify the PLMN ID of the inbound roamer when the AF subscribes with V-NEF about the outcome of the provisioning of VPLMN-specific URSP rules. It may be present if the "reportEvent" attribute value is "SUCCESS_UE_POL_DEL_SP" or "UNSUCCESS_UE_POL_DEL_SP". | VPLMNSpecificURSP |

## 5.11.2.3.8 Type: TrafficDescriptorComponents

Table 5.11.2.3.8-1: Definition of type TrafficDescriptorComponents

| Attribute name | Data type          | P | Cardinality | Description                                                                                                                     | Applicability |
|----------------|--------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------|---------------|
| appDescs       | map(AppDescriptor) | C | 1..N        | Describes the operation systems and the corresponding applications for each operation systems. The key of map is osId. (NOTE 2) |               |
| flowDescs      | array(string)      | C | 1..N        | Destination IP 3 tuple(s) (IP address or IPv6 network prefix, port number, protocol ID of the protocol above IP). The content   |               |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |   |      |                                                                                                                                                                                                   |                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |   |      | of the string has the same encoding as the IPFilterRule AVP value as defined in IETF RFC 6733 [54], applicable only to the destination IP 3 tuple(s). (NOTE 3)                                    |                   |
| domainDescs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | array(string)                 | C | 1..N | FQDN(s) or a regular expression which are used as a domain name matching criteria. (NOTE 4)                                                                                                       |                   |
| ethFlowDescs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | array(EthFlowDescription)     | C | 1..N | Descriptor(s) for destination information of non-IP traffic in which only ethernet flow description is defined. (NOTE 3)                                                                          |                   |
| dnns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | array(Dnn)                    | C | 1..N | This is matched against the DNN information provided by the application.                                                                                                                          |                   |
| connCaps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | array(ConnectionCapabilities) | C | 1..N | This is matched against the information provided by a UE application when it requests a network connection with certain capabilities.                                                             |                   |
| opSpecConnCaps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | array(Bytes)                  | C | 1..N | Operator specific connection capabilities. Its encoding shall comply with the encoding defined in clause 5.2 of 3GPP TS 24.526 [48].                                                              | ExtConnCapability |
| pinId                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | string                        | C | 0..1 | This is matched against a PIN ID for a specific PIN configured in the PEGC. Its encoding shall comply with the UE policy part type URSP as defined in clause 5.2 of 3GPP TS 24.526 [48]. (NOTE 5) | PIN               |
| connGroupId                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | string                        | C | 0..1 | This is matched against a Connectivity Group ID for a specific Connectivity Group configured in 5G-RG. (NOTE 6)                                                                                   | ConnGroup         |
| <p>NOTE 1: At least one attribute of the above Traffic descriptor components shall be present.</p> <p>NOTE 2: The information is used to identify the Application(s) that is(are) running on the UE's OS. The included "osId" attribute does not include an OS version number. The included "applIds" attribute does not include a version number for the application.</p> <p>NOTE 3: "flowDescs" attribute and "ethFlowDescs" attribute are mutually exclusive.</p> <p>NOTE 4: The match of this traffic descriptor component does not require successful DNS resolution of the FQDN provided by the UE Application.</p> <p>NOTE 5: The "pinId" attribute and other attributes are mutually exclusive.</p> <p>NOTE 6: The "connGroupId" attribute may be present only when the attribute "flowDescs" or "ethFlowDescs" are present and no other attributes may be present in the same traffic descriptor components.</p> |                               |   |      |                                                                                                                                                                                                   |                   |

#### 5.11.2.3.9 Type: NetworkDescription

**Table 5.11.2.3.9-1: Definition of type NetworkDescription**

| Attribute name | Data type | P | Cardinality | Description                                                         | Applicability |
|----------------|-----------|---|-------------|---------------------------------------------------------------------|---------------|
| plmnId         | PlmnId    | C | 0..1        | PLMN Identifier. It represents a combination of MCC and MNC. (NOTE) |               |
| mcc            | Mcc       | C | 0..1        | Mobile Country Code (MCC). (NOTE)                                   |               |

|                                                                                        |            |   |      |                                                                                                                     |  |
|----------------------------------------------------------------------------------------|------------|---|------|---------------------------------------------------------------------------------------------------------------------|--|
| mncs                                                                                   | array(Mnc) | O | 1..N | Represents the applicable MNC(s) for the indicated MCC. It may be present when the "mcc" attribute is present.      |  |
| anyPlmnInd                                                                             | boolean    | C | 0..1 | Indicates any PLMN. When present, it shall be set to true.<br>true: any PLMN (i.e., any MCC and any MNC).<br>(NOTE) |  |
| NOTE: One of the "plmnId", the "mcc" or the "anyPlmnInd" attributes shall be included. |            |   |      |                                                                                                                     |  |

5.11.2.3.10 Void

5.11.2.3.11 Void

5.11.2.3.12 Type: Non3gppDeviceInformation

**Table 5.11.2.3.12-1: Definition of type Non3gppDeviceInformation**

| Attribute name                                                                     | Data type            | P | Cardinality | Description                                                                                             | Applicability |
|------------------------------------------------------------------------------------|----------------------|---|-------------|---------------------------------------------------------------------------------------------------------|---------------|
| non3gppDevId                                                                       | string               | M | 1           | Contains the Non-3GPP Device Identifier.                                                                |               |
| dnnSnssaiInfo                                                                      | DnnSnssaiInformation | O | 0..1        | Contains the DNN and S-NSSAI information to be used                                                     |               |
| flowInfos                                                                          | array(FlowInfo)      | O | 1..N        | Contains the IP data flow(s) of the non-3gpp device which requires specific QoS.<br>(NOTE 2)            |               |
| ethFlowInfos                                                                       | array(EthFlowInfo)   | O | 1..N        | Contains the ethernet flow description of the non-3gpp device which requires specific QoS.<br>(NOTE 2)  |               |
| qosReference                                                                       | string               | C | 0..1        | Contains the requested QoS requirements expressed as a QoS Reference.<br>(NOTE 1)                       |               |
| indQosParamSet                                                                     | QosParameterSet      | C | 0..1        | Contains the requested QoS requirements expressed as one or more individual QoS parameters.<br>(NOTE 1) |               |
| NOTE 1: These attributes are mutually exclusive, and one of them shall be present. |                      |   |             |                                                                                                         |               |
| NOTE 2: These attributes are mutually exclusive.                                   |                      |   |             |                                                                                                         |               |

5.11.2.3.13 Type: DetailedEventInfo

**Table 5.11.2.3.13-1: Definition of type DetailedEventInfo**

| Attribute name  | Data type             | P | Cardinality | Description                               | Applicability |
|-----------------|-----------------------|---|-------------|-------------------------------------------|---------------|
| uePolEventInfos | array(UePolEventInfo) | M | 1..N        | Contains the UE policy event information. |               |
| gpsi            | Gpsi                  | M | 1           | Identifies the GPSI of the reported UE.   |               |



## 5.11.2.3.14 Type: UePolEventInfo

Table 5.11.2.3.14-1: Definition of type UePolEventInfo

| Attribute name | Data type     | P | Cardinality | Description                                                                                                                                                                                                                      | Applicability |
|----------------|---------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| policyType     | UePolPartType | M | 1           | Contains the UE policy part type for which the detailed outcome is being reported.                                                                                                                                               |               |
| outcome        | Outcome       | O | 0..1        | Contains the reported outcome.                                                                                                                                                                                                   |               |
| afReqUrsplds   | array(string) | O | 1..N        | Identify the URSP rules provisioned by the AF that has not been delivered successfully. It may be present if the "reportEvent" attribute value is "PARTLY_UNSUCC_UE_POL_DEL_SP" and the attribute "policyType" is set to "URSP". |               |

## 5.11.2.4 Simple data types and enumerations

## 5.11.2.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.11.2.4.2 Simple data types

The simple data types defined in table 5.11.2.4.2-1 shall be supported.

Table 5.11.2.4.2-1: Simple data types

| Type Name          | Type Definition | Description                                                                                                                                                                                             | Applicability |
|--------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| A2xParamsPc5       | string          | Configuration parameters for A2X communication over PC5. Its encoding shall comply with the UE policies for A2X communication over PC5 reference point as defined in 3GPP TS 24.578 [69].               | A2X           |
| A2xParamsPc5Rm     | string          | This data type is defined in the same way as the "A2xParamsPc5" data type, but with the OpenAPI "nullable: true" property.                                                                              | A2X           |
| A2xParamsUu        | string          | Configuration parameters for A2X communication over Uu reference point. Its encoding shall comply with the UE policies for A2X communication over Uu reference point as defined in 3GPP TS 24.578 [69]. | A2X           |
| A2xParamsUuRm      | string          | This data type is defined in the same way as the "A2xParamsUu" data type, but with the OpenAPI "nullable: true" property.                                                                               | A2X           |
| ParameterOverPc5   | string          | Configuration parameters for V2X communication over PC5. Its encoding shall comply with the UE policies for V2X communication over PC5 as defined in clause 5.3 of 3GPP TS 24.588 [33].                 |               |
| ParameterOverPc5Rm | string          | This data type is defined in the same way as the "ParameterOverPc5" data type, but with the OpenAPI "nullable: true" property.                                                                          |               |
| ParameterOverUu    | string          | Configuration parameters for V2X communication over Uu. Its encoding shall comply with the UE policies for V2X communication over Uu as defined in clause 5.4 of 3GPP TS 24.588 [33].                   |               |
| ParameterOverUuRm  | string          | This data type is defined in the same way as the "ParameterOverUu" data type, but with the OpenAPI "nullable: true" property.                                                                           |               |
| ParamForProSeDd    | string          | Configuration parameters for 5G ProSe direct discovery. Its encoding shall comply with the UE policies for 5G                                                                                           | ProSe         |

|                                  |        |                                                                                                                                                                                                                                                               |           |
|----------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|                                  |        | ProSe direct discovery defined in clause 5.3 of 3GPP TS 24.555 [49].                                                                                                                                                                                          |           |
| ParamForProSeDdRm                | string | This data type is defined in the same way as the "ParamForProSeDd" data type, but with the OpenAPI "nullable: true" property.                                                                                                                                 | ProSe     |
| ParamForProSeDc                  | string | Configuration parameters for 5G ProSe direct communications. Its encoding shall comply with the UE policies for 5G ProSe direct communications defined in clause 5.4 of 3GPP TS 24.555 [49].                                                                  | ProSe     |
| ParamForProSeDcRm                | string | This data type is defined in the same way as the "ParamForProSeDc" data type, but with the OpenAPI "nullable: true" property.                                                                                                                                 | ProSe     |
| ParamForProSeU2NRRelUe           | string | Configuration parameters for 5G ProSe UE-to-network relay UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-Network Relay. Its encoding shall comply with the UE policies for 5G ProSe UE-to-network relay UE defined in clause 5.5 of 3GPP TS 24.555 [49]. | ProSe     |
| ParamForProSeU2NRRelUeRm         | string | This data type is defined in the same way as the "ParamForProSeU2NRRelUe" data type, but with the OpenAPI "nullable: true" property.                                                                                                                          | ProSe     |
| ParamForProSeRemUe               | string | Configuration parameters for 5G ProSe remote UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-Network Relay. Its encoding shall comply with the UE policies for 5G ProSe remote UE defined in clause 5.6 of 3GPP TS 24.555 [49].                           | ProSe     |
| ParamForProSeRemUeRm             | string | This data type is defined in the same way as the "ParamForProSeRemUe" data type, but with the OpenAPI "nullable: true" property.                                                                                                                              | ProSe     |
| ParamForProSeU2URRelUe           | string | Configuration parameters for 5G ProSe UE-to-UE relay UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-UE Relay. Its encoding shall comply with the UE policies for 5G ProSe UE-to-UE relay UE defined in clause 5.8 of 3GPP TS 24.555 [49].                | ProSe_Ph2 |
| ParamForProSeU2URRelUeRm         | string | This data type is defined in the same way as the "ParamForProSeU2URRelUe" data type, but with the OpenAPI "nullable: true" property.                                                                                                                          | ProSe_Ph2 |
| ParamForProSeEndUe               | string | Configuration parameters for 5G ProSe end UE supporting 5G ProSe Layer-2 and/or Layer-3 UE-to-UE Relay. Its encoding shall comply with the UE policies for 5G ProSe end UE defined in clause 5.9 of 3GPP TS 24.555 [49].                                      | ProSe_Ph2 |
| ParamForProSeEndUeRm             | string | This data type is defined in the same way as the "ParamForProSeEndUe" data type, but with the OpenAPI "nullable: true" property.                                                                                                                              | ProSe_Ph2 |
| ParamProSeMultiHopU2NRRelUe      | string | Configuration parameters for 5G ProSe UE-to-Network Relay UE supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay. Its encoding shall comply with the UE policies defined in clause 5.10 of 3GPP TS 24.555 [49].                          | ProSe_Ph3 |
| ParamProSeMultiHopU2NRRelUeRm    | string | This data type is defined in the same way as the ParamProSeMultiHopU2NRRelUe data type, but with the OpenAPI "nullable" property set to "true".                                                                                                               | ProSe_Ph3 |
| ParamProSeMultiHopRemUe          | string | Configuration parameters for 5G ProSe Remote UE supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay. Its encoding shall comply with the UE policies defined in clause 5.12 of 3GPP TS 24.555 [49].                                       | ProSe_Ph3 |
| ParamProSeMultiHopRemUeRm        | string | This data type is defined in the same way as the ParamProSeMultiHopRemUe data type, but with the OpenAPI "nullable" property set to "true".                                                                                                                   | ProSe_Ph3 |
| ParamProSeMultiHopIntermediateUe | string | Configuration parameters for 5G ProSe Intermediate UE-to-Network Relay supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay. Its encoding shall comply with the UE policies defined in clause 5.11 of 3GPP TS 24.555 [49].                | ProSe_Ph3 |

|                              |        |                                                                                                                                                                                                                     |            |
|------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| ParamProSeMultiHopIntermUeRm | string | This data type is defined in the same way as the ParamProSeMultiHopIntermUe data type, but with the OpenAPI "nullable" property set to "true".                                                                      | ProSe_Ph3  |
| ParamProSeMultiHopU2URelUe   | string | Configuration parameters for 5G ProSe Layer-3 UE-to-UE Relay UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay. Its encoding shall comply with the UE policies defined in clause 5.13 of 3GPP TS 24.555 [49]. | ProSe_Ph3  |
| ParamProSeMultiHopU2URelUeRm | string | This data type is defined in the same way as the ParamProSeMultiHopU2URelUe data type, but with the OpenAPI "nullable" property set to "true".                                                                      | ProSe_Ph3  |
| ParamProSeMultiHopEndUe      | string | Configuration parameters for 5G ProSe Layer-3 End UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay. Its encoding shall comply with the UE policies defined in clause 5.14 of 3GPP TS 24.555 [49].            | ProSe_Ph3  |
| ParamProSeMultiHopEndUeRm    | string | This data type is defined in the same way as the ParamProSeMultiHopEndUe data type, but with the OpenAPI "nullable" property set to "true".                                                                         | ProSe_Ph3  |
| ParamForRangingSIPos         | string | Configuration parameters for ranging and sidelink positioning. Its encoding shall comply with the UE policies for ranging and sidelink positioning defined in clause 5.2.3 of 3GPP TS 24.514 [72]                   | Ranging_SL |
| ParamForRangingSIPosRm       | string | This data type is defined in the same way as the "ParamForRangingslpos data type, but with the OpenAPI "nullable: true" property.                                                                                   | Ranging_SL |

#### 5.11.2.4.3 Enumeration: Event

**Table 5.11.2.4.3-1: Enumeration Event**

The enumeration Event represents the AF subscribe to event notification of the outcome related to the invocation of AF provisioned service parameters.

| Enumeration value                   | Description                                                                                               | Applicability      |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------|
| SUCCESS_UE_POL_DEL_SP               | Successful UE Policy Delivery related to the invocation of AF provisioned Service Parameters.             |                    |
| UNSUCCESS_UE_POL_DEL_SP             | Unsuccessful UE Policy Delivery related to the invocation of AF provisioned Service Parameters.           |                    |
| PARTLY_UNSUCC_UE_POL_DEL_SP         | Partially unsuccessful UE Policy Delivery related to the invocation of AF provisioned Service Parameters. | ExtDeliveryOutcome |
| UNSUCCESS_PCF_SERVICE_AUTHORIZATION | Unsuccessful authorization in the PCF to the invocation of AF provisioned Service Parameters.             | PCFSerParAuth      |

#### 5.11.2.4.4 Enumeration: AuthorizationResult

The enumeration AuthorizationResult represents the NEF notify the AF about the service parameters authorization updates result, e.g. to revoke an authorization.

**Table 5.11.2.4.4-1: Enumeration AuthorizationResult**

| Enumeration value | Description                                                |
|-------------------|------------------------------------------------------------|
| AUTH_REVOKED      | Indicated the service parameters authorization is revoked. |

#### 5.11.2.4.5 Enumeration: Failure

The enumeration Failure represents the failure reason for the unsuccessful result.

**Table 5.11.2.4.5-1: Enumeration Failure**

| Enumeration value   | Description                                                                                                                                                                                                                              | Applicability |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| UNSPECIFIED         | Indicates the PCF received the UE sent UE policy delivery service cause #111 (Protocol error, unspecified), or if "PCFSerParAuth" feature is supported, that the PCF does not authorize the service information for unspecified reasons. |               |
| UE_NOT_REACHABLE    | Indicates the PCF received the notification from the AMF that the UE is not reachable.                                                                                                                                                   |               |
| UNKNOWN             | Indicates unknown reasons upon no response from the UE, e.g. UPDS message type is not defined or not implemented by the UE, or not compatible with the UPDS state, in which the UE shall ignore the UPDS message.                        |               |
| UE_TEMP_UNREACHABLE | Indicates the PCF received the notification from the AMF that the UE is not reachable but the PCF will retry again.                                                                                                                      |               |
| DNN_NOT_ALLOWED     | Indicates that the DNN is not authorized for the user.                                                                                                                                                                                   | PCFSerParAuth |
| SNSSAI_NOT_ALLOWED  | Indicates that the SNSSAI is not authorized for the user.                                                                                                                                                                                | PCFSerParAuth |

#### 5.11.2.4.6 Enumeration: ConnectionCapabilities

The enumeration ConnectionCapabilities represents the information provided by a UE application when it requests a network connection with certain capabilities.

**Table 5.11.2.4.6-1: Enumeration ConnectionCapabilities**

| Enumeration value      | Description                                                                                | Applicability     |
|------------------------|--------------------------------------------------------------------------------------------|-------------------|
| IMS                    | Indicates the connection capability to support IMS service.                                |                   |
| MMS                    | Indicates the connection capability to support MMS service.                                |                   |
| SUPL                   | Indicates the connection capability to support SUPL service.                               |                   |
| INTERNET               | Indicates the connection capability to support Internet service.                           |                   |
| IOT_DELAY_TOLERANT     | Indicates the connection capability to support IoT delay-tolerant services.<br>(NOTE)      | ExtConnCapability |
| IOT_NON_DELAY_TOLERANT | Indicates the connection capability to support IoT non-delay-tolerant services.<br>(NOTE)  | ExtConnCapability |
| DL_STREAMING           | Indicates the connection capability to support downlink streaming services.<br>(NOTE)      | ExtConnCapability |
| UL_STREAMING           | Indicates the connection capability to support uplink streaming services.<br>(NOTE)        | ExtConnCapability |
| VEHIC_COMM             | Indicates the connection capability to support vehicular communication services.<br>(NOTE) | ExtConnCapability |
| REAL_TIME_INTERACTIVE  | Indicates the connection capability to support real time interactive services.<br>(NOTE)   | ExtConnCapability |
| UNIFIED_COMM           | Indicates the connection capability to support unified communication services.<br>(NOTE)   | ExtConnCapability |
| BACKGROUND             | Indicates the connection capability to support background services.<br>(NOTE)              | ExtConnCapability |

|                                                                                               |                                                                                                                            |                   |
|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------|
| MISS_CRITICAL                                                                                 | Indicates the connection capability to support mission critical services.<br>(NOTE)                                        | ExtConnCapability |
| TIME_CRITICAL                                                                                 | Indicates the connection capability to support time critical services.<br>(NOTE)                                           | ExtConnCapability |
| LOW_LAT_LOSS_TOL_UNACK                                                                        | Indicates the connection capability to support low latency loss tolerant communications in un-acknowledged mode.<br>(NOTE) | ExtConnCapability |
| NOTE: These connection capabilities are traffic categories specified in GSMA PRD NG.135 [75]. |                                                                                                                            |                   |

#### 5.11.2.4.7 Enumeration: UePolPartType

The enumeration UePolPartType represents a UE policy part type.

**Table 5.11.2.4.7-1: Enumeration UePolPartType**

| Enumeration value | Description                             | Applicability |
|-------------------|-----------------------------------------|---------------|
| URSP              | Represents a URSP UE policy part type.  |               |
| V2XP              | Represents a V2X UE policy part type.   |               |
| A2XP              | Represents a A2X UE policy part type.   |               |
| PROSEP            | Represents a ProSe UE policy part type. |               |
| RSLPP             | Represents a RSLPP UE policy part type. |               |

#### 5.11.2.4.8 Enumeration: Outcome

The enumeration Outcome represents detailed outcome of the requests for AF provisioned service parameters.

**Table 5.11.2.4.8-1: Enumeration Outcome**

| Enumeration value     | Description                                                         | Applicability |
|-----------------------|---------------------------------------------------------------------|---------------|
| REJECTED_BY_UE        | The requested parameters were not successfully installed on the UE. |               |
| NOT_AUTHORIZED_BY_PCF | The requested parameters were not authorized by the PCF.            |               |

### 5.11.3 Used Features

The table below defines the features applicable to the ServiceParameter API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.11.3-1: Features used by ServiceParameter API**

| Feature number | Feature Name            | Description                                                                                                                                                                     |
|----------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | ProSe                   | This feature indicates the support of UE policy and N2 information provisioning for 5G ProSe.                                                                                   |
| 2              | enNB                    | Indicates the support of enhancements to the northbound interfaces.                                                                                                             |
| 3              | AfNotifications         | This feature indicates the support of AF subscribed event(s) notifications.                                                                                                     |
| 4              | Notification_websocket  | The delivery of notifications over Websocket is supported as described in 3GPP TS 29.122 [4]. This feature requires that the Notification_test_event feature is also supported. |
| 5              | Notification_test_event | The testing of notification connection is supported as described in 3GPP TS 29.122 [4].                                                                                         |
| 6              | AfGuideURSP             | This feature indicates the support of AF guidance for URSP determination.                                                                                                       |
| 7              | A2X                     | This feature indicates the support of A2X communication.                                                                                                                        |

|    |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8  | ProSe_Ph2          | <p>This feature indicates the support of the first set of enhancements to the 5G ProSe functionality.</p> <p>The following sub-functionalities are supported:</p> <ul style="list-style-type: none"> <li>- Support UE policy and N2 information provisioning for UE-to-UE Relay.</li> </ul> <p>This feature requires that the "ProSe" feature is also supported.</p>                                                                                                                                                                  |
| 9  | PIN                | <p>This feature indicates the support of Personal IoT Network requirements.</p> <p>This feature requires the support of the "AfGuideURSP" feature.</p>                                                                                                                                                                                                                                                                                                                                                                                |
| 10 | VPLMNSpecificURSP  | <p>This feature indicates the support of AF guidance on VPLMN-specific URSP rules.</p> <p>This feature requires that "AfGuideURSP" and "AfNotifications" features are also supported.</p>                                                                                                                                                                                                                                                                                                                                             |
| 11 | AfGuideTNAPs       | <p>This feature indicates the support of AF providing guidance to the HPLMN of the UE of the list of TNAP(s) collocated with the 5G-RG(s) of a specific user.</p>                                                                                                                                                                                                                                                                                                                                                                     |
| 12 | Ranging_SL         | <p>This feature indicates the support of the ranging and sidelink positioning functionality.</p> <p>The following functionalities are supported:</p> <ul style="list-style-type: none"> <li>- Support the provisioning/update/deletion of ranging and sidelink positioning service parameters.</li> </ul>                                                                                                                                                                                                                             |
| 13 | PduSessTypeChange  | <p>This feature indicates the support of the provisioning/update of the requested PDU Session type functionality as part of the Generic Group Management, Exposure and Communication Enhancements.</p> <p>The following functionalities are supported:</p> <ul style="list-style-type: none"> <li>- Support the provisioning/update of the requested PDU Session type as part of the information provided by the AF for guiding URSP determination.</li> </ul> <p>This feature requires the support of the "AfGuideURSP" feature.</p> |
| 14 | ExtConnCapability  | <p>This feature indicates the support of:</p> <ul style="list-style-type: none"> <li>- The connection capabilities defined as traffic categories in GSMA PRD NG.135 [75].</li> <li>- Operator Specific traffic categories.</li> </ul> <p>This feature requires the support of the "AfGuideURSP" feature.</p>                                                                                                                                                                                                                          |
| 15 | ProSe_Ph3          | <p>This feature indicates the support of the second set of enhancements to the 5G ProSe functionality.</p> <p>The following sub-functionalities are supported:</p> <ul style="list-style-type: none"> <li>- Support UE policy and N2 information provisioning for Multi-hop UE-to-Network Relay.</li> <li>- Support UE policy and N2 information provisioning for Layer-3 Multi-hop UE-to-UE Relay.</li> </ul> <p>This feature requires that the "ProSe_Ph2" feature is also supported.</p>                                           |
| 16 | Non3gppDevice      | <p>This feature indicates the support of provisioning information for non-3GPP device.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 17 | ConnGroup          | <p>This feature indicates the support of providing the Connectivity Group ID in the traffic descriptor for matching.</p> <p>This feature requires the support of the "AfGuideURSP" feature.</p>                                                                                                                                                                                                                                                                                                                                       |
| 18 | PCFSerParAuth      | <p>Indicates the support of notifications about the unsuccessful authorization related to the invocation of AF provisioned service parameters.</p> <p>This feature requires that "AfNotifications" feature is also supported.</p>                                                                                                                                                                                                                                                                                                     |
| 19 | ExtDeliveryOutcome | <p>Indicates the support of notifications about the unsuccessfully executed UE policy outcome together with the partially unsuccessful UE policy delivery event related to the invocation of AF provisioned service parameters.</p> <p>This feature requires the support of AfNotifications feature and PCFSerParAuth feature.</p>                                                                                                                                                                                                    |

## 5.11.4 Error handling

### 5.11.4.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.11.4.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the ServiceParameter API.

### 5.11.4.3 Application Errors

The application errors defined for ServiceParameter API are listed in table 5.11.4.3-1.

**Table 5.11.4.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.12 ACSPParameterProvision API

### 5.12.0 Introduction

The Nnef\_ParameterProvision service shall use the ACSPParameterProvision API for ACS parameters provisioning.

The API URI of ACSPParameterProvision API shall be:

**{apiRoot}/3gpp-acs-pp/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-acs-pp".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.12.1 Resources

#### 5.12.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.12.1.1-1 and the resources and HTTP methods used for the ACSPParameterProvision API.

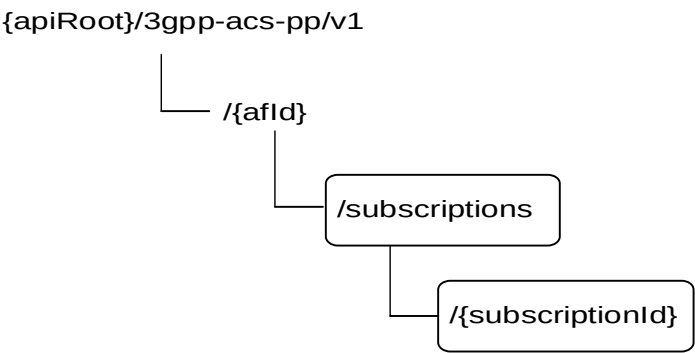


Figure 5.12.1.1-1: Resource URI structure of the ACSParameterProvision API

Table 5.12.1.1-1 provides an overview of the resources and HTTP methods applicable for the ACSParameterProvision API.

Table 5.12.1.1-1: Resources and methods overview

| Resource name                             | Resource URI                           | HTTP method | Description                                                                       |
|-------------------------------------------|----------------------------------------|-------------|-----------------------------------------------------------------------------------|
| ACS Configuration Subscriptions           | /{afId}/subscriptions                  | GET         | Read all subscriptions for a given AF.                                            |
|                                           |                                        | POST        | Create a new ACS configuration subscription.                                      |
| Individual ACS Configuration Subscription | /{afId}/subscriptions/{subscriptionId} | GET         | Read an existing ACS configuration subscription identified by {subscriptionId}.   |
|                                           |                                        | PUT         | Update an existing ACS configuration subscription identified by {subscriptionId}. |
|                                           |                                        | PATCH       | Modify an existing ACS configuration subscription identified by {subscriptionId}. |
|                                           |                                        | DELETE      | Delete an existing ACS configuration subscription identified by {subscriptionId}. |

5.12.1.2 Resource: ACS Configuration Subscriptions

5.12.1.2.1 Introduction

This resource allows a AF to read all active ACS Configuration Subscriptions for the given AF, or create an new individual ACS Configuration subscription in the NEF.

5.12.1.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-acs-pp/v1/{afId}/subscriptions

This resource shall support the resource URI variables defined in table 5.12.1.2.2-1.

Table 5.12.1.2.2-1: Resource URI variables for this resource

| Name    | Definition                           |
|---------|--------------------------------------|
| apiRoot | Clause 5.2.4 of 3GPP TS 29.122 [4].  |
| afId    | Identifier of the AF of type string. |



### 5.12.1.2.3 Resource Methods

#### 5.12.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.12.1.2.3.

#### 5.12.1.2.3.2 GET

The GET method allows to read all active subscriptions for a given AF. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.12.1.2.3.2-1.

**Table 5.12.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.12.1.2.3.2-2 and the response data structures and response codes specified in table 5.12.1.2.3.2-3.

**Table 5.12.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.12.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(AcsConfigurationData)                                                                                              | M | 0..N        | 200 OK                 | All the subscription information for the AF in the request URI are returned.                                                                                                                                                                                    |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                 |

**Table 5.12.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.12.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.12.1.2.3.3 POST

The POST method creates a new resource to individual ACS Configuration subscription for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.12.1.2.3.3-1 and the response data structures and response codes specified in table 5.12.1.2.3.3-2.

**Table 5.12.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type             | P | Cardinality | Description                                                                 |
|-----------------------|---|-------------|-----------------------------------------------------------------------------|
| AcsConfiguration Data | M | 1           | Parameters to create an individual ACS Configuration subscription resource. |

**Table 5.12.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| AcsConfiguration Data                                                                                                     | M | 1           | 201 Created    | The subscription resource was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                         |

**Table 5.12.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                              |
|----------|-----------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-acsp/v1/{afId}/subscriptions/{subscriptionId} |

## 5.12.1.3 Resource: Individual ACS Configuration Subscription

## 5.12.1.3.1 Introduction

This resource allows a AF to read, update or delete an existing ACS Configuration subscription.

## 5.12.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-acsp/v1/{afId}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.9.1.3.2-1.

**Table 5.12.1.3.2-1: Resource URI variables for this resource**

| Name           | Definition                                              |
|----------------|---------------------------------------------------------|
| apiRoot        | Clause 5.2.4 of 3GPP TS 29.122 [4].                     |
| afId           | Identifier of the AF of type string.                    |
| subscriptionId | Identifier of the subscription resource of type string. |

## 5.12.1.3.3 Resource Methods

## 5.12.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.12.1.3.3.

## 5.12.1.3.3.2 GET

The GET method allows to read the active subscription for a given AF and subscription Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.12.1.3.3.2-1.

**Table 5.12.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.12.1.3.3.2-2 and the response data structures and response codes specified in table 5.12.1.3.3.2-3.

**Table 5.12.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.12.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AcsConfiguration Data                                                                                                    | M | 1           | 200 OK                 | The information for the subscription in the request URI are returned.                                                                                                                                                                                           |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                 |

**Table 5.12.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.12.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.12.1.3.3.3 PUT

The PUT method updates an existing resource to update a configuration. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.9.1.3.3.3-1 and the response data structures and response codes specified in table 5.9.1.3.3.3-2.

**Table 5.12.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type             | P | Cardinality | Description                      |
|-----------------------|---|-------------|----------------------------------|
| AcsConfiguration Data | M | 1           | Modify an existing subscription. |

**Table 5.12.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AcsConfiguration Data                                                                                                    | M | 1           | 200 OK                 | The subscription resource was updated successfully and a representation of the updated resource is returned.                                                                                                                                                       |
| n/a                                                                                                                      |   |             | 204 No Content         | The subscription resource was updated successfully.                                                                                                                                                                                                                |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                    |

**Table 5.12.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.12.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.12.1.3.3.3A PATCH

The PATCH method modifies an existing resource to update an existing ACS Configuration Subscription. The AF shall initiate the HTTP PATCH request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.9.1.3.3.3A-1 and the response data structures and response codes specified in table 5.9.1.3.3.3A-2.

**Table 5.12.1.3.3.3A-1: Data structures supported by the PATCH Request Body on this resource**

| Data type                  | P | Cardinality | Description                      |
|----------------------------|---|-------------|----------------------------------|
| AcsConfiguration DataPatch | M | 1           | Modify an existing subscription. |

**Table 5.12.1.3.3.3A-2: Data structures supported by the PATCH Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
|-----------|---|-------------|----------------|-------------|

|                                                                                                                            |   |   |                        |                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------|---|---|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AcsConfiguration Data                                                                                                      | M | 1 | 200 OK                 | The subscription resource was modified successfully and a representation of the updated resource is returned.                                                                                                                    |
| n/a                                                                                                                        |   |   | 204 No Content         | The subscription resource was modified successfully.                                                                                                                                                                             |
| n/a                                                                                                                        |   |   | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                        |   |   | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |   |                        |                                                                                                                                                                                                                                  |

**Table 5.12.1.3.3.3A-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.12.1.3.3.3A-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.12.1.3.3.4 DELETE

The DELETE method deletes an existing individual subscription for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.12.1.3.3.4-1.

**Table 5.12.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.12.1.3.3.4-2 and the response data structures and response codes specified in table 5.12.1.3.3.4-3.

**Table 5.12.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.12.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description                                            |
|-----------|---|-------------|----------------|--------------------------------------------------------|
| N/A       |   |             | 204 No Content | The subscription resource was terminated successfully. |

|                                                                                                                             |  |  |                              |                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |  |  | 307<br>Temporary<br>Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |  |  | 308<br>Permanent<br>Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                              |                                                                                                                                                                                                                                                                   |

**Table 5.12.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.12.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.12.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.12.1B Notifications

There are no notifications defined for this API in this release of the specification.

## 5.12.2 Data Model

### 5.12.2.1 General

This clause specifies the application data model supported by the ACSParameterProvision API.

Table 5.12.2.1-1 specifies the data types defined for the ACSParameterProvision API.

**Table 5.12.2.1-1: ACSParameterProvision API specific Data Types**

| Data type                 | Clause defined | Description                                                                                | Applicability |
|---------------------------|----------------|--------------------------------------------------------------------------------------------|---------------|
| AcsConfigurationData      | 5.12.2.3.2     | Represents an individual ACS Configuration subscription resource.                          |               |
| AcsConfigurationDataPatch | 5.12.2.3.3     | Represents the parameters to request to modify an existing ACS Configuration subscription. | PatchUpdate   |

### 5.12.2.2 Reused data types

The data types reused by the ACSParameterProvision API from other specifications are listed in table 5.12.2.2-1.

**Table 5.12.2.2-1: Re-used Data Types**

| Data type | Reference          | Comments                        |
|-----------|--------------------|---------------------------------|
| AcsInfo   | 3GPP TS 29.571 [8] | Contains the information of ACS |

|                        |                    |                                                                                        |
|------------------------|--------------------|----------------------------------------------------------------------------------------|
| ExternalGroupId        | 3GPP TS 29.122 [4] | External Group Identifier for a user group.                                            |
| Gpsi                   | 3GPP TS 29.571 [8] | Identifies a GPSI.                                                                     |
| Link                   | 3GPP TS 29.122 [4] | Represents a referenced resource.                                                      |
| MtcProviderInformation | 3GPP TS 29.571 [8] | Indicates MTC provider information.                                                    |
| SupportedFeatures      | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features defined in table 5.9.4-1. |

### 5.12.2.3 Structured data types

#### 5.12.2.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.12.2.3.2 Type: AcsConfigurationData

**Table 5.12.2.3.2-1: Definition of type AcsConfigurationData**

| Attribute name                                                              | Data type              | P | Cardinality | Description                                                                                                                                                                                                             | Applicability |
|-----------------------------------------------------------------------------|------------------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| self                                                                        | Link                   | C | 0..1        | Identifies the individual service parameter subscription resource URI. Shall be present by the NEF in HTTP responses that include an object of AcsConfigurationData Data type.                                          |               |
| gpsi                                                                        | Gpsi                   | O | 0..1        | Identifies GPSI. (NOTE)                                                                                                                                                                                                 |               |
| exterGroupId                                                                | ExternalGroupId        | O | 0..1        | Represents a group of users. (NOTE)                                                                                                                                                                                     |               |
| acsInfo                                                                     | AcsInfo                | M | 1           | Contains the information of ACS.                                                                                                                                                                                        |               |
| mtcProviderId                                                               | MtcProviderInformation | O | 0..1        | Indicates MTC provider information.                                                                                                                                                                                     |               |
| suppFeat                                                                    | SupportedFeatures      | M | 1           | Indicates the list of Supported features used as described in clause 5.12.3. This attribute shall be supplied in the POST request that requested the creation of an individual ACS configuration Subscription resource. |               |
| NOTE: Only one of the "gpsi" or "exterGroupId" attribute shall be provided. |                        |   |             |                                                                                                                                                                                                                         |               |

#### 5.12.2.3.3 Type: AcsConfigurationDataPatch

**Table 5.12.2.3.3-1: Definition of type AcsConfigurationDataPatch**

| Attribute name | Data type              | P | Cardinality | Description                         | Applicability |
|----------------|------------------------|---|-------------|-------------------------------------|---------------|
| acsInfo        | AcsInfo                | O | 0..1        | Contains the information of ACS.    |               |
| mtcProviderId  | MtcProviderInformation | O | 0..1        | Indicates MTC provider information. |               |

### 5.12.2.4 Simple data types and enumerations

#### 5.12.2.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.12.2.4.2 Simple data types

The simple data types defined in table 5.12.2.4.2-1 shall be supported.

**Table 5.12.2.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.12.3 Used Features

The table below defines the features applicable to the ACSParameterProvision API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.12.3-1: Features used by ACSParameterProvision API**

| Feature number | Feature Name | Description                                                                                                                                      |
|----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | PatchUpdate  | Indicates the support of enhancements to the northbound interfaces (e.g. support the partial modification of an existing subscription resource). |

### 5.12.4 Error handling

#### 5.12.4.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

#### 5.12.4.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the ACSParameterProvision API.

#### 5.12.4.3 Application Errors

The application errors defined for ACSParameterProvision API are listed in table 5.12.4.3-1.

**Table 5.12.4.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.13 MoLcsNotify API

### 5.13.0 Introduction

The Nnef\_MoLcsNotify service shall use the MoLcsNotify API.

The API URI of MoLcsNotify API shall be:

**{apiRoot}/3gpp-mo-lcs-notify/v1**

with the following components:



- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-mo-lcs-notify".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

## 5.13.1 Resources

There are no resources defined for this API in this release of the specification.

### 5.13.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.13.2 Notifications

### 5.13.2.1 Introduction

Upon receipt of a UE location information update notification from the GMLC, the NEF shall send an HTTP POST message in order to notify the AF of the updated UE location information.

### 5.13.2.2 Event Notification

Callback URI: {**notificationDestination**} shall be used with the callback URI variables defined in table 5.13.2.2-1.

**Table 5.13.2.2-1: Callback URI variables**

| Name                    | Definition                                                                                                                                          |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| notificationDestination | A URI indicating the notification destination where N33 notification requests shall be delivered to.<br>This URI shall be preconfigured in the NEF. |

### 5.13.2.3 Operation Definition

#### 5.13.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.13.2.3.1-1 and the response data structures and response codes specified in table 5.13.2.3.1-2.

**Table 5.13.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type     | P | Cardinality | Description                                       |
|---------------|---|-------------|---------------------------------------------------|
| LocUpdateData | M | 1           | Delivers UE location to AF during MO-LR procedure |

**Table 5.13.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type          | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                   |
|--------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LocUpdateDataReply | M | 1           | 200 OK                 | The notification is received successfully.                                                                                                                                                                                                                                                    |
| N/A                |   |             | 307 Temporary Redirect | Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

|                                                                                                                           |  |  |                              |                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                       |  |  | 308<br>Permanent<br>Redirect | Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                              |                                                                                                                                                                                                                                                                                               |

**Table 5.13.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.13.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.13.3 Data Model

### 5.13.3.1 General

This clause specifies the application data model supported by the MoLcsNotify API.

### 5.13.3.2 Reused data types

The data types reused by the MoLcsNotify API from other specifications are listed in table 5.13.3.2-1.

**Table 5.13.3.2-1: Re-used Data Types**

| Data type         | Reference           | Comments                                                                                |
|-------------------|---------------------|-----------------------------------------------------------------------------------------|
| SupportedFeatures | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features defined in table 5.13.4-1. |
| Gpsi              | 3GPP TS 29.571 [8]  | Identifies a GPSI.                                                                      |
| LocationInfo      | 3GPP TS 29.122 [4]  | Represent user location information for exposure.                                       |
| LcsQosClass       | 3GPP TS 29.572 [34] | LCS QoS Class.                                                                          |
| ServiceIdentity   | 3GPP TS 29.515 [35] | Service identity                                                                        |

### 5.13.3.3 Structured data types

#### 5.13.3.3.1 Introduction

This clause defines the structured data types to be used by the MoLcsNotify API.

#### 5.13.3.3.2 Type: LocUpdateData

This type represents a UE updated location information from the NEF to the AF.

**Table 5.13.3.3.2-1: Definition of type LocUpdateData**

| Attribute name | Data type | P | Cardinality | Description                            | Applicability |
|----------------|-----------|---|-------------|----------------------------------------|---------------|
| gpsi           | Gpsi      | M | 1           | Generic Public Subscription identifier |               |

|                   |                     |   |      |                                                                                                                    |  |
|-------------------|---------------------|---|------|--------------------------------------------------------------------------------------------------------------------|--|
| locInfo           | LocationInfo        | M | 1    | Represent user location information for exposure.                                                                  |  |
| lcsQosClass       | LcsQosClass         | M | 1    | LCS QoS Class.                                                                                                     |  |
| svcId             | ServiceIdentity     | O | 0..1 | Service Identity may be specified by the UE for LCS request.                                                       |  |
| suppFeat          | SupportedFeatures   | M | 1    | Indicates the list of Supported features used as described in clause 5.13.4.                                       |  |
| additionalLocInfo | array(LocationInfo) | O | 1..N | Represent additional user location information for exposure when location information for multiple UEs is exposed. |  |

### 5.13.3.3.3 Type: LocUpdateDataReply

This data type represents a reply to a MO LCS notification and is sent from the AF to the NEF.

**Table 5.13.3.3.3-1: Definition of type LocUpdateDataReply**

| Attribute name | Data type         | P | Cardinality | Description                                                                  | Applicability |
|----------------|-------------------|---|-------------|------------------------------------------------------------------------------|---------------|
| suppFeat       | SupportedFeatures | M | 1           | Indicates the list of Supported features used as described in clause 5.13.4. |               |

## 5.13.3.4 Simple data types and enumerations

### 5.13.3.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.13.3.4.2 Simple data types

The simple data types defined in table 5.13.3.4.2-1 shall be supported.

**Table 5.13.3.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.13.4 Used Features

The table below defines the features applicable to the MoLcsNotify API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.13.4-1: Features used by MoLcsNotify API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.13.5 Error handling

### 5.13.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.13.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the MoLcsNotify API.

### 5.13.5.3 Application Errors

The application errors defined for MoLcsNotify API are listed in table 5.13.5.3-1.

**Table 5.13.5.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.14 AKMA API

### 5.14.1 Introduction

The Nnef\_AKMA service shall use the AKMA API.

The API URI of AKMA API shall be:

**{apiRoot}/3gpp-akma/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-akma".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.14.2 Resources

There are no resources defined for this API in this release of the specification.

### 5.14.3 Custom Operations without associated resources

#### 5.14.3.1 Overview

The structure of the custom operation URIs of the AKMA API is shown in Figure 5.14.3.1-1.

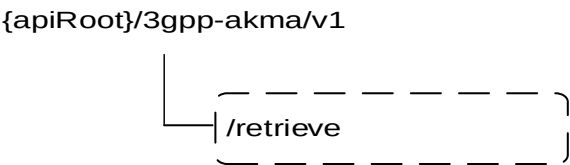


Figure 5.14.3.1-1: Custom operation URI structure of the AKMA API

Table 5.14.3.1-1 provides an overview of the custom operations and applicable HTTP methods.

Table 5.14.3.1-1: Custom operations without associated resources

| Operation name | Custom operation URI | Mapped HTTP method | Description                                          |
|----------------|----------------------|--------------------|------------------------------------------------------|
| Retrieve       | /retrieve            | POST               | Request to retrieve AKMA Application Key information |

5.14.3.2      Operation: Retrieve

5.14.3.2.1      Description

The custom operation allows a service consumer to retrieve AKMA application key information via the NEF.

5.14.3.2.2      Operation Definition

This operation shall support the request and response data structures and response codes specified in tables 5.14.3.2.2-1 and 5.14.3.2.2-2.

Table 5.14.3.2.2-1: Data structures supported by the POST Request Body on this resource

| Data type        | P | Cardinality | Description                                                         |
|------------------|---|-------------|---------------------------------------------------------------------|
| AkmaAfKeyRequest | M | 1           | Parameters to request to retrieve AKMA Application Key information. |

Table 5.14.3.2.2-2: Data structures supported by the POST Response Body on this resource

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AkmaAfKeyData                                                                                                               | M | 1           | 200 OK                 | The requested AKMA Application Key information was returned successfully.                                                                                                                                                        |
| n/a                                                                                                                         |   |             | 204 No Content         | If the requested data does not exist, the NEF shall respond with "204 No Content".                                                                                                                                               |
| n/a                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                              | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                         |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                  |
| NOTE 2: Failure cases are described in clause 5.14.7.                                                                       |   |             |                        |                                                                                                                                                                                                                                  |

**Table 5.14.3.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.14.3.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.14.4 Notifications

### 5.14.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.14.4.1-1: Notifications overview**

| Notification                          | Callback URI | HTTP method or custom operation | Description (service operation)                                                                        |
|---------------------------------------|--------------|---------------------------------|--------------------------------------------------------------------------------------------------------|
| AKMA Service Disablement Notification | {notifUri}   | POST                            | Enable the NEF to notify a previously subscribed AF of the disablement of the AKMA service for the UE. |

### 5.14.4.2 AKMA Service Disablement Notification

#### 5.14.4.2.1 Description

The AKMA Service Disablement Notification is used by the NEF to notify the AF of AKMA service disablement for the UE.

#### 5.14.4.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 5.14.4.2.2-1.

**Table 5.14.4.2.2-1: Callback URI variables**

| Name     | Definition                                                                                                 |
|----------|------------------------------------------------------------------------------------------------------------|
| notifUri | Callback URI provided by the AF during retrieval of AKMA application key as defined in table 5.14.3.2.2-1. |

#### 5.14.4.2.3 Operation Definition

This method shall support the request data structures specified in table 5.14.4.2.3.1-1 and the response data structures and response codes specified in table 5.14.4.2.3-2.

**Table 5.14.4.2.3-1: Data structures supported by the POST Request Body on this resource**

| Data type          | P | Cardinality | Description                                           |
|--------------------|---|-------------|-------------------------------------------------------|
| ServiceDiableNotif | M | 1           | Represents the AKMA Service Disablement Notification. |

**Table 5.14.4.2.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                  |   |             | 204 No Content         | Successful case. The notification is received successfully and processed.                                                                                                                                                                                                                      |
| n/a                                                                                                                                  |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                  |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                |

**Table 5.14.4.2.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.19.4.2.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.14.5 Data Model

### 5.14.5.1 General

This clause specifies the application data model supported by the AKMA API. Table 5.14.5.1-1 specifies the data types defined for the AKMA API.

**Table 5.14.5.1-1: AKMA API specific Data Types**

| Data type           | Clause defined | Description                                                    | Applicability |
|---------------------|----------------|----------------------------------------------------------------|---------------|
| AkmaAfKeyRequest    | 5.14.5.3.2     | Represents AKMA application key retrieval request information. |               |
| AkmaAfKeyData       | 5.14.5.3.3     | Represents AKMA application key information.                   |               |
| ServiceDisableNotif | 5.15.5.3.4     | Represents a AKMA service disable information.                 |               |

### 5.14.5.2 Reused data types

The data types reused by the AKMA API from other specifications are listed in table 514.5.2-1.

**Table 5.14.5.2-1: Re-used Data Types**

| Data type         | Reference          | Comments                                                      |
|-------------------|--------------------|---------------------------------------------------------------|
| DateTime          | 3GPP TS 29.122 [4] | Represents a data and a time.                                 |
| Gpsi              | 3GPP TS 29.571 [8] | Represents a GPSI.                                            |
| ProblemDetails    | 3GPP TS 29.122 [4] | Represents error related information.                         |
| Supi              | 3GPP TS 29.571 [8] | Represents a SUPI.                                            |
| SupportedFeatures | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features. |
| Uri               | 3GPP TS 29.122 [4] | Represents a URI.                                             |

### 5.14.5.3 Structured data types

#### 5.14.5.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.14.5.3.2 Type: AkmaAfKeyRequest

**Table 5.14.5.3.2-1: Definition of type AkmaAfKeyRequest**

| Attribute name                                                                                                                                                                                                       | Data type         | P | Cardinality | Description                                                                                                                                                                  | Applicability (NOTE) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| afId                                                                                                                                                                                                                 | AfId              | M | 1           | Identification of AF                                                                                                                                                         |                      |
| aKId                                                                                                                                                                                                                 | AKId              | M | 1           | A-KID                                                                                                                                                                        |                      |
| anonInd                                                                                                                                                                                                              | boolean           | O | 0..1        | Indicates whether an anonymous user access. Set to "true" if an anonymous user access is requested; otherwise set to "false". Default value is "false" if omitted.           |                      |
| notifiUri                                                                                                                                                                                                            | Uri               | O | 0..1        | Contains the notification URI via which the AF desires to receive notifications on AKMA service disablement.                                                                 | RoamingRestriction   |
| suppFeat                                                                                                                                                                                                             | SupportedFeatures | C | 0..1        | Contains the list of supported feature(s) among the ones defined in clause 5.14.6.<br><br>This attribute shall be present only when feature negotiation needs to take place. |                      |
| NOTE: Properties marked with a feature as defined in clause 5.14.6 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property applies for all the features. |                   |   |             |                                                                                                                                                                              |                      |

#### 5.14.5.3.3 Type: AkmaAfKeyData

**Table 5.14.5.3.3-1: Definition of type AkmaAfKeyData**

| Attribute name | Data type | P | Cardinality | Description                                          | Applicability (NOTE) |
|----------------|-----------|---|-------------|------------------------------------------------------|----------------------|
| kaf            | string    | M | 1           | K <sub>AF</sub>                                      |                      |
| expiry         | DateTime  | M | 1           | Expiration time of K <sub>AF</sub> .                 |                      |
| gpsi           | Gpsi      | O | 0..1        | Indicates an external ID of the UE. (NOTE 2, NOTE 3) |                      |
| supi           | Supi      | C | 0..1        | Indicates the SUPI of the UE. (NOTE 2)               |                      |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |   |      |                                                                                                                                                                              |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| supFeat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SupportedFeatures | O | 0..1 | Contains the list of supported feature(s) among the ones defined in clause 5.14.6.<br><br>This attribute shall be present only when feature negotiation needs to take place. |  |
| <p>NOTE 1: Properties marked with a feature as defined in clause 5.14.6 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property applies for all the features.</p> <p>NOTE 2: When the "AkmaAfKeyData" data structure is used in the current release of this specification, the "gpsi" attribute may be included and the "supi" attribute is not applicable.</p> <p>NOTE 3: When the "anonInd" attribute contained in AkmaAfKeyRequest data type is set to "true" in the incoming request, the "gpsi" attribute shall not be included.</p> |                   |   |      |                                                                                                                                                                              |  |

#### 5.14.5.3.4 Type: ServiceDisableNotif

**Table 5.14.5.3.4-1: Definition of type ServiceDisableNotif**

| Attribute name | Data type | P | Cardinality | Description                                          | Applicability |
|----------------|-----------|---|-------------|------------------------------------------------------|---------------|
| aKId           | AKId      | M | 1           | Contains the A-KID previously transmitted to the AF. |               |

### 5.14.5.4 Simple data types and enumerations

#### 5.14.5.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.14.5.4.2 Simple data types

The simple data types defined in table 5.14.5.4.2-1 shall be supported.

**Table 5.14.5.4.2-1: Simple data types**

| Type Name | Type Definition | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Applicability |
|-----------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| AfId      | string          | Identification of AF which is formatted as the following string:<br>"<FQDN>.<Ua* security protocol id>", wherein, <FQDN> is the FQDN of the AF and <Ua* security protocol id> is a string of 5 octet and the identification of the Ua* security protocol is specified as Ua security protocol identifier in Annex H of 3GPP TS 33.220 [39] that the AF will use with the UE.<br>Example:<br>1. FQDN: <a href="http://www.app1.com">www.app1.com</a> , Ua* security protocol id: 0100BC0001, then AfId: <a href="http://www.app1.com.0100BC0001">www.app1.com.0100BC0001</a>             |               |
| AKId      | string          | AKMA Key Identifier shall be in NAI format as specified in clause 2.2 of IETF RFC 7542 [40], which is formatted as the following string:<br>"<username>@<realm>", wherein, <username> shall include Routing Indicator and the A-TID in the format "rid<value>.atid<value>", where "rid" and "atid" are labels indicating Routing Indicator and A-TID and <realm> shall include Home Network Id.<br>Example:<br>1. If Routing Indicator: 012, A-TID: 019345346 and Home Network Id: 5gc.mnc012.mcc345.3gppnetwork.org, then AKId: rid012.akid019345346@5gc.mnc012.mcc345.3gppnetwork.org |               |

|  |  |                                                                                                                        |  |
|--|--|------------------------------------------------------------------------------------------------------------------------|--|
|  |  | Routing Indicator, Home Network Id are specified in 3GPP TS 23.003 [55].<br>A-TID is specified in 3GPP TS 33.535 [38]. |  |
|--|--|------------------------------------------------------------------------------------------------------------------------|--|

## 5.14.6 Used Features

The table below defines the features applicable to the AKMA API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.14.6-1: Features used by AKMA API**

| Feature number | Feature Name       | Description                                                                                                                   |
|----------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1              | RoamingRestriction | This feature indicates the support of roaming UE detection by the network and the denial of the AKMA services to roaming UEs. |

## 5.14.7 Error handling

### 5.14.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.14.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the AKMA API.

### 5.14.7.3 Application Errors

The application errors defined for the AKMA API are listed in table 5.14.7.3-1.

**Table 5.14.7.3-1: Application errors**

| Application Error           | HTTP status code | Description                                                                                                                                          | Applicability      |
|-----------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| K_AKMA_NOT_PRESENT          | 403 Forbidden    | Indicates that the K <sub>AKMA</sub> identified by the A-KID provided in the AKMA Application Key retrieval request body is not present at the AAnF. |                    |
| ROAMING_AKMA_SERVICE_DENIED | 403 Forbidden    | Indicates that the Network identifies the request is for a Roaming UE and denies the AKMA service.                                                   | RoamingRestriction |

## 5.15 TimeSyncExposure API

### 5.15.0 Introduction

The Nnef\_TimeSyncExposure service shall use the TimeSyncExposure API.

The API URI of TimeSyncExposure API shall be:

**{apiRoot}/3gpp-time-sync/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].

- "apiName" shall be set to "3gpp-time-sync".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

## 5.15.1 Resources

### 5.15.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.15.1.1-1 and the resources and HTTP methods used for the TimeSyncExposure API.

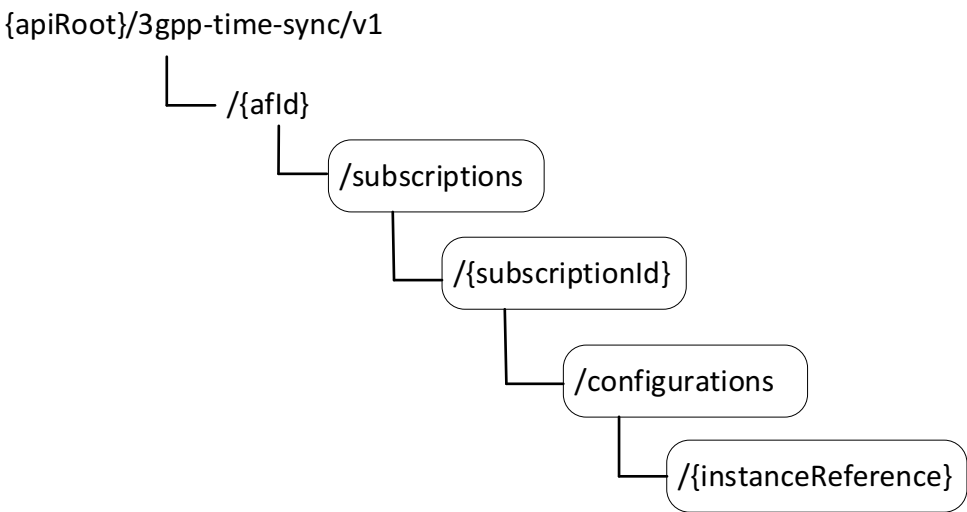


**Figure 5.15.1.1-1: Resource URI structure of the TimeSyncExposure API**

Table 5.15.1.1-1 provides an overview of the resources and HTTP methods applicable for the TimeSyncExposure API.

**Table 5.15.1.1-1: Resources and methods overview**

| Resource name                                          | Resource URI                                                              | HTTP method | Description                                                                                 |
|--------------------------------------------------------|---------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------|
| Time Synchronization Exposure Subscriptions            | /{afId}/subscriptions                                                     | GET         | Read all subscriptions for a given AF.                                                      |
|                                                        |                                                                           | POST        | Create a new subscription to time synchronization exposure.                                 |
| Individual Time Synchronization Exposure Subscription  | /{afId}/subscriptions/{subscriptionId}                                    | GET         | Read a subscription to time synchronization exposure.                                       |
|                                                        |                                                                           | PUT         | Modify all of the properties of an existing subscription to time synchronization exposure.  |
|                                                        |                                                                           | DELETE      | Delete a subscription to time synchronization exposure.                                     |
| Time Synchronization Exposure Configurations           | /{afId}/subscriptions/{subscriptionId}/configurations                     | GET         | Read all configurations for a given AF and subscription.                                    |
|                                                        |                                                                           | POST        | Create a new configuration to time synchronization exposure                                 |
| Individual Time Synchronization Exposure Configuration | /{afId}/subscriptions/{subscriptionId}/configurations/{instanceReference} | GET         | Read a configuration to time synchronization exposure.                                      |
|                                                        |                                                                           | PUT         | Modify all of the properties of an existing configuration to time synchronization exposure. |

|  |  |        |                                                                    |
|--|--|--------|--------------------------------------------------------------------|
|  |  | DELETE | Delete a configuration to time synchronization exposure.           |
|  |  | DELETE | DELETE a new configuration of 5G access stratum time distribution. |

### 5.15.1.2 Resource: Time Synchronization Exposure Subscriptions

#### 5.15.1.2.1 Introduction

This resource allows an AF to read all active time synchronization exposure subscriptions for the given AF, or allows an AF to create a new Individual Time Synchronization Exposure Subscription in the NEF.

#### 5.15.1.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-time-sync/v1/{afId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.15.1.2.2-1.

**Table 5.15.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

#### 5.15.1.2.3 Resource Methods

##### 5.15.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.15.1.2.2.

##### 5.15.1.2.3.2 GET

The GET method allows to read all active subscriptions for a given AF. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.15.1.2.3.2-1.

**Table 5.15.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name      | Data type         | P | Cardinality | Description                              |
|-----------|-------------------|---|-------------|------------------------------------------|
| supp-feat | SupportedFeatures | O | 0..1        | Contains the list of supported features. |

This method shall support the request data structures specified in table 5.15.1.2.3.2-2 and the response data structures and response codes specified in table 5.15.1.2.3.2-3.

**Table 5.15.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.15.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                    | P | Cardinality | Response codes | Description                                                              |
|------------------------------|---|-------------|----------------|--------------------------------------------------------------------------|
| array(TimeSyncExposureSubsc) | M | 0..N        | 200 OK         | The subscription information for the AF in the request URI are returned. |

|                                                                                                                          |  |  |                              |                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                      |  |  | 307<br>Temporary<br>Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |  |  | 308<br>Permanent<br>Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                              |                                                                                                                                                                                                                                                |

**Table 5.15.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.15.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**5.15.1.2.3.3 POST**

The POST method creates a new subscription resource to time synchronization exposure subscription for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.15.1.2.3.3-1 and the response data structures and response codes specified in table 5.15.1.2.3.3-2.

**Table 5.15.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type             | P | Cardinality | Description                                                                                                        |
|-----------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------|
| TimeSyncExposureSubsc | M | 1           | Contains the information for the creation of a new Individual Time Synchronization Exposure Subscription resource. |

**Table 5.15.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type             | P | Cardinality | Response codes | Description                                                                                                                        |
|-----------------------|---|-------------|----------------|------------------------------------------------------------------------------------------------------------------------------------|
| TimeSyncExposureSubsc | M | 1           | 201 Created    | The subscription was created successfully.<br><br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| ProblemDetails        | O | 0..1        | 403 Forbidden  | (NOTE 2)                                                                                                                           |

NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

NOTE 2: Failure causes are described in clause 5.15.6.

**Table 5.15.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                                                                                                  |
|----------|--------|---|---|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-time-sync/v1/{afId}/subscriptions/{subscriptionId} |
|----------|--------|---|---|--------------------------------------------------------------------------------------------------------------------------------------------------|

### 5.15.1.3 Resource: Individual Time Synchronization Exposure Subscription

#### 5.15.1.3.1 Introduction

This resource allows an AF to read, update or delete an existing Individual Time Synchronization Exposure Subscription.

#### 5.15.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-time-sync/v1/{afId}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.15.1.3.2-1.

**Table 5.15.1.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                               |
|----------------|-----------|------------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].      |
| afId           | string    | Identifier of the AF.                    |
| subscriptionId | string    | Identifier of the subscription resource. |

#### 5.15.1.3.3 Resource Methods

##### 5.15.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.15.1.3.2.

##### 5.15.1.3.3.2 GET

The GET method allows to read the active subscription for a given AF and subscription Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.15.1.3.3.2-1.

**Table 5.15.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name      | Data type         | P | Cardinality | Description                              |
|-----------|-------------------|---|-------------|------------------------------------------|
| supp-feat | SupportedFeatures | O | 0..1        | Contains the list of supported features. |

This method shall support the request data structures specified in table 5.15.1.3.3.2-2 and the response data structures and response codes specified in table 5.15.1.3.3.2-3.

**Table 5.15.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.15.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type             | P | Cardinality | Response codes | Description                                                              |
|-----------------------|---|-------------|----------------|--------------------------------------------------------------------------|
| TimeSyncExposureSubsc | M | 1           | 200 OK         | The subscription information for the AF in the request URI are returned. |

|                                                                                                                          |  |  |                        |                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                      |  |  | 307 Temporary Redirect | <p>Temporary redirection.</p> <p>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| N/A                                                                                                                      |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                                       |

**Table 5.15.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.15.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.15.1.3.3.3 PUT

The PUT method modifies an existing subscription resource to update a subscription. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.15.1.3.3.3-1 and the response data structures and response codes specified in table 5.15.1.3.3.3-2.

**Table 5.15.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type             | P | Cardinality | Description                                                    |
|-----------------------|---|-------------|----------------------------------------------------------------|
| TimeSyncExposureSubsc | M | 1           | Modify an existing Time Synchronization Exposure Subscription. |

**Table 5.15.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type             | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-----------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TimeSyncExposureSubsc | M | 1           | 200 OK                 | The subscription was updated successfully.                                                                                                                                                                                                            |
| N/A                   |   |             | 204 No Content         | The subscription was updated successfully.                                                                                                                                                                                                            |
| N/A                   |   |             | 307 Temporary Redirect | <p>Temporary redirection.</p> <p>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |

|                                                                                                                            |   |      |                              |                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------|---|------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                        |   |      | 308<br>Permanent<br>Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                             | O | 0..1 | 403<br>Forbidden             | (NOTE 2)                                                                                                                                                                                                                                       |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |      |                              |                                                                                                                                                                                                                                                |
| NOTE 2: Failure causes are described in clause 5.15.6.                                                                     |   |      |                              |                                                                                                                                                                                                                                                |

**Table 5.15.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.15.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.15.1.3.3.4 DELETE

The DELETE method deletes the time synchronization exposure subscription for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.15.1.3.3.4-1.

**Table 5.15.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.15.1.3.3.4-2 and the response data structures and response codes specified in table 5.15.1.3.3.4-3.

**Table 5.15.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.15.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                    |
|-----------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A       |   |             | 204 No Content         | The subscription was terminated successfully.                                                                                                                                                                                                  |
| N/A       |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |



|                                                                                                                             |  |  |                        |                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                                       |

**Table 5.15.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.15.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

## 5.15.1.4 Resource: Time Synchronization Exposure Configurations

### 5.15.1.4.1 Introduction

This resource allows an AF to read all active time synchronization exposure configuration for the given AF and subscription, or allows an AF to create a new time synchronization configuration and activate the time synchronization service with the configuration.

### 5.15.1.4.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-time-sync/v1/{afId}/subscriptions/{subscriptionId}/configurations**

This resource shall support the resource URI variables defined in table 5.15.1.4.2-1.

**Table 5.15.1.4.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                               |
|----------------|-----------|------------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].      |
| afId           | string    | Identifier of the AF.                    |
| subscriptionId | string    | Identifier of the subscription resource. |

### 5.15.1.4.3 Resource Methods

#### 5.15.1.4.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.15.1.4.3.

#### 5.15.1.4.3.2 GET

The GET method allows to read all active configurations for a given AF and subscription. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.15.1.4.3.2-1.

**Table 5.15.1.4.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.15.1.4.3.2-2 and the response data structures and response codes specified in table 5.15.1.4.3.2-3.

**Table 5.15.1.4.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.15.1.4.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(TimeSyncExposureConfig)                                                                                            | M | 0..N        | 200 OK                 | The configuration information for the AF in the request URI are returned.                                                                                                                                                                      |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                |

**Table 5.15.1.4.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.15.1.4.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

### 5.15.1.4.3.3 POST

The POST method creates a new configuration resource to activate time synchronization service for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.15.1.4.3.3-1 and the response data structures and response codes specified in table 5.15.1.4.3.3-2.

**Table 5.15.1.4.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
|-----------|---|-------------|-------------|

|                        |   |   |                                                                                    |
|------------------------|---|---|------------------------------------------------------------------------------------|
| TimeSyncExposureConfig | M | 1 | Parameters to create a configuration and to activate time synchronization service. |
|------------------------|---|---|------------------------------------------------------------------------------------|

**Table 5.15.1.4.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TimeSyncExposureConfig                                                                                                      | M | 1           | 201 Created            | The subscription was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header.                                                                                                                |
| n/a                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection.<br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection.<br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                              | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                                      |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                               |
| NOTE 2: Failure causes are described in clause 5.15.6.                                                                      |   |             |                        |                                                                                                                                                                                                                                               |

**Table 5.15.1.4.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                                                         |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-time-sync/v1/{afId}/subscriptions/{subscriptionId}/configurations/{instanceReference} |

**Table 5.15.1.4.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.15.1.4.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

## 5.15.1.5 Resource: Individual Time Synchronization Exposure Configuration

### 5.15.1.5.1 Introduction

This resource allows an AF to read/modify/cancel a configuration to active/modify/deactivate Time Synchronization service with the NEF.

### 5.15.1.5.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-time-sync/v1/{afId}/subscriptions/{subscriptionId}/configuration/{instanceReference}**

This resource shall support the resource URI variables defined in table 5.15.1.5.2-1.

**Table 5.15.1.5.2-1: Resource URI variables for this resource**

| Name              | Data type | Definition                               |
|-------------------|-----------|------------------------------------------|
| apiRoot           | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].      |
| afId              | string    | Identifier of the AF.                    |
| subscriptionId    | string    | Identifier of the subscription resource. |
| instanceReference | string    | Identifier of the PTP instance resource  |

### 5.15.1.5.3 Resource Methods

#### 5.15.1.5.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.15.1.5.2.

#### 5.15.1.5.3.2 GET

The GET method allows to read the active configuration for a given AF, subscription Id and configuration Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.15.1.5.3.2-1.

**Table 5.15.1.5.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.15.1.5.3.2-2 and the response data structures and response codes specified in table 5.15.1.5.3.2-3.

**Table 5.15.1.5.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.15.1.5.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type              | P | Cardinality | Response codes         | Description                                                                                                                                                   |
|------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TimeSyncExposureConfig | M | 1           | 200 OK                 | The configuration information for the AF in the request URI are returned.                                                                                     |
| N/A                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. |

|                                                                                                                          |  |  |                        |                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                          |  |  |                        | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                                                                                      |
| N/A                                                                                                                      |  |  | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                                |

**Table 5.15.1.5.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.15.1.5.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

### 5.15.1.5.3.3 PUT

The PUT method modifies an existing configuration resource to update a configuration. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.15.1.5.3.3-1 and the response data structures and response codes specified in table 5.15.1.5.3.3-2.

**Table 5.15.1.5.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type              | P | Cardinality | Description                                                     |
|------------------------|---|-------------|-----------------------------------------------------------------|
| TimeSyncExposureConfig | M | 1           | Modify an existing Time Synchronization Exposure Configuration. |

**Table 5.15.1.5.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                    |
|------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TimeSyncExposureConfig | M | 1           | 200 OK                 | The time synchronization configuration was updated successfully.                                                                                                                                                                               |
| N/A                    |   |             | 204 No Content         | The time synchronization configuration was updated successfully.                                                                                                                                                                               |
| N/A                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.                                                                                  |

|                                                                                                                            |   |      |               |                                                                           |
|----------------------------------------------------------------------------------------------------------------------------|---|------|---------------|---------------------------------------------------------------------------|
|                                                                                                                            |   |      |               | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                             | O | 0..1 | 403 Forbidden | (NOTE 2)                                                                  |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |      |               |                                                                           |
| NOTE 2: Failure causes are described in clause 5.15.6.                                                                     |   |      |               |                                                                           |

**Table 5.15.1.5.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.15.1.5.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**5.15.1.5.3.4 DELETE**

The DELETE method deletes the time synchronization exposure subscription for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.15.1.5.3.4-1.

**Table 5.15.1.5.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.15.1.5.3.4-2 and the response data structures and response codes specified in table 5.15.1.5.3.4-3.

**Table 5.15.1.5.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.15.1.5.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                            |
|-----------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A       |   |             | 204 No Content         | The configuration was terminated successfully.                                                                                                                                                                                         |
| N/A       |   |             | 307 Temporary Redirect | Temporary redirection.<br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A       |   |             | 308 Permanent Redirect | Permanent redirection.<br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.                                                                              |

|                                                                                                                             |  |  |  |                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------|
|                                                                                                                             |  |  |  | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |  |                                                                           |

**Table 5.15.1.5.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.15.1.5.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

## 5.15.2 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.15.3 Notifications

### 5.15.3.1 Introduction

**Table 5.15.3.1-1: Notifications overview**

| Notification                                    | Callback URI     | HTTP method or custom operation | Description (service operation)                                   |
|-------------------------------------------------|------------------|---------------------------------|-------------------------------------------------------------------|
| Time Synchronization Capability Notification    | {subsNotifUri}   | POST                            | Time Synchronization Capability Notification for a list of UEs.   |
| Time Synchronization Configuration Notification | {configNotifUri} | POST                            | Current State of Time Synchronization configuration Notification. |

### 5.15.3.2 Time Synchronization Capability Notification

#### 5.15.3.2.1 Description

The Notification is used by the NEF to report the Time Synchronization Capability to the AF.

#### 5.15.3.2.2 Callback URI

The Callback URI "{subsNotifUri}" shall be used with the callback URI variables defined in table 5.15.3.2.2-1.

**Table 5.15.3.2.2-1: Callback URI variables**

| Name         | Definition                                                                                                               |
|--------------|--------------------------------------------------------------------------------------------------------------------------|
| subsNotifUri | Callback reference provided by the AF during creation/modification of the subscription as defined in Table 5.15.4.3.2-1. |

### 5.15.3.2.3 Operation Definition

#### 5.15.3.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.15.3.2.3.1-1 and the response data structures and response codes specified in table 5.15.3.2.3.1-2 and the Location Headers specified in table 5.15.3.2.3.1-3 and table 5.15.3.2.3.1-4.

**Table 5.15.3.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type                 | P | Cardinality | Description                                                                           |
|---------------------------|---|-------------|---------------------------------------------------------------------------------------|
| TimeSyncExposureSubsNotif | M | 1           | Provides the time synchronization capabilities of a list of UEs by the NEF to the AF. |

**Table 5.15.3.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                       |   |             | 204 No Content         | The event notification is received successfully.                                                                                                                                                                                                                                       |
| N/A                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                        |

**Table 5.15.3.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.15.3.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

#### 5.15.3.2.3.2 Notification via Websocket

If supported by both AF and NEF and successfully negotiated, the Time Synchronization Capability Notification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4 of 3GPP TS 29.122 [4].



### 5.15.3.3 Time Synchronization Configuration Notification

#### 5.15.3.3.1 Description

The Notification is used by the NEF to report the state of Time Synchronization service configuration to the AF.

#### 5.15.3.3.2 Callback URI

The Callback URI "{configNotifUri}" shall be used with the callback URI variables defined in table 5.15.3.3.2-1.

**Table 5.15.3.3.2-1: Callback URI variables**

| Name           | Definition                                                                                                                |
|----------------|---------------------------------------------------------------------------------------------------------------------------|
| configNotifUri | Callback reference provided by the AF during creation/modification of the configuration as defined in Table 5.15.4.3.6-1. |

#### 5.15.3.3.3 Operation Definition

##### 5.15.3.3.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.15.3.3.3.1-1 and the response data structures and response codes specified in table 5.15.3.3.3.1-2 and the Location Headers specified in table 5.15.3.3.3.1-3 and table 5.15.3.3.3.1-4.

**Table 5.15.3.3.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type                   | P | Cardinality | Description                                                                                    |
|-----------------------------|---|-------------|------------------------------------------------------------------------------------------------|
| TimeSyncExposureConfigNotif | M | 1           | Provides the current state of time synchronization service configuration by the NEF to the AF. |

**Table 5.15.3.3.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                       |   |             | 204 No Content         | The notification is received successfully.                                                                                                                                                                                                                                                          |
| N/A                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                     |

**Table 5.15.3.3.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.15.2.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

5.15.3.3.3.2                Void

## 5.15.4 Data Model

### 5.15.4.1 General

This clause specifies the application data model supported by the TimeSyncExposure API.

Table 5.15.4.1-1 specifies the data types defined for the TimeSyncExposure API.

**Table 5.15.4.1-1: TimeSyncExposure API specific Data Types**

| Data type                          | Clause defined | Description                                                                                                                    | Applicability     |
|------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------|
| AsTimeResource                     | 5.15.4.4.8     | Identifies the supported 5G clock quality.                                                                                     |                   |
| AcceptanceCriteriaResultIndication | 5.15.4.4.9     | Contains the acceptable/not acceptable indication of the clock quality acceptance criteria result information.                 | NetTimeSyncStatus |
| AvailReport                        | 5.15.4.3.22    | Contains the availability status for a UE/DS-TT.                                                                               | SupportReport     |
| AvailStatus                        | 5.15.4.4.10    | Defines the availability status.                                                                                               | SupportReport     |
| ConfigForPort                      | 5.15.4.3.18    | Contains configuration information for each port.                                                                              |                   |
| EventFilter                        | 5.15.4.3.10    | Contains the filter conditions to match for notifying the event(s) of time synchronization capabilities.                       |                   |
| GmCapable                          | 5.15.4.4.5     | Indicates separately whether 5GS supports acting as a gPTP or PTP grandmaster.                                                 |                   |
| InstanceType                       | 5.15.4.4.7     | Identifies supported PTP instance type.                                                                                        |                   |
| Protocol                           | 5.15.4.4.4     | Identifies the supported protocol.                                                                                             |                   |
| PtpCapabilitiesPerUe               | 5.15.4.3.11    | Contains the supported PTP capabilities per UE.                                                                                |                   |
| PtpInstance                        | 5.15.4.3.12    | Contains PTP instance configuration and activation information requested by the AF.                                            |                   |
| ReportedCapability                 | 5.15.4.5.1     | Extends the EventFilter data type with the AvailReport data type to allow to indicate the availability status of the UE/DS-TT. | SupportReport     |
| StateOfConfiguration               | 5.15.4.3.17    | Contains the PTP port state of the time synchronization configuration.                                                         |                   |
| StateOfDsth                        | 5.15.4.3.19    | Contains the PTP port state of a DS-TT                                                                                         |                   |
| SubscribedEvent                    | 5.15.4.4.6     | Identifies the subscribed event.                                                                                               |                   |
| SubsEventNotification              | 5.15.4.3.8     | Represents the notification about a subscribed Individual Event.                                                               |                   |
| TimeSyncCapability                 | 5.15.4.3.3     | Contains the time synchronization capability.                                                                                  |                   |
| TimeSyncExposureConfig             | 5.15.4.3.6     | Contains the Time Synchronization Configuration parameters.                                                                    |                   |
| TimeSyncExposureConfigNotif        | 5.15.4.3.9     | Contains the notification of time synchronization service state.                                                               |                   |
| TimeSyncExposureSubsc              | 5.15.4.3.2     | Contains the requested parameters for the subscription to time synchronization capability notifications.                       |                   |
| TimeSyncExposureSubsNotif          | 5.15.4.3.7     | Contains the notification of time synchronization capability.                                                                  |                   |

### 5.15.4.2 Reused data types

The data types reused by the TimeSyncExposure API from other specifications are listed in table 5.15.4.2-1.

**Table 5.15.4.2-1: Re-used Data Types**

| Data type                       | Reference           | Comments                                                                                       | Applicability          |
|---------------------------------|---------------------|------------------------------------------------------------------------------------------------|------------------------|
| ClockQualityAcceptanceCriterion | 3GPP TS 29.571 [8]  | Identifies clock quality acceptance criteria information.                                      | NetTimeSyncStatus      |
| ClockQualityDetailLevel         | 3GPP TS 29.571 [8]  | Identifies clock quality detail level information.                                             | NetTimeSyncStatus      |
| DateTime                        | 3GPP TS 29.122 [4]  | Represents a data and a time.                                                                  |                        |
| Dnn                             | 3GPP TS 29.571 [8]  | Identifies a DNN.                                                                              |                        |
| DurationSec                     | 3GPP TS 29.122 [4]  | Indicates the time duration.                                                                   |                        |
| ExternalGroupId                 | 3GPP TS 29.122 [4]  | External Group Identifier for a user group.                                                    |                        |
| Gpsi                            | 3GPP TS 29.571 [8]  | Identifies a GPSI.                                                                             |                        |
| NotificationMethod              | 3GPP TS 29.508 [26] | Represents the notification method.                                                            |                        |
| ProblemDetails                  | 3GPP TS 29.122 [4]  | Represents error related information.                                                          |                        |
| Snsai                           | 3GPP TS 29.571 [8]  | Identifies the S-NSSAI.                                                                        |                        |
| SpatialValidityCond             | 3GPP TS 29.571 [8]  | Represents the Spatial Validity Condition.                                                     | CoverageArea           |
| SupportedFeatures               | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features defined in table 5.15.5-1.        |                        |
| TemporalValidity                | 3GPP TS 29.514 [7]  | Indicates the time interval(s) during which the AF request is to be applied.                   |                        |
| UInteger                        | 3GPP TS 29.571 [8]  | Unsigned integer.                                                                              |                        |
| Uri                             | 3GPP TS 29.122 [4]  | Identifies a referenced resource.                                                              |                        |
| WebsocketNotifConfig            | 3GPP TS 29.122 [4]  | Contains the configuration parameters to set up notification delivery over Websocket protocol. | Notification_websocket |

### 5.15.4.3 Structured data types

#### 5.15.4.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.15.4.3.2 Type: TimeSyncExposureSubsc

**Table 5.15.4.3.2-1: Definition of type TimeSyncExposureSubsc**

| Attribute name | Data type       | P | Cardinality | Description                                                                                                                                                                                                                                                                                    | Applicability |
|----------------|-----------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| exterGroupId   | ExternalGroupId | C | 0..1        | Identifies a group of UE(s) for which the time synchronization capabilities is requested.<br>(NOTE 1)                                                                                                                                                                                          |               |
| gpsis          | array(Gpsi)     | C | 1..N        | Contains a list of UE for which the time synchronization capabilities is requested.<br>(NOTE 1)                                                                                                                                                                                                |               |
| anyUeInd       | boolean         | C | 0..1        | Identifies whether the AF request applies to any UE (i.e. all UEs).<br><br><ul style="list-style-type: none"> <li>- "true": the AF request is applicable to any UE.</li> <li>- "false": the AF request is not applicable to any UE.</li> <li>- Default value is "false" if omitted.</li> </ul> |               |

|                         |                        |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |
|-------------------------|------------------------|---|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
|                         |                        |   |      | (NOTE 1) (NOTE 2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |
| notifMethod             | NotificationMethod     | O | 0..1 | If "notifMethod" is not supplied, the default value "ON_EVENT_DETECTION" applies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |
| dnn                     | Dnn                    | O | 0..1 | Identifies a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. (NOTE 2) (NOTE 3)                                                                                                                                                                                                                                                                                                                                                                                                               |                         |
| snssai                  | Snssai                 | O | 0..1 | Identifies an S-NSSAI. (NOTE 2) (NOTE 3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |
| afServiceId             | string                 | O | 0..1 | Identifies a service on behalf of which the AF is issuing the request. (NOTE 3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |
| subscribedEvents        | array(SubscribedEvent) | O | 1..N | Identifies the requirement to be notified of the event(s).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |
| eventFilters            | array(EventFilter)     | O | 1..N | Contains the filter conditions to match for notifying the event(s) of time synchronization capabilities for a list of UE(s).                                                                                                                                                                                                                                                                                                                                                                                                                                      |                         |
| subsNotifUri            | Uri                    | M | 1    | Notification URI for time sensitive capability reporting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |
| subsNotifId             | string                 | M | 1    | Notification Correlation ID assigned by the AF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |
| maxReportNbr            | UInteger               | O | 0..1 | If omitted, there is no limit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |
| expiry                  | DateTime               | C | 0..1 | This attribute indicates the expiry time of the subscription, after which the NEF shall not send any event notifications and the subscription becomes invalid. It may be included in an event subscription request and may be included in an event subscription response based on operator policies. If an expiry time was included in the request, then the expiry time returned in the response should be less than or equal to that value. If the expiry time is not included in the response, the AF shall not associate an expiry time for the subscription. |                         |
| repPeriod               | DurationSec            | C | 0..1 | Is supplied for notification Method "periodic".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |
| requestTestNotification | boolean                | O | 0..1 | Indicates whether the AF requests the NEF to send a test notification.<br><br>- Set to "true" by the AF to request the NEF to send a test notification as defined in clause 5.2.5.3 of 3GPP TS 29.122 [4].<br>- Set to "false" by the AF not to request the NEF to send a test notification.<br>- Default value is "false" if omitted.                                                                                                                                                                                                                            | Notification_test_event |
| websocketNotifConfig    | WebsocketNotifConfig   | O | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Notification_websocket  |

|                                                                                                                   |                   |   |      |                                                                                                                                                                              |  |
|-------------------------------------------------------------------------------------------------------------------|-------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| supFeat                                                                                                           | SupportedFeatures | C | 0..1 | Contains the list of supported feature(s) among the ones defined in clause 5.15.5.<br><br>This attribute shall be present only when feature negotiation needs to take place. |  |
| NOTE 1: Only one of the properties "gpsis", "anyUeInd" or "extergroupId" shall be included.                       |                   |   |      |                                                                                                                                                                              |  |
| NOTE 2: The properties of "anyUeInd" may be included only when the properties of "dnn" and "snssai" are included. |                   |   |      |                                                                                                                                                                              |  |
| NOTE 3: Either the combination of "dnn" and "snssai" or the "afServiceId" may be included.                        |                   |   |      |                                                                                                                                                                              |  |

#### 5.15.4.3.3 Type: TimeSyncCapability

**Table 5.15.4.3.3-1: Definition of type TimeSyncCapability**

| Attribute name                                                                                                                                                                        | Data type                  | P | Cardinality | Description                                                                                                                                                                  | Applicability |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| upNodeId                                                                                                                                                                              | Uint64                     | M | 1           | Identifies the applicable NW-TT. Contains a TSC user plane node Id. If integrated with TSN, the user plane node Id is a bridge Id defined in IEEE 802.1Q [51] clause 14.2.5. |               |
| gmCapables                                                                                                                                                                            | array(GmCapable)           | C | 1..N        | Indicates whether user plane node supports acting as a gPTP and/or PTP grandmaster.<br><br>(NOTE 1)                                                                          |               |
| asTimeRes                                                                                                                                                                             | AsTimeResource             | C | 0..1        | Indicates the supported 5G clock quality (i.e. the source of time used by the 5GS).<br><br>(NOTE 1)                                                                          |               |
| ptpCapForUes                                                                                                                                                                          | map(PtpCapabilitiesPer Ue) | C | 1..N        | Contains the PTP capabilities supported by the list of UE(s). The key of the map is the gpsi. Shall be present if the "gmCapables" attribute is included.<br><br>(NOTE 2)    |               |
| NOTE 1: At least one of the "gmCapables" attribute and "asTimeRes" attribute shall be included.                                                                                       |                            |   |             |                                                                                                                                                                              |               |
| NOTE 2: The "ptpCapForUes" attribute shall contain the PTP capabilities for previously target UE(s) for which the PTP capabilities changed and/or the PTP capabilities for new UE(s). |                            |   |             |                                                                                                                                                                              |               |

#### 5.15.4.3.4 Void

#### 5.15.4.3.5 Void

#### 5.15.4.3.6 Type: TimeSyncExposureConfig

**Table 5.15.4.3.6-1: Definition of type TimeSyncExposureConfig**

| Attribute name | Data type | P | Cardinality | Description                                                                                                                                                                  | Applicability |
|----------------|-----------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| upNodeId       | Uint64    | M | 1           | Identifies the applicable NW-TT. Contains a TSC user plane node Id. If integrated with TSN, the user plane node Id is a bridge Id defined in IEEE 802.1Q [41] clause 14.2.5. |               |

|                |                                 |   |      |                                                                                                                                                                                                                                                                                                                               |                   |
|----------------|---------------------------------|---|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| reqPtpls       | PtpInstance                     | M | 1    | Identifies the PtP instance configuration and activation requested by the AF.                                                                                                                                                                                                                                                 |                   |
| gmEnable       | boolean                         | C | 0..1 | Indicates whether the AF requests 5GS to act as a grandmaster for PTP or gPTP.<br><br>- "true" indicates that the AF requests the 5GS to act as a grandmaster for PTP or gPTP.<br>- "false" indicates that the AF does not request the 5GS to act as a grandmaster for PTP or gPTP.<br>- Default value is "false" if omitted. |                   |
| gmPrio         | UInteger                        | C | 0..1 | Indicates a priority used as defaultDS.priority1 when generating Announce message when 5GS acts as (g)PTP GM. It may be present if the "gmEnable" is set to true.                                                                                                                                                             |                   |
| timeDom        | UInteger                        | M | 1    | Indicate the (g)PTP domain that the (TSN)AF is located in.                                                                                                                                                                                                                                                                    |                   |
| timeSyncErrBdg | UInteger                        | O | 0..1 | Indicates the time synchronization error budget for the time synchronization service in units of nanoseconds. Minimum = 1.                                                                                                                                                                                                    |                   |
| tempValidity   | TemporalValidity                | O | 0..1 | Indicates the time period when the time synchronization service for a PTP instance is active.                                                                                                                                                                                                                                 |                   |
| configNotifUri | Uri                             | M | 1    | Notification URI for configuration state reporting.                                                                                                                                                                                                                                                                           |                   |
| configNotifId  | string                          | M | 1    | Notification Correlation ID assigned by the AF.                                                                                                                                                                                                                                                                               |                   |
| coverageArea   | SpatialValidityCond             | O | 0..1 | Time Synchronization Coverage Area. (NOTE)                                                                                                                                                                                                                                                                                    | CoverageArea      |
| clkQltDetLvl   | ClockQualityDetailLevel         | O | 0..1 | Indicates the clock quality detail level.<br>For (g)PTP services, its value, if provided, shall be set to "ACCEPT_INDICATION".                                                                                                                                                                                                | NetTimeSyncStatus |
| clkQltAcptCri  | ClockQualityAcceptanceCriterion | C | 0..1 | Indicates the clock quality acceptance criteria, and it is used to determine whether the time synchronization status for the (g)PTP service is acceptable / not acceptable.<br><br>This attribute shall be present when the "clkQltDetLvl" attribute is present.                                                              | NetTimeSyncStatus |

NOTE: The "trackingAreaList" attribute within the "coverageArea" attribute is not applicable for the untrusted AF.

#### 5.15.4.3.7 Type: TimeSyncExposureSubsNotif

**Table 5.15.4.3.7-1: Definition of type TimeSyncExposureSubsNotif**

| Attribute name | Data type | P | Cardinality | Description                                     | Applicability |
|----------------|-----------|---|-------------|-------------------------------------------------|---------------|
| subsNotifId    | string    | M | 1           | Notification Correlation ID assigned by the AF. |               |

|             |                              |   |      |                                                   |  |
|-------------|------------------------------|---|------|---------------------------------------------------|--|
| eventNotifs | array(SubsEventNotification) | M | 1..N | Notifications about subscribed Individual Events. |  |
|-------------|------------------------------|---|------|---------------------------------------------------|--|

#### 5.15.4.3.8 Type SubsEventNotification

**Table 5.15.4.3.8-1: Definition of type SubsEventNotification**

| Attribute name | Data type                 | P | Cardinality | Description                                                                                                                                                                                                                                 | Applicability |
|----------------|---------------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| event          | SubscribedEvent           | M | 1           | Subscribed events.                                                                                                                                                                                                                          |               |
| timeSyncCapas  | array(TimeSyncCapability) | C | 1..N        | Contains a list of time synchronization capabilities for the 5GS (list of User Plane Node Id) and the UE(s) (per User Plane Node Id).<br><br>This attribute shall be present if the reported event is "AVAILABILITY_FOR_TIME_SYNC_SERVICE". |               |

#### 5.15.4.3.9 Type: TimeSyncExposureConfigNotif

**Table 5.15.4.3.9-1: Definition of type TimeSyncExposureConfigNotif**

| Attribute name | Data type            | P | Cardinality | Description                                                               | Applicability |
|----------------|----------------------|---|-------------|---------------------------------------------------------------------------|---------------|
| configNotifId  | string               | M | 1           | Notification Correlation ID assigned by the AF.                           |               |
| stateOfConfig  | StateOfConfiguration | M | 1           | Indicates the current state of time synchronization service configuration |               |

#### 5.15.4.3.10 Type: EventFilter

**Table 5.15.4.3.10-1: Definition of type EventFilter**

| Attribute name | Data type           | P | Cardinality | Description                               | Applicability |
|----------------|---------------------|---|-------------|-------------------------------------------|---------------|
| instanceTypes  | array(InstanceType) | O | 1..N        | Indicates the PTP instance type(s).       |               |
| transProtocols | array(Protocol)     | O | 1..N        | Indicates the transport protocol type(s). |               |
| ptpProfiles    | array(string)       | O | 1..N        | Identifies the supported PTP profiles.    |               |

#### 5.15.4.3.11 Type: PtpCapabilitiesPerUe

**Table 5.15.4.3.11-1: Definition of type PtpCapabilitiesPerUe**

| Attribute name                                                                                                                                                                                                                                                                                              | Data type                 | P | Cardinality | Description                                                       | Applicability |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---|-------------|-------------------------------------------------------------------|---------------|
| gpsi                                                                                                                                                                                                                                                                                                        | Gpsi                      | M | 1           | Identifies the UE to which the reported PTP instance below apply. |               |
| ptpCaps                                                                                                                                                                                                                                                                                                     | array(ReportedCapability) | M | 1..N        | Contains the reported PTP capabilities for the UE.<br><br>(NOTE)  |               |
| NOTE: When the "SupportReport" feature is supported, it also indicates the PTP capabilities of the UE changed because of the termination of the PDU session. In this case, the "ptpCaps" attribute shall contain a ReportedCapability entry with the "avStatus" attribute set to "PDU_SESSION_TERMINATION". |                           |   |             |                                                                   |               |

## 5.15.4.3.12 Type: PtpInstance

**Table 5.15.4.3.12-1: Definition of type PtpInstance**

| Attribute name | Data type            | P | Cardinality | Description                                                          | Applicability |
|----------------|----------------------|---|-------------|----------------------------------------------------------------------|---------------|
| instanceType   | InstanceType         | M | 1           | Indicates the PTP instance type.                                     |               |
| protocol       | Protocol             | M | 1           | Indicates the protocol type.                                         |               |
| ptpProfile     | string               | M | 1           | Identifies the PTP profile.                                          |               |
| portConfigs    | array(ConfigForPort) | O | 1..N        | Contains the configurations for the PTP port(s) in the PTP instance. |               |

## 5.15.4.3.13 Void

## 5.15.4.3.14 Void

## 5.15.4.3.15 Void

## 5.15.4.3.16 Void

## 5.15.4.3.17 Type: StateOfConfiguration

**Table 5.15.4.3.17-1: Definition of type StateOfConfiguration**

| Attribute name                                                                                                              | Data type                          | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                         | Applicability     |
|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| stateOfNwtt                                                                                                                 | boolean                            | O | 0..1        | When the PTP port state is Leader, Follower or Passive, it is included and set to true to indicate the state of configuration for NW-TT port is active; when PTP port state is in any other case, it is included and set to false to indicate the state of configuration for NW-TT port is inactive. Default value is false. (NOTE) |                   |
| clkQltyIndOfNwtt                                                                                                            | AcceptanceCriteriaResultIndication | O | 0..1        | Indicates the clock quality acceptance criteria changes ("ACCEPTABLE", "NOT_ACCEPTABLE") for any of the PTP port(s) in NW-TT of the PTP instance.                                                                                                                                                                                   | NetTimeSyncStatus |
| stateOfDsts                                                                                                                 | array(StateOfDstt)                 | O | 1..N        | Contains the PTP port states of the DS-TT(s).                                                                                                                                                                                                                                                                                       |                   |
| NOTE: Leader and Follower terms in this specification are aligned with NOTE 2 in clause 5.27.1.2.2.1 of 3GPP TS 23.501 [3]. |                                    |   |             |                                                                                                                                                                                                                                                                                                                                     |                   |

## 5.15.4.3.18 Type: ConfigForPort

**Table 5.15.4.3.18-1: Definition of type ConfigForPort**

| Attribute name | Data type | P | Cardinality | Description                                                                                 | Applicability |
|----------------|-----------|---|-------------|---------------------------------------------------------------------------------------------|---------------|
| gpsi           | Gpsi      | C | 0..1        | Identifies the UE/DS-TT to which the provided configuration parameters apply.<br><br>(NOTE) |               |



|                 |         |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
|-----------------|---------|---|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| n6Ind           | boolean | C | 0..1 | <p>Indicates whether the provided configuration parameters apply to the N6 interface.</p> <ul style="list-style-type: none"> <li>- "true" indicates that the the provided configuration parameters apply to the N6 interface.</li> </ul> <p>The presence of this attribute with the value "false" shall be prohibited.</p> <p>(NOTE)</p>                                                                                                                                                                                            |  |
| ptpEnable       | boolean | O | 0..1 | <p>This attribute indicates how to set the portDS.portEnable.</p> <ul style="list-style-type: none"> <li>- "true" indicates to set the portDS.portEnable to TRUE.</li> <li>- "false" indicates to set the portDS.portEnable to FALSE.</li> <li>- The default value is "false" when omitted, and the default value as described in the PTP Profile is used.</li> </ul>                                                                                                                                                               |  |
| logSyncInter    | integer | O | 0..1 | <p>Specifies the mean time interval between successive Sync messages. This is applicable for IEEE Std 1588 [45] Boundary Clock or IEEE Std 802.1AS [46] operation.</p> <p>If omitted, the default value as described in the PTP Profile is used.</p>                                                                                                                                                                                                                                                                                |  |
| logSyncInterInd | boolean | O | 0..1 | <p>Indicates how the value of the "logSyncInter" attribute is to be used.</p> <ul style="list-style-type: none"> <li>- When set to "false", the value of "logSyncInter" attribute is used to set the initialLogSyncInterval as described in IEEE Std 802.1AS [46].</li> <li>- When set to "true", the value of "logSyncInter" attribute is used to set the mgtSettableLogSyncInterval as described in IEEE Std 802.1AS [46].</li> <li>- If omitted, the default value as described in the IEEE Std 802.1AS [46] is used.</li> </ul> |  |
| logAnnouInter   | integer | O | 0..1 | <p>Specifies the mean time interval between successive Announce messages. This is applicable for IEEE Std 1588 [45] Boundary Clock or IEEE Std 802.1AS [46] operation.</p> <p>If omitted, the default value as described in the PTP Profile is used.</p>                                                                                                                                                                                                                                                                            |  |

|                                                                               |         |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|-------------------------------------------------------------------------------|---------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| logAnnouInterInd                                                              | boolean | O | 0..1 | <p>Indicates how the value of the "logAnnouInter" attribute is to be used.</p> <ul style="list-style-type: none"> <li>- When set to "false", the value of "logAnnouInter" attribute is used to set the initialLogAnnounceInterval as described in IEEE Std 802.1AS [46].</li> <li>- When set to "true", the value of "logAnnouInter" attribute is used to set the mgtSettableLogAnnounceInterval as described in IEEE Std 802.1AS [46].</li> <li>- If omitted, the default value as described in the IEEE Std 802.1AS [46] is used.</li> </ul> |  |
| NOTE: Either the "gpsi" attribute or the "n6Ind" attribute shall be included. |         |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |

## 5.15.4.3.19 Type: StateOfDstt

Table 5.15.4.3.19-1: Definition of type StateOfDstt

| Attribute name                                                                                                         | Data type                          | P | Cardinality | Description                                                                                                                                                                                                                                                                                          | Applicability     |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| gpsi                                                                                                                   | Gpsi                               | M | 1           | Identifies the UE/DS-TT which the parameters below apply.                                                                                                                                                                                                                                            |                   |
| state                                                                                                                  | boolean                            | M | 1           | When the PTP port state is Leader, Follower or Passive, it is included and set to true to indicate the state of configuration for DS-TT port is active; when PTP port state is in any other case, it is included and set to false to indicate the state of configuration for DS-TT port is inactive. |                   |
| clkQltIndOfDstt                                                                                                        | AcceptanceCriteriaResultIndication | O | 0..1        | Indicates the clock quality acceptance criteria changes ("ACCEPTABLE", "NOT_ACCEPTABLE") for the indicated DS-TT port of the PTP instance.                                                                                                                                                           | NetTimeSyncStatus |
| NOTE: Leader and Follower terms in this specification are aligned with NOTE 2 in clause 5.27.1.2.2.1 of TS 23.501 [3]. |                                    |   |             |                                                                                                                                                                                                                                                                                                      |                   |

## 5.15.4.3.20 Void

## 5.15.4.3.21 Void

## 5.15.4.3.22 Type: AvailReport

Table 5.15.4.3.22-1: Definition of type AvailReport

| Attribute name | Data type   | P | Cardinality | Description                        | Applicability |
|----------------|-------------|---|-------------|------------------------------------|---------------|
| avStatus       | AvailStatus | O | 0..1        | Indicates the availability status. |               |

#### 5.15.4.4 Simple data types and enumerations

##### 5.15.4.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

##### 5.15.4.4.2 Simple data types

The simple data types defined in table 5.15.4.4.2-1 shall be supported.

**Table 5.15.4.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

##### 5.15.4.4.3 Void

##### 5.15.4.4.4 Enumeration: Protocol

**Table 5.15.4.4.4-1: Enumeration Protocol**

| Enumeration value | Description                                                               | Applicability |
|-------------------|---------------------------------------------------------------------------|---------------|
| ETH               | Indicates Ethernet as defined in IEEE Std 1588 [45] Annex E is supported. |               |
| IPV4              | Indicates IPv4 as defined in IEEE Std 1588 [45] Annex C is supported.     |               |
| IPV6              | Indicates IPv6 as defined in IEEE Std 1588 [45] Annex D is supported      |               |

##### 5.15.4.4.5 Enumeration: GmCapable

**Table 5.15.4.4.5-1: Enumeration GmCapable**

| Enumeration value | Description                    | Applicability |
|-------------------|--------------------------------|---------------|
| GPTP              | gPTP grandmaster is supported. |               |
| PTP               | PTP grandmaste is supported.   |               |

##### 5.15.4.4.6 Enumeration: SubscribedEvent

**Table 5.15.4.4.6-1: Enumeration SubscribedEvent**

| Enumeration value                  | Description                                                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------------------|
| AVAILABILITY_FOR_TIME_SYNC_SERVICE | The AF requests to be notified about 5GS and/or UE availability and capability for time synchronization service. |

##### 5.15.4.4.7 Enumeration: InstanceType

**Table 5.15.4.4.7-1: Enumeration InstanceType**

| Enumeration value | Description | Applicability |
|-------------------|-------------|---------------|
|                   |             |               |

|                    |                                                                            |  |
|--------------------|----------------------------------------------------------------------------|--|
| BOUNDARY_CLOCK     | Indicates Boundary Clock as defined in IEEE Std 1588 [45].                 |  |
| E2E_TRANS_CLOCK    | Indicates End-to-End Transparent Clock as defined in IEEE Std 1588 [45].   |  |
| P2P_TRANS_CLOCK    | Indicates Peer-to-Peer Transparent Clock as defined in IEEE Std 1588 [45]. |  |
| P2P_RELAY_INSTANCE | Indicates PTP Relay instance as defined in IEEE Std 802.1AS [46]           |  |

#### 5.15.4.4.8 Enumeration: AsTimeResource

The enumeration AsTimeResource represents the supported 5G clock quality (i.e. the source of time used by the 5GS). It shall comply with the provisions defined in table 5.15.4.4.8-1.

**Table 5.15.4.4.8-1: Enumeration AsTimeResource**

| Enumeration value   | Description                                                | Applicability |
|---------------------|------------------------------------------------------------|---------------|
| ATOMIC_CLOCK        | Indicates atomic clock is supported.                       |               |
| GNSS                | Indicates Global Navigation Satellite System is supported. |               |
| TERRESTRIAL_RADIO   | Indicates terrestrial radio is supported.                  |               |
| SERIAL_TIME_CODE    | Indicates serial time code is supported.                   |               |
| PTP                 | Indicates PTP is supported.                                |               |
| NTP                 | Indicates NTP is supported.                                |               |
| HAND_SET            | Indicates hand set is supported.                           |               |
| INTERNAL_OSCILLATOR | Indicates internal oscillator is supported.                |               |
| OTHER               | Indicates other source of time is supported.               |               |

#### 5.15.4.4.9 Enumeration: AcceptanceCriteriaResultIndication

**Table 5.15.4.4.9-1: Enumeration AcceptanceCriteriaResultIndication**

| Enumeration value | Description                                                                     | Applicability |
|-------------------|---------------------------------------------------------------------------------|---------------|
| ACCEPTABLE        | PTP port in (g)PTP service meets the clock quality acceptance criteria.         |               |
| NON_ACCEPTABLE    | PTP port in (g)PTP service does not meet the clock quality acceptance criteria. |               |

#### 5.15.4.4.10 Enumeration: AvailStatus

**Table 5.15.4.4.10-1: Definition of type AvailStatus**

| Enumeration value       | Description                                                                        | Applicability |
|-------------------------|------------------------------------------------------------------------------------|---------------|
| PDU_SESSION_TERMINATION | The UE is not available for (g)PTP services because the PDU session is terminated. |               |

### 5.15.4.5 Data types describing alternative data types or combinations of data types

#### 5.15.4.5.1 Type: ReportedCabability

The ReportedCabability data type extends the EventFilter data type with the attribute(s) defined in the AvailReport data type, to enable to indicate the availability status of the UE/DS-TT.

**Table 5.15.4.5.1-1: Definition of type ReportedCabability as a list of non-exclusive alternatives**

| Data type | Cardinality | Description | Applicability |
|-----------|-------------|-------------|---------------|
|-----------|-------------|-------------|---------------|

|             |   |                                                                                                                            |               |
|-------------|---|----------------------------------------------------------------------------------------------------------------------------|---------------|
| EventFilter | 1 | It represents the conditions to match for notifying the event(s) of time synchronization capabilities for a list of UE(s). |               |
| AvailReport | 1 | It represents the availability status report of the UE.                                                                    | SupportReport |

## 5.15.5 Used Features

The table below defines the features applicable to the TimeSyncExposure API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.15.5-1: Features used by TimeSyncExposure API**

| Feature number | Feature Name            | Description                                                                                                                                                                                                         |
|----------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | Notification_websocket  | The delivery of notifications over Websocket is supported as defined in 3GPP TS 29.122 [4]. This feature requires that the Notification_test_event feature is also supported.                                       |
| 2              | Notification_test_event | The testing of notification connection is supported as defined in 3GPP TS 29.122 [4].                                                                                                                               |
| 3              | CoverageArea            | Indicates support of the inclusion of the Time Synchronization Coverage Area in time synch configuration requests.                                                                                                  |
| 4              | NetTimeSyncStatus       | This feature indicates the support of network timing synchronization status and reporting.                                                                                                                          |
| 5              | SupportReport           | This feature indicates the support of the report of whether the requested Time Synchronization is available and, based on the UE's Time Synchronization Subscription Data in UDM, authorized for the requested UEs. |

## 5.15.6 Error handling

### 5.15.6.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.15.6.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the TimeSyncExposure API.

### 5.15.6.3 Application Errors

The application errors defined for the TimeSyncExposure API are listed in table 5.15.6.3-1.

**Table 5.15.6.3-1: Application errors**

| Application Error         | HTTP status code | Description                                                                                                                              | Applicability |
|---------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| UE_SERVICE_NOT_AUTHORIZED | 403 Forbidden    | The AF request is not authorized or the AF requested parameter(s) are not allowed by UE's Time Synchronization Subscription Data in UDM. | SupportReport |

# 5.16 EcsAddressProvision API

## 5.16.0 Introduction

The Nnef\_EcsAddressProvision service shall use the EcsAddressProvision API.

The API URI of EcsAddressProvision API shall be:

**{apiRoot}/3gpp-ecs-address-provision/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-ecs-address-provision".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

## 5.16.1 Resources

### 5.16.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.16.1.1-1 and the resources and HTTP methods used for the EcsAddressProvision API.

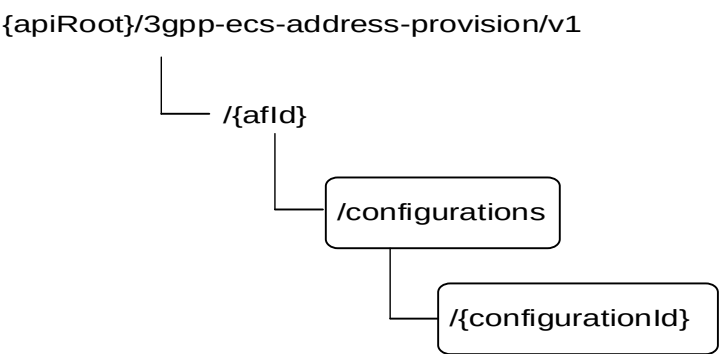


**Figure 5.16.1.1-1: Resource URI structure of the EcsAddressProvision API**

Table 5.16.1.1-1 provides an overview of the resources and HTTP methods applicable for the EcsAddressProvision API.

**Table 5.16.1.1-1: Resources and methods overview**

| Resource name                                  | Resource URI                             | HTTP method | Description                                                                                |
|------------------------------------------------|------------------------------------------|-------------|--------------------------------------------------------------------------------------------|
| ECS Address Provision Configurations           | /{afld}/configurations                   | GET         | Read all configurations for a given AF identified by {afld}.                               |
|                                                |                                          | POST        | Create a new configuration to provision ECS address(es).                                   |
| Individual ECS Address Provision Configuration | /{afld}/configurations/{configurationId} | GET         | Read an existing configuration identified by {configurationId}.                            |
|                                                |                                          | PUT         | Modify all of the properties of an existing configuration identified by {configurationId}. |
|                                                |                                          | DELETE      | Delete a configuration identified by {configurationId}.                                    |

## 5.16.1.2 Resource: ECS Address Provision Configurations

### 5.16.1.2.1 Introduction

This resource allows a AF to read all active ECS Address Provision Configurations for a given AF, or create an new Individual ECS Address Provision Configuration to the NEF.

### 5.16.1.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-ecs-address-provision/v1/{afId}/configurations**

This resource shall support the resource URI variables defined in table 5.16.1.2.2-1.

**Table 5.16.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

### 5.16.1.2.3 Resource Methods

#### 5.16.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.16.1.2.2.

#### 5.16.1.2.3.2 GET

The GET method allows to read all active configurations for a given AF. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.16.1.2.3.2-1.

**Table 5.16.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.16.1.2.3.2-2 and the response data structures and response codes specified in table 5.16.1.2.3.2-3.

**Table 5.16.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.16.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                      |
|-----------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(EcsAddress Provision) | M | 0..N        | 200 OK                 | All the configurations for the AF are returned.                                                                                                                                                                                                                  |
| N/A                         |   |             | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                         |   |             | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.                                                                           |

|                                                                                                                          |  |  |  |                                                                           |
|--------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------|
|                                                                                                                          |  |  |  | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |  |                                                                           |

**Table 5.16.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.16.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.16.1.2.3.3 POST

The POST method creates a new resource to Individual ECS Address Provision Configuration for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.16.1.2.3.3-1 and the response data structures and response codes specified in table 5.16.1.2.3.3-2.

**Table 5.16.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type           | P | Cardinality | Description                                                    |
|---------------------|---|-------------|----------------------------------------------------------------|
| EcsAddressProvision | M | 1           | Parameters to create a configuration to provision ECS address. |

**Table 5.16.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------|
| EcsAddressProvision                                                                                                       | M | 1           | 201 Created    | The configuration was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                 |

**Table 5.16.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                                 |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-ecs-address-provision/v1/{afld}/configurations/{configurationId} |

## 5.16.1.3 Resource: Individual ECS Address Provision Configuration

### 5.16.1.3.1 Introduction

This resource allows a AF to read, update or delete an existing Individual ECS Address Provision Configuration.



## 5.16.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-ecs-address-provision/v1/{afId}/configurations/{configurationId}

This resource shall support the resource URI variables defined in table 5.16.1.3.2-1.

**Table 5.16.1.3.2-1: Resource URI variables for this resource**

| Name            | Data type | Definition                                |
|-----------------|-----------|-------------------------------------------|
| apiRoot         | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].       |
| afId            | string    | Identifier of the AF.                     |
| configurationId | string    | Identifier of the configuration resource. |

## 5.16.1.3.3 Resource Methods

## 5.16.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.16.1.3.2.

## 5.16.1.3.3.2 GET

The GET method allows to read the active configuration for a given AF and a given configuration Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.16.1.3.3.2-1.

**Table 5.16.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.16.1.3.3.2-2 and the response data structures and response codes specified in table 5.16.1.3.3.2-3.

**Table 5.16.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.16.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EcsAddressProvision                                                                                                      | M | 1           | 200 OK                 | The information for the configuration in the request URI are returned.                                                                                                                                                                                           |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                  |

**Table 5.16.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.16.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.16.1.3.3.3 PUT

The PUT method is used to replace an existing Individual ECS Address Provision Configuration. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.16.1.3.3.3-1 and the response data structures and response codes specified in table 5.16.1.3.3.3-2.

**Table 5.16.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type           | P | Cardinality | Description                                                         |
|---------------------|---|-------------|---------------------------------------------------------------------|
| EcsAddressProvision | M | 1           | Replace an existing Individual ECS Address Provision Configuration. |

**Table 5.16.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EcsAddressProvision                                                                                                      | M | 1           | 200 OK                 | The configuration was updated successfully.                                                                                                                                                                                                                         |
| N/A                                                                                                                      |   |             | 204 No Content         | The configuration was updated successfully.                                                                                                                                                                                                                         |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                     |

**Table 5.16.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.16.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

#### 5.16.1.3.3.4 DELETE

The DELETE method deletes an existing Individual ECS Address Provision Configuration. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.7.1.3.3.4-1.

**Table 5.7.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.7.1.3.3.4-2 and the response data structures and response codes specified in table 5.7.1.3.3.4-3.

**Table 5.7.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.7.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |   |             | 204 No Content         | The configuration was terminated successfully.                                                                                                                                                                                                                     |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                    |

**Table 5.7.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.7.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.16.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.16.1B Notifications

There are no notifications defined for this API in this release of the specification.

## 5.16.2 Data Model

### 5.16.2.1 General

This clause specifies the application data model supported by the EcsAddressProvision API.

Table 5.16.2.1-1 specifies the data types defined for the EcsAddressProvision API.

**Table 5.16.2.1-1: EcsAddressProvision API specific Data Types**

| Data type           | Clause defined | Description                                                 | Applicability |
|---------------------|----------------|-------------------------------------------------------------|---------------|
| EcsAddressProvision | 5.16.2.3.2     | Represents ECS address provision configuration information. |               |

### 5.16.2.2 Reused data types

The data types reused by the EcsAddressProvision API from other specifications are listed in table 5.16.2.2-1.

**Table 5.16.2.2-1: Re-used Data Types**

| Data type              | Reference           | Comments                                                                                   | Applicability  |
|------------------------|---------------------|--------------------------------------------------------------------------------------------|----------------|
| EcsAuthMethod          | 3GPP TS 29.503 [17] | Represents the ECS Authentication Methods.                                                 | ECSAuthMethods |
| EcsServerAddr          | 3GPP TS 29.571 [8]  | Represents the Edge Configuration Server (ECS) address configuration information.          |                |
| Link                   | 3GPP TS 29.122 [4]  | Represents a referenced resource.                                                          |                |
| MtcProviderInformation | 3GPP TS 29.571 [8]  | Represents the MTC Provider Information.                                                   | enNB1          |
| PlmnIdNid              | 3GPP TS 29.571 [8]  | Represents the PLMN identifier.                                                            | HR-SBO         |
| SpatialValidityCond    | 3GPP TS 29.571 [8]  | Represents the Spatial Validity Condition.                                                 |                |
| SupportedFeatures      | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features defined in table 5.16.3-1.    |                |
| SupportedPlmn          | 3GPP TS 29.503 [17] | ID of the PLMN supported by the ECS along with the list of ECSPs associated with the PLMN. | ECSSuppPlmns   |
| TargetUeld             | 5.6.3.3.7           | Represents the target UE(s) information.                                                   |                |

### 5.16.2.3 Structured data types

#### 5.16.2.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.16.2.3.2 Type: EcsAddressProvision

**Table 5.16.2.3.2-1: Definition of type EcsAddressProvision**

| Attribute name | Data type     | P | Cardinality | Description                                                                                                                                | Applicability |
|----------------|---------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| self           | Link          | C | 0..1        | Identifies the individual configuration resource. Shall be present in the HTTP GET response when reading all the configurations for an AF. |               |
| ecsServerAddr  | EcsServerAddr | M | 1           | Represents the ECS address(es).                                                                                                            |               |

|                     |                        |   |      |                                                                                                                      |                |
|---------------------|------------------------|---|------|----------------------------------------------------------------------------------------------------------------------|----------------|
| mtcProviderId       | MtcProviderInformation | O | 0..1 | Identifies the MTC Service Provider and/or MTC Application.                                                          | enNB1          |
| spatialValidityCond | SpatialValidityCond    | O | 0..1 | Represents the spatial validity condition.                                                                           |                |
| tgtUe               | TargetUeId             | O | 0..1 | Indicates the target UE information.                                                                                 |                |
| plmnId              | PlmnIdNid              | O | 0..1 | Identifier of the serving PLMN in which the provisioned information applies.                                         | HR-SBO         |
| ecsAuthMethods      | array(EcsAuthMethod)   | O | 1..N | Indicates the Supported ECS Authentication Method(s).                                                                | ECSAuthMethods |
| supportedPlmns      | array(SupportedPlmn)   | O | 1..N | Indicates the List of PLMNs and associated ECSPs for which EDN configuration information can be provided by the ECS. | ECSSuppPlmns   |
| suppFeat            | SupportedFeatures      | M | 1    | Indicates the negotiated supported features.                                                                         |                |

## 5.16.2.4 Simple data types and enumerations

### 5.16.2.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.16.2.4.2 Simple data types

The simple data types defined in table 5.16.2.4.2-1 shall be supported.

**Table 5.16.2.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.16.3 Used Features

The table below defines the features applicable to the EcsAddressProvision API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.16.3-1: Features used by EcsAddressProvision API**

| Feature number | Feature Name   | Description                                                                                                                                               |
|----------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | HR-SBO         | This feature indicates the support of provisioning ECS Address Configuration Information for when the serving PLMN is different from the PLMN of the NEF. |
| 2              | enNB1          | This feature indicates the support of Rel-18 enhancements to this northbound API.                                                                         |
| 3              | ECSAuthMethods | This feature indicates the support of ECS authentication methods provided to the NEF.                                                                     |
| 4              | ECSSuppPlmns   | This feature indicates the support of ECS supported PLMNs.                                                                                                |

## 5.16.4 Error handling

### 5.16.4.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

5.16.4.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the EcsAddressProvision API.

5.16.4.3 Application Errors

The application errors defined for EcsAddressProvision API are listed in table 5.16.4.3-1.

Table 5.16.4.3-1: Application errors

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

5.17 AMPolicyAuthorization API

5.17.0 Introduction

The Nnef\_AMPolicyAuthorization service shall use the AMPolicyAuthorization API.

The API URI of AMPolicyAuthorization API shall be:

**{apiRoot}/3gpp-am-policyauthorization/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-am-policyauthorization".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

5.17.1 Resources

5.17.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.17.1.1-1 and the resources and HTTP methods used for the AMPolicyAuthorization API.

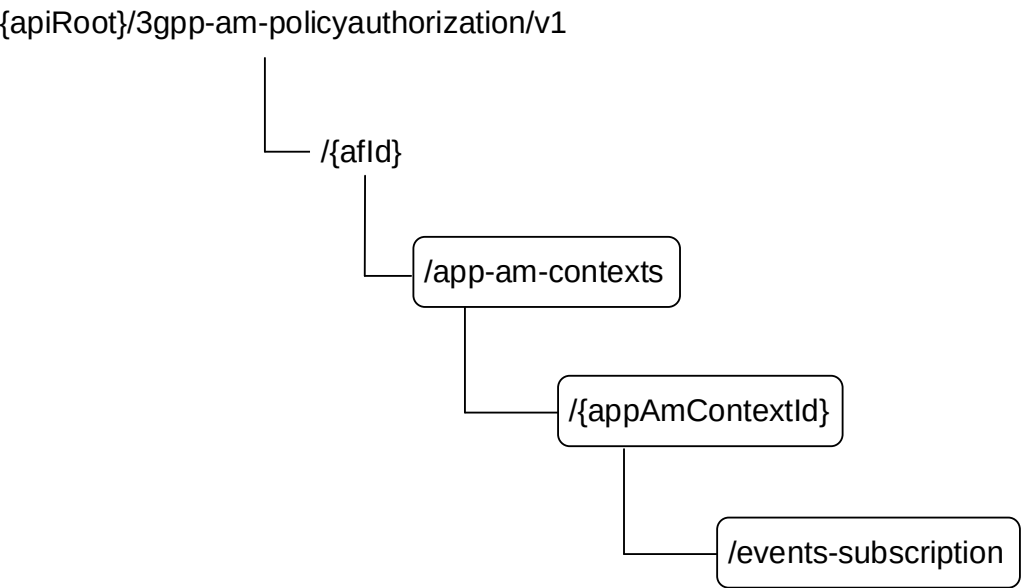


**Figure 5.17.1.1-1: Resource URI structure of the AMPolicyAuthorization API**

Table 5.17.1.1-1 provides an overview of the resources and HTTP methods applicable for the AMPolicyAuthorization API.

**Table 5.17.1.1-1: Resources and methods overview**

| Resource name                     | Resource URI                                                    | HTTP method | Description                                                                                                                                 |
|-----------------------------------|-----------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Application AM Contexts           | /[{afld}]/app-am-contexts                                       | POST        | Create a new Individual application AM context resource and may create the child AM Policy Events Subscription sub-resource.                |
| Individual application AM Context | /[{afld}]/app-am-contexts/{appAmContextId}                      | GET         | Reads an existing Individual application AM context resource.                                                                               |
|                                   |                                                                 | PATCH       | Updates an existing Individual application AM context resource. It can also create or update an AM Policy Events Subscription sub-resource. |
|                                   |                                                                 | DELETE      | Deletes an existing Individual application AM context resource and the child AM Policy Events Subscription sub-resource.                    |
| AM Policy Events Subscription     | /[{afld}]/app-am-contexts/{appAmContextId}/event-s-subscription | PUT         | Creates a new AM Policy Events Subscription sub-resource or modifies an existing AM Policy Events Subscription sub-resource.                |
|                                   |                                                                 | DELETE      | Deletes an AM Policy Events Subscription sub-resource.                                                                                      |

## 5.17.1.2 Resource: Application AM Contexts

### 5.17.1.2.1 Introduction

This resource allows an AF to request the creation of a new Individual application AM context resource.

### 5.17.1.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-am-policyauthorization/v1/{afId}/app-am-contexts**

This resource shall support the resource URI variables defined in table 5.17.1.2.2-1.

**Table 5.17.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

### 5.17.1.2.3 Resource Methods

#### 5.17.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.17.1.2.2.

#### 5.17.1.2.3.2 POST

The POST method creates a new resource to Individual application AM context for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.17.1.2.3.2-1 and shall support the response data structures and response codes specified in table 5.17.1.2.3.2-2.

**Table 5.17.1.2.3.2-1: Data structures supported by the POST Request Body on this resource**

| Data type           | P | Cardinality | Description                                                                                             |
|---------------------|---|-------------|---------------------------------------------------------------------------------------------------------|
| AppAmContextExpData | M | 1           | Contains the exposure information for the creation of a new Individual application AM context resource. |

**Table 5.17.1.2.3.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes            | Description                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AppAmContextExpRespData                                                                                                     | M | 1           | 201 Created               | Successful case.<br>The Individual application AM context resource was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| ProblemDetails                                                                                                              | O | 0..1        | 500 Internal Server Error | (NOTE 2)                                                                                                                                                                         |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                           |                                                                                                                                                                                  |
| NOTE 2: Failure causes are described in clause 5.17.5.                                                                      |   |             |                           |                                                                                                                                                                                  |

**Table 5.17.1.2.3.2-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                                  |
|----------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-am-policyauthorization/v1/{afId}/app-am-contexts/{appAmContextId} |



### 5.17.1.3 Resource: Individual Application AM Context

#### 5.17.1.3.1 Introduction

This resource allows an AF to read, update or delete an existing Individual application AM context.

#### 5.17.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-am-policyauthorization/v1/{afId}/app-am-contexts/{appAmContextId}

This resource shall support the resource URI variables defined in table 5.17.1.3.2-1.

**Table 5.17.1.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                                                                          |
|----------------|-----------|-------------------------------------------------------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].                                                 |
| afId           | string    | Identifier of the AF.                                                               |
| appAmContextId | string    | Identifier of the application AM context formatted according to IETF RFC 3986 [44]. |

#### 5.17.1.3.3 Resource Methods

##### 5.17.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.17.1.3.2.

##### 5.17.1.3.3.2 GET

The GET method allows to read the existing application AM context for a given AF and a given application AM context Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.17.1.3.3.2-1.

**Table 5.17.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.17.1.3.3.2-2, the response data structures and response codes specified in table 5.17.1.3.3.2-3 and the Location Headers specified in table 5.17.1.3.3.2-4 and table 5.17.1.3.3.2-5.

**Table 5.17.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.17.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type           | P | Cardinality | Response codes | Description                                                                                                                   |
|---------------------|---|-------------|----------------|-------------------------------------------------------------------------------------------------------------------------------|
| AppAmContextExpData | M | 1           | 200 OK         | Successful case.<br>The exposure information of an existing Individual application AM context in the request URI is returned. |

|                                                                                                                            |   |      |                              |                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------|---|------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                        |   |      | 307<br>Temporary<br>Redirect | Temporary redirection, during the AM context retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                        |   |      | 308<br>Permanent<br>Redirect | Permanent redirection, during the AM context retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                             | O | 0..1 | 404 Not<br>Found             | (NOTE 2)                                                                                                                                                                                                                                                          |
| NOTE 1: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |      |                              |                                                                                                                                                                                                                                                                   |
| NOTE 2: Failure causes are described in clause 5.17.5.                                                                     |   |      |                              |                                                                                                                                                                                                                                                                   |

**Table 5.17.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.17.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.17.1.3.3.3 PATCH

The PATCH method is used to modify an existing Individual application AM context. The AF shall initiate the HTTP PATCH request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.17.1.3.3.3-1.

**Table 5.17.1.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.17.1.3.3.3-2, the response data structures and response codes specified in table 5.17.1.3.3.3-3 and the Location Headers specified in table 5.17.1.3.3.3-4 and table 5.17.1.3.3.3-5.

**Table 5.17.1.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type                 | P | Cardinality | Description                                                                                   |
|---------------------------|---|-------------|-----------------------------------------------------------------------------------------------|
| AppAmContextExpUpdateData | M | 1           | Contains the modification(s) to be applied to the Individual application AM context resource. |

**Table 5.17.1.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type               | P | Cardinality | Response codes | Description                                                                             |
|-------------------------|---|-------------|----------------|-----------------------------------------------------------------------------------------|
| AppAmContextExpRespData | M | 1           | 200 OK         | Successful case.<br><br>The exposure information of the updated application AM context. |

|                                                                                                                                         |   |      |                        |                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------|---|------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                                     |   |      | 204 No Content         | The application AM context was updated successfully.                                                                                                                                                                                                                 |
| N/A                                                                                                                                     |   |      | 307 Temporary Redirect | Temporary redirection, during the AM context modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                                     |   |      | 308 Permanent Redirect | Permanent redirection, during the AM context modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                          | O | 0..1 | 400 Bad Request        | (NOTE 2)                                                                                                                                                                                                                                                             |
| ProblemDetails                                                                                                                          | O | 0..1 | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                                                             |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |      |                        |                                                                                                                                                                                                                                                                      |
| NOTE 2: Failure causes are described in clause 5.17.5.                                                                                  |   |      |                        |                                                                                                                                                                                                                                                                      |

**Table 5.17.1.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | String    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.17.1.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | String    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.17.1.3.3.4 DELETE

The DELETE method deletes an existing Individual application AM context. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.17.1.3.3.4-1.

**Table 5.17.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.17.1.3.3.4-2 and the response data structures and response codes specified in table 5.17.1.3.3.4-3, and the Location Headers specified in table 5.17.1.3.3.4-4 and table 5.17.1.3.3.4-5.

**Table 5.17.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.17.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
|-----------|---|-------------|----------------|-------------|

|                                                                                                                               |   |      |                        |                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------|---|------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                           |   |      | 204 No Content         | Successful case.<br>The application AM context was terminated successfully.                                                                                                                                                                                         |
| N/A                                                                                                                           |   |      | 307 Temporary Redirect | Temporary redirection, during the AM context termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                           |   |      | 308 Permanent Redirect | Permanent redirection, during the AM context termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                | O | 0..1 | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                                                            |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |      |                        |                                                                                                                                                                                                                                                                     |
| NOTE 2: Failure causes are described in clause 5.17.5.                                                                        |   |      |                        |                                                                                                                                                                                                                                                                     |

**Table 5.17.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.17.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.17.1.4 Resource: AM Policy Events Subscription

### 5.17.1.4.1 Introduction

This resource allows an AF to create a new AM policy events subscription sub-resource or modifies an existing AM policy events subscription sub-resource.

### 5.17.1.4.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-am-policyauthorization/v1/{afId}/app-am-contexts/{appAmContextId}/events-subscription**

This sub-resource shall support the resource URI variables defined in table 5.17.1.4.2-1.

**Table 5.17.1.4.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                                                                          |
|----------------|-----------|-------------------------------------------------------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].                                                 |
| afId           | string    | Identifier of the AF.                                                               |
| appAmContextId | string    | Identifier of the application AM context formatted according to IETF RFC 3986 [44]. |

### 5.17.1.4.3 Resource Methods

#### 5.17.1.4.3.1 General

The following clauses specify the resource methods supported by the sub-resource as described in clause 5.17.1.4.2.

## 5.17.1.4.3.2 PUT

The PUT method allows to create a new AM policy events subscription sub-resource in an existing application AM context or modifies an existing AM policy events subscription sub-resource. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.17.1.4.3.2-1.

**Table 5.17.1.4.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.17.1.4.3.2-2, the response data structures and response codes specified in table 5.17.1.4.3.2-3 and the Location Headers specified in table 5.17.1.4.3.2-4, table 5.17.1.4.3.2-5 and table 5.17.1.4.3.2-6.

**Table 5.17.1.4.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type         | P | Cardinality | Description                                                                                         |
|-------------------|---|-------------|-----------------------------------------------------------------------------------------------------|
| AmEventsSubscData | M | 1           | Contains the information for the creation and/or modification of the AM Policy Events Subscription. |

**Table 5.17.1.4.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                             | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AmEventsSubscRespData                                                                                                                 | M | 1           | 201 Created            | Successful case.<br>The AM policy events subscription sub-resource was created. The representation of the AM Policy Events Subscription sub-resource is included within the properties of the AmEventsSubscData data type. The one or more matched events, if available, are included within the properties of the AmEventsNotification data type.                                                       |
| AmEventsSubscRespData                                                                                                                 | M | 1           | 200 OK                 | Successful case.<br>The AM policy events subscription sub-resource was modified and a representation of the sub-resource is returned. The representation of the AM Policy Events Subscription sub-resource is included within the properties of the AmEventsSubscData data type. The one or more matched events, if available, are included within the properties of the AmEventsNotification data type. |
| N/A                                                                                                                                   |   |             | 204 No Content         | Successful case.<br>The AM policy events subscription sub-resource was modified successfully, with no content to be sent in the response message body.                                                                                                                                                                                                                                                   |
| N/A                                                                                                                                   |   |             | 307 Temporary Redirect | Temporary redirection, during the AM policy events subscription or modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                               |
| N/A                                                                                                                                   |   |             | 308 Permanent Redirect | Permanent redirection, during the AM policy events subscription or modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                               |
| ProblemDetails                                                                                                                        | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                                                                                                                                                                                                 |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                                                                                                                          |
| NOTE 2: Failure causes are described in clause 5.17.5.                                                                                |   |             |                        |                                                                                                                                                                                                                                                                                                                                                                                                          |

**Table 5.17.1.4.3.2-4: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                                                                                                                   |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | String    | M | 1           | Contains the URI of the resource in which an AM policy events subscription sub-resource has been created, according to the structure:<br>{apiRoot}/3gpp-am-policyauthorization/v1/{afld}/app-am-contexts/{appAmContextId}/events-subscription |

**Table 5.17.1.4.3.2-5: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | String    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.17.1.4.3.2-6: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.17.1.4.3.3 DELETE

The DELETE method deletes existing subscribed AM policy event(s) within the existing Individual application AM context. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.17.1.4.3.3-1.

**Table 5.17.1.4.3.3-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.17.1.4.3.3-2 and the response data structures and response codes specified in table 5.17.1.4.3.3-3 and the Location Headers specified in table 5.17.1.4.3.3-4 and table 5.17.1.4.3.3-5.

**Table 5.17.1.4.3.3-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.17.1.4.3.3-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                            |
|-----------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A       |   |             | 204 No Content         | Successful case.<br>The AM policy event(s) subscription resource is deleted.                                                                                                                                                                                           |
| N/A       |   |             | 307 Temporary Redirect | Temporary redirection, during the AM policy events deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A       |   |             | 308 Permanent Redirect | Permanent redirection, during the AM policy events deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

|                                                                                                                               |   |      |               |          |
|-------------------------------------------------------------------------------------------------------------------------------|---|------|---------------|----------|
| ProblemDetails                                                                                                                | O | 0..1 | 404 Not Found | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |      |               |          |
| NOTE 2: Failure causes are described in clause 5.17.5.                                                                        |   |      |               |          |

**Table 5.17.1.4.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | String    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.17.1.4.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | String    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.17.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.17.2 Notifications

### 5.17.2.1 Introduction

Upon receipt of AM Event Notification from the PCF indicating the subscribed AM policy event is detected, the NEF shall send an HTTP POST message including the notified AM policy event to the AF. The NEF and the AF shall support the notification mechanism as described in clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.17.2.1-1: Notifications overview**

| Notification          | Callback URI    | HTTP method or custom operation | Description (service operation)                                            |
|-----------------------|-----------------|---------------------------------|----------------------------------------------------------------------------|
| AM Event Notification | {eventNotifUri} | POST                            | The AM policy changes event notification is provided by the NEF to the AF. |

### 5.17.2.2 AM Event Notification

#### 5.17.2.2.1 Description

The AM Event Notification is used by the NEF to report one or several observed AM policy change events to AF that has subscribed to such Notifications via the AM policy events subscription sub-resource.

#### 5.17.2.2.2 Callback URI

The Callback URI "{eventNotifUri}" shall be used with the callback URI variables defined in table 5.17.2.2.2-1.

**Table 5.17.2.2.2-1: Callback URI variables**

| Name          | Definition                                                                                                                                                                                                                                     |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| eventNotifUri | Callback reference provided by the AF during creation/modification of the subscription within the AM policy events subscription sub-resource as defined in Table 5.17.3.3.2-1 or Table 5.17.3.3.3-1 or Table 5.6.2.4-1 of 3GPP TS 29.534 [43]. |

### 5.17.2.2.3 Operation Definition

#### 5.17.2.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.17.2.2.3.1-1 and the response data structures and response codes specified in table 5.17.2.2.3.1-2 and the Location Headers specified in table 5.17.2.2.3.1-3 and table 5.17.2.2.3.1-4.

**Table 5.17.2.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type            | P | Cardinality | Description                                                                                            |
|----------------------|---|-------------|--------------------------------------------------------------------------------------------------------|
| AmEventsNotification | M | 1           | Provides information about the observed access and mobility policy change events by the NEF to the AF. |

**Table 5.17.2.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                       |   |             | 204 No Content         | The event notification is received successfully.                                                                                                                                                                                                                                                    |
| N/A                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                     |

**Table 5.17.2.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | String    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.17.2.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | String    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

#### 5.17.2.2.3.2 Notification via Websocket

If supported by both AF and NEF and successfully negotiated, the AM Event Notification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4 of 3GPP TS 29.122 [4].



## 5.17.3 Data Model

### 5.17.3.1 General

This clause specifies the application data model supported by the AMPolicyAuthorization API.

Table 5.17.3.1-1 specifies the data types defined for the AMPolicyAuthorization API.

**Table 5.17.3.1-1: AMPolicyAuthorization API specific Data Types**

| Data type                 | Clause defined | Description                                                                                                                                                              | Applicability  |
|---------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| AppAmContextExpData       | 5.17.3.3.2     | Represents an Individual application AM context exposure resource.                                                                                                       |                |
| AppAmContextExpRespData   | 5.17.3.5.1     | Represents a response to a modification or creation request of an Individual Application AM context resource. It may contain the notification of the already met events. |                |
| AppAmContextExpUpdateData | 5.17.3.3.3     | Represents the modification(s) to be applied to the Individual application AM context exposure resource.                                                                 |                |
| SliceReplReq              | 5.17.3.3.7     | Represents the requested Network Slice Replacement requirements.                                                                                                         | AfNetSliceRepl |
| SliceReplReqInfo          | 5.17.3.3.5     | Represents the AF requested Network Slice Replacement requirements information.                                                                                          | AfNetSliceRepl |
| SliceReplType             | 5.17.3.4.3     | Represents the type of the requested Network Slice Replacement.                                                                                                          | AfNetSliceRepl |
| GeographicalArea          | 5.17.3.3.4     | Represents the geographical area information (e.g. a civic address or shapes).                                                                                           |                |

### 5.17.3.2 Reused data types

The data types reused by the AMPolicyAuthorization API from other specifications are listed in table 5.17.3.2-1.

**Table 5.17.3.2-1: Re-used Data Types**

| Data type             | Reference           | Comments                                                                                                                                                                                                                          | Applicability |
|-----------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| AmEventsNotification  | 3GPP TS 29.534 [43] | Describes the notification about the events occurred within an Individual application AM context resource.                                                                                                                        |               |
| AmEventsSubscData     | 3GPP TS 29.534 [43] | Identifies the AM policy events the application subscribes to.                                                                                                                                                                    |               |
| AmEventsSubscDataRm   | 3GPP TS 29.534 [43] | This data type is defined in the same way as the "AmEventsSubscData" data type, but with the OpenAPI "nullable: true" property.                                                                                                   |               |
| AmEventsSubscRespData | 3GPP TS 29.534 [43] | It represents a response to an AM policy events subscription request and contains the created/updated AM Policy Events Subscription resource. It may also include the Notification of the events met at the time of subscription. |               |
| CivicAddress          | 3GPP TS 29.572 [34] | Identifies the civic address.                                                                                                                                                                                                     |               |
| DurationSec           | 3GPP TS 29.122 [4]  | Indicates the time duration.                                                                                                                                                                                                      |               |
| DurationSecRm         | 3GPP TS 29.122 [4]  | Indicates the time duration, same as the "DurationSec" data type, but with the OpenAPI "nullable: true" property.                                                                                                                 |               |
| GeographicArea        | 3GPP TS 29.572 [34] | Identifies the geographical information with shapes.                                                                                                                                                                              |               |
| Gpsi                  | 3GPP TS 29.571 [8]  | Identifies a GPSI.                                                                                                                                                                                                                |               |
| Link                  | 3GPP TS 29.122 [4]  | Identifies a referenced resource.                                                                                                                                                                                                 |               |
| ProblemDetails        | 3GPP TS 29.122 [4]  | Represents error related information.                                                                                                                                                                                             |               |

|                      |                    |                                                                                                |                        |
|----------------------|--------------------|------------------------------------------------------------------------------------------------|------------------------|
| SupportedFeatures    | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features defined in table 5.17.4-1.        |                        |
| WebsocketNotifConfig | 3GPP TS 29.122 [4] | Contains the configuration parameters to set up notification delivery over Websocket protocol. | Notification_websocket |

### 5.17.3.3 Structured data types

#### 5.17.3.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.17.3.3.2 Type: AppAmContextExpData

**Table 5.17.3.3.2-1: Definition of type AppAmContextExpData**

| Attribute name          | Data type                | P | Cardinality | Description                                                                                                                                                                                      | Applicability           |
|-------------------------|--------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| self                    | Link                     | C | 0..1        | Identifies the individual configuration resource. Shall be present in the HTTP GET response when reading all the configurations for an AF.                                                       |                         |
| evSubscs                | AmEventsSubscData        | O | 0..1        | Represents the subscription to one or more AM policy events.                                                                                                                                     |                         |
| gpsi                    | Gpsi                     | M | 1           | Identifies the GPSI.                                                                                                                                                                             |                         |
| highThruInd             | boolean                  | C | 0..1        | Indicates whether high throughput is desired for the indicated UE traffic. Set to "true" if high throughput is desired; otherwise set to "false". Default value is "false" if omitted.<br>(NOTE) |                         |
| covReqs                 | array(Geographical Area) | C | 1..N        | Identifies the allowed geographical areas.<br>(NOTE)                                                                                                                                             |                         |
| policyDuration          | DurationSecRm            | O | 0..1        | Indicates the time duration that the policy shall last.                                                                                                                                          |                         |
| sliceReplReq            | SliceReplReq             | C | 0..1        | Contains the AF requested Network Slice Replacement requirements.<br>(NOTE)                                                                                                                      | AfNetSliceRepl          |
| suppFeat                | SupportedFeatures        | C | 0..1        | Contains the list of supported feature(s) among the ones defined in clause 5.17.4.<br><br>This attribute shall be present only when feature negotiation needs to take place.                     |                         |
| requestTestNotification | boolean                  | O | 0..1        | Set to true by the AF to request the NEF to send a test notification as defined in clause 5.2.5.3 of 3GPP TS 29.122 [4]. Set to false or omitted otherwise.                                      | Notification_test_event |
| websocketNotifConfig    | WebsocketNotifConfig     | O | 0..1        | Configuration parameters to set up notification delivery over Websocket protocol.                                                                                                                | Notification_websocket  |

NOTE: At least one of these attributes shall be present.

#### 5.17.3.3.3 Type: AppAmContextExpUpdateData

**Table 5.17.3.3.3-1: Definition of type AppAmContextExpUpdateData**

| Attribute name | Data type               | P | Cardinality | Description                                                                                                                                       | Applicability  |
|----------------|-------------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| evSubscs       | AmEventsSubscDataRm     | O | 0..1        | Represents the subscription to one or more AM policy events.                                                                                      |                |
| highThruInd    | boolean                 | O | 0..1        | Indicates whether high throughput is desired for the indicated UE traffic. Set to "true" if high throughput is desired; otherwise set to "false". |                |
| covReqs        | array(GeographicalArea) | O | 1..N        | Identifies the allowed geographical areas.<br><br>(NOTE)                                                                                          |                |
| policyDuration | DurationSecRm           | O | 0..1        | Indicates the time duration that the policy shall last.                                                                                           |                |
| sliceReplReq   | SliceReplReq            | O | 0..1        | Contains the AF requested Network Slice Replacement requirements.                                                                                 | AfNetSliceRepl |

NOTE: The value of the property shall be set to NULL for removal.

#### 5.17.3.3.4 Type: GeographicalArea

**Table 5.17.3.3.4-1: Definition of type GeographicalArea**

| Attribute name | Data type      | P | Cardinality | Description                                                 | Applicability |
|----------------|----------------|---|-------------|-------------------------------------------------------------|---------------|
| civicAddress   | CivicAddress   | C | 0..1        | Identifies a civic address.                                 |               |
| shapes         | GeographicArea | C | 0..1        | Identifies a geographic area specified by different shapes. |               |

NOTE: One of "civicAddress" attribute or "shapes" attribute shall be included.

#### 5.17.3.3.5 Type: SliceReplReqInfo

**Table 5.17.3.3.5-1: Definition of type SliceReplReqInfo**

| Attribute name | Data type | P | Cardinality | Description                                                   | Applicability |
|----------------|-----------|---|-------------|---------------------------------------------------------------|---------------|
| snssai         | Snssai    | C | 0..1        | Contains the initial S-NSSAI.<br><br>(NOTE)                   |               |
| altSnssai      | Snssai    | C | 0..1        | Contains the Alternative S-NSSAI.<br><br>(NOTE)               |               |
| afServId       | string    | C | 0..1        | Contains the initial AF Service Identifier.<br><br>(NOTE)     |               |
| altAfServId    | string    | C | 0..1        | Contains the Alternative AF Service Identifier,<br><br>(NOTE) |               |

NOTE: Either both the "snssai" and "altSnssai" attributes or both the "afServiceId" and "altAfServiceId" attributes shall be present.

5.17.3.3.6 Void

5.17.3.3.7 Type: SliceReplReq

**Table 5.17.3.3.7-1: Definition of type SliceReplReq**

| Attribute name | Data type        | P | Cardinality | Description                                                                                                                                                                                | Applicability |
|----------------|------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| type           | SliceReplType    | M | 1           | Contains the type of the requested Network Slice Replacement.                                                                                                                              |               |
| afSliceReplReq | SliceReplReqInfo | C | 0..1        | Contains the AF requested Network Slice Replacement requirements information.<br><br>This attribute shall be present only when the "type" attribute is set to "INITIATE_AF_REQ_SLICE_REP". |               |

## 5.17.3.4 Simple data types and enumerations

### 5.17.3.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.17.3.4.2 Simple data types

The simple data types defined in table 5.17.3.4.2-1 shall be supported.

**Table 5.17.3.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.17.3.4.3 Enumeration: SliceReplType

The enumeration SliceReplType represents the type of the requested Network Slice Replacement. It shall comply with the provisions defined in table 5.17.3.4.3-1.

**Table 5.17.3.4.3-1: Enumeration SliceReplType**

| Enumeration value          | Description                                                                                                                                            | Applicability |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| INITIATE_AF_REQ_SLICE_REP  | Indicates that the type of the requested Network Slice Replacement is the initiation of an AF requested Network Slice Replacement.                     |               |
| TERMINATE_AF_REQ_SLICE_REP | Indicates that the type of the requested Network Slice Replacement is the termination of a previously requested Network Slice Replacement from the AF. |               |

### 5.17.3.5 Data types describing alternative data types or combinations of data types

#### 5.17.3.5.1 Type: AppAmContextExpRespData

**Table 5.17.3.5.1-1: Definition of type AppAmContextExpRespData as a list of non-exclusive alternatives**

| Data type            | Cardinality | Description                                                                                                                        | Applicability |
|----------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------|---------------|
| AmEventsNotification | 0..1        | It represents the notification of a match event during the creation or modification of the Individual application AM context data. |               |
| AppAmContextExpData  | 1           | It represents the Individual application AM context resource.                                                                      |               |

### 5.17.4 Used Features

The table below defines the features applicable to the AMPolicyAuthorization API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.17.4-1: Features used by AMPolicyAuthorization API**

| Feature number | Feature Name            | Description                                                                                                                                                                                                                                                                     |
|----------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | Notification_websocket  | The delivery of notifications over Websocket is supported as described in 3GPP TS 29.122 [4]. This feature requires that the Notification_test_event feature is also supported.                                                                                                 |
| 2              | Notification_test_event | The testing of notification connection is supported as described in 3GPP TS 29.122 [4].                                                                                                                                                                                         |
| 3              | AfNetSliceRepl          | This feature indicates the support of the enhancements to support AF requested Network Slice Replacement services.<br><br>The following functionalities are supported:<br>- Support the provisioning and management of the AF requested Network Slice Replacement requirements. |

### 5.17.5 Error handling

#### 5.17.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

#### 5.17.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the AMPolicyAuthorization API.

#### 5.17.5.3 Application Errors

The application errors defined for the AMPolicyAuthorization API are listed in table 5.17.5.3-1.

**Table 5.17.5.3-1: Application errors**

| Application Error      | HTTP status code | Description                                                                                                                                             |
|------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| INVALID_POLICY_REQUEST | 400 Bad Request  | The HTTP request is rejected because the service information for the AM context is invalid or insufficient for the PCF to perform the requested action. |

|                                     |                           |                                                                                                      |
|-------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------|
| APPLICATION_AM_CONTEXT_NOT_FO<br>ND | 404 Not Found             | The HTTP request is rejected because the specified Individual Application AM Context does not exist. |
| POLICY_ASSOCIATION_NOT_AVAILABLE    | 500 Internal Server Error | The PCF failed in executing binding with the UE/AM Policy Context.                                   |
|                                     |                           |                                                                                                      |

## 5.18 AMInfluence API

### 5.18.0 Introduction

The Nnef\_AMInfluence service shall use the AMInfluence API.

The API URI of AMInfluence API shall be:

**{apiRoot}/3gpp-am-influence/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-am-influence".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.18.1 Resources

#### 5.18.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.18.1.1-1 and the resources and HTTP methods used for the AMInfluence API.

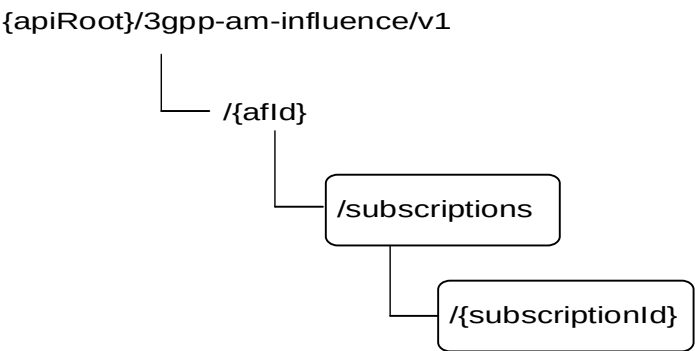


**Figure 5.18.1.1-1: Resource URI structure of the AMInfluence API**

Table 5.18.1.1-1 provides an overview of the resources and HTTP methods applicable for the AMInfluence API.

**Table 5.18.1.1-1: Resources and methods overview**

| Resource name                       | Resource URI          | HTTP method | Description                                |
|-------------------------------------|-----------------------|-------------|--------------------------------------------|
| AM Influence Subscription<br>(NOTE) | /{afId}/subscriptions | GET         | Read all subscriptions for a given AF.     |
|                                     |                       | POST        | Create a new subscription to AM influence. |

|                                                                                                                                                             |                                        |        |                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------|--------------------------------------------------|
| Individual AM Influence Subscription                                                                                                                        | /{afld}/subscriptions/{subscriptionId} | GET    | Read an existing subscription to AM influence.   |
|                                                                                                                                                             |                                        | PUT    | Update an existing subscription to AM influence. |
|                                                                                                                                                             |                                        | PATCH  | Modify an existing subscription to AM influence. |
|                                                                                                                                                             |                                        | DELETE | Delete an existing subscription to AM influence. |
| NOTE: The "AM Influence Subscription" resource is a collection resource and corresponds to the collection of AM Influence Subscriptions managed by the NEF. |                                        |        |                                                  |

### 5.18.1.2 Resource: AM Influence Subscription

#### 5.18.1.2.1 Introduction

This resource allows an AF to read all active AM influence subscriptions and create a new subscription resource for a given AF.

#### 5.18.1.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-am-influence/v1/{afId}/subscriptions

This resource shall support the resource URI variables defined in table 5.18.1.2.2-1.

**Table 5.18.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

#### 5.18.1.2.3 Resource Methods

##### 5.18.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.18.1.2.2.

##### 5.18.1.2.3.2 GET

The GET method allows to read all active subscriptions for a given AF. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.18.1.2.3.2-1.

**Table 5.18.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.18.1.2.3.2-2 and the response data structures and response codes specified in table 5.18.1.2.3.2-3.

**Table 5.18.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.18.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(AmInfluSub)                                                                                                        | M | 0..N        | 200 OK                 | The subscription information for the AF in the request URI are returned.                                                                                                                                                                                        |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                 |

**Table 5.18.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.18.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.18.1.2.3.3 POST

The POST method creates a new subscription resource to AM influence subscription for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.18.1.2.3.3-1 and the response data structures and response codes specified in table 5.18.1.2.3.3-2.

**Table 5.18.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type  | P | Cardinality | Description                                                                                                                       |
|------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
| AmInfluSub | M | 1           | Parameters to create a resource for the AM Influence and/or notification about service area coverage outcome events with the NEF. |

**Table 5.18.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------|
| AmInfluSub                                                                                                                | M | 1           | 201 Created    | The subscription was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                |

**Table 5.18.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|



|          |        |   |   |                                                                                                                                                  |
|----------|--------|---|---|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-am-Influence/v1/{afId}/subscriptions/{subscriptionId} |
|----------|--------|---|---|--------------------------------------------------------------------------------------------------------------------------------------------------|

### 5.18.1.3 Resource: Individual AM Influence Subscription

#### 5.18.1.3.1 Introduction

This resource allows an AF to read, update or delete an existing AM Influence subscription.

#### 5.18.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-am-influence/v1/{afId}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.18.1.3.2-1.

**Table 5.18.1.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                          |
|----------------|-----------|-------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId           | string    | Identifier of the AF.               |
| subscriptionId | string    | Identifier of the subscription.     |

#### 5.18.1.3.3 Resource Methods

##### 5.18.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.18.1.3.2.

##### 5.18.1.3.3.2 GET

The GET method allows to read the active subscription for a given AF and subscription Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.18.1.3.3.2-1.

**Table 5.18.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.18.1.3.3.2-2 and the response data structures and response codes specified in table 5.18.1.3.3.2-3.

**Table 5.18.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.18.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type  | P | Cardinality | Response codes         | Description                                                                                                                                                                           |
|------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AmInfluSub | M | 1           | 200 OK                 | The subscription information for the AF in the request URI are returned.                                                                                                              |
| N/A        |   |             | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. |

|                                                                                                                          |  |  |                        |                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                          |  |  |                        | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                                                                                                       |
| N/A                                                                                                                      |  |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                                                 |

**Table 5.18.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.18.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.18.1.3.3.3 PUT

The PUT method is used to replace an existing subscription resource to update a subscription. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.18.1.3.3.3-1 and the response data structures and response codes specified in table 5.18.1.3.3.3-2.

**Table 5.18.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type  | P | Cardinality | Description                                   |
|------------|---|-------------|-----------------------------------------------|
| AmInfluSub | M | 1           | Modify an existing AM Influence subscription. |

**Table 5.18.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AmInfluSub                                                                                                               | M | 1           | 200 OK                 | The subscription was replaced successfully and a representation is returned.                                                                                                                                                                                       |
| N/A                                                                                                                      |   |             | 204 No Content         | The subscription was replaced successfully.                                                                                                                                                                                                                        |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                    |

**Table 5.18.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.18.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.18.1.3.3.4 PATCH

The PATCH method allows to change some properties of an existing AM influence subscription. The AF shall initiate the HTTP PATCH request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.18.1.3.3.4-1 and the response data structures and response codes specified in table 5.18.1.3.3.4-2.

**Table 5.18.1.3.3.4-1: Data structures supported by the PATCH Request Body on this resource**

| Data type       | P | Cardinality | Description                                                                                                                    |
|-----------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------|
| AmInfluSubPatch | M | 1           | Partial update of a subscription to AM influence and/or notifications about service area coverage outcome events with the NEF. |

**Table 5.18.1.3.3.4-2: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AmInfluSub                                                                                                                 | M | 1           | 200 OK                 | The subscription was partial modified successfully and a representation is returned.                                                                                                                                                                               |
| N/A                                                                                                                        |   |             | 204 No Content         | The subscription was partial modified successfully.                                                                                                                                                                                                                |
| N/A                                                                                                                        |   |             | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                        |   |             | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                    |

**Table 5.18.1.3.3.4-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.18.1.3.3.4-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.18.1.3.3.5 DELETE

The DELETE method deletes an existing individual AM influence subscription for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.18.1.3.3.5-1.

**Table 5.18.1.3.3.5-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.18.1.3.3.5-2 and the response data structures and response codes specified in table 5.18.1.3.3.5-3.

**Table 5.18.1.3.3.5-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.18.1.3.3.5-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |   |             | 204 No Content         | The subscription was terminated successfully.                                                                                                                                                                                                                     |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                   |

**Table 5.18.1.3.3.5-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.18.1.3.3.5-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.18.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.18.2 Notifications

### 5.18.2.1 Introduction

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.18.2.1-1: Notifications overview**

| Notification       | Callback URI              | HTTP method or custom operation | Description (service operation)                             |
|--------------------|---------------------------|---------------------------------|-------------------------------------------------------------|
| Event Notification | {notificationDestination} | POST                            | The AM influence event notification from the NEF to the AF. |

### 5.18.2.2 Event Notification

#### 5.18.2.2.1 Description

The Event Notification is used by the NEF to report AM influence event(s) to the AF.

#### 5.18.2.2.2 Target URI

The Callback URI "{notificationDestination}" shall be used with the callback URI variables defined in table 5.18.2.2.2-1.

**Table 5.18.2.2.2-1: Callback URI variables**

| Name                    | Data type | Definition                                                                                                                                                                                                                 |
|-------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| notificationDestination | Link      | Callback reference provided by the AF during creation/modification of the subscription within the AmInfluSub data type as defined in Table 5.18.3.3.2-1 or the AmInfluSubPatch data type as defined in Table 5.18.3.3.3-1. |

### 5.18.2.2.3 Operation Definition

#### 5.18.2.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.18.2.2.3.1-1 and the response data structures and response codes specified in table 5.18.2.2.3.1-2.

**Table 5.18.2.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type         | P | Cardinality | Description                                                           |
|-------------------|---|-------------|-----------------------------------------------------------------------|
| AmInfluEventNotif | M | 1           | The AM influence event notification is provided by the NEF to the AF. |

**Table 5.18.2.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                |
|-----------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A       |   |             | 204 No Content         | The event notification is received successfully.                                                                                                                                                                                                                                           |
| N/A       |   |             | 307 Temporary Redirect | Temporary redirection.<br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

|                                                                                                                                      |  |  |                              |                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                                  |  |  | 308<br>Permanent<br>Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                              |                                                                                                                                                                                                                                                                                                |

**Table 5.18.2.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.18.2.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

#### 5.18.2.2.3.2 Notification via Websocket

If supported by both AF and NEF and successfully negotiated, the AmInfluEventNotif may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4 of 3GPP TS 29.122 [4].

### 5.18.3 Data Model

#### 5.18.3.1 General

This clause specifies the application data model supported by the AMInfluence API.

Table 5.18.3.1-1 specifies the data types defined for the AMInfluence API.

**Table 5.18.3.1-1: AMInfluence API specific Data Types**

| Data type            | Clause defined | Description                                                                                                                                  | Applicability  |
|----------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| AmInfluEvent         | 5.18.3.4.3     | Represents the service area coverage outcome event.                                                                                          |                |
| AmInfluEventNotif    | 5.18.3.3.4     | Represents an AM influence event notification.                                                                                               |                |
| AmInfluSub           | 5.18.3.3.2     | Represents an AM influence subscription.                                                                                                     |                |
| AmInfluSubPatch      | 5.18.3.3.3     | Represents parameters to request the modification of an AM influence subscription resource.                                                  |                |
| DnnSnssaiInformation | 5.18.3.3.5     | Represents a (DNN, SNSSAI) combination.                                                                                                      |                |
| SliceReplReqInfoRm   | 5.18.3.3.6     | Represents the same as the SliceReplReqInfo data type specified in clause 5.17.3.3.5 but with the OpenAPI "nullable" property set to "true". | AfNetSliceRepl |

#### 5.18.3.2 Reused data types

The data types reused by the AMInfluence API from other specifications are listed in table 5.18.3.2-1.

**Table 5.18.3.2-1: Re-used Data Types**

| Data type            | Reference           | Comments                                                                                                          | Applicability     |
|----------------------|---------------------|-------------------------------------------------------------------------------------------------------------------|-------------------|
| Dnn                  | 3GPP TS 29.571 [8]  | Identifies a DNN.                                                                                                 |                   |
| DurationSec          | 3GPP TS 29.122 [4]  | Indicates the time duration.                                                                                      |                   |
| DurationSecRm        | 3GPP TS 29.122 [4]  | Indicates the time duration, same as the "DurationSec" data type, but with the OpenAPI "nullable: true" property. |                   |
| ExternalGroupld      | 3GPP TS 29.122 [4]  | External Group Identifier for a user group.                                                                       |                   |
| GeographicalArea     | Clause 5.17.3.3.4   | Identifies the geographical area information.                                                                     |                   |
| Gpsi                 | 3GPP TS 29.571 [8]  | Identifies a GPSI.                                                                                                |                   |
| Link                 | 3GPP TS 29.122 [4]  | Identifies a referenced resource.                                                                                 |                   |
| LinkRm               | 3GPP TS 29.122 [4]  | Indicates a referenced resource, same as the "Link" data type, but with the OpenAPI "nullable: true" property.    |                   |
| Plmnld               | 3GPP TS 29.571 [8]  | Identifies a PLMN.                                                                                                | DCAMP_Roaming_LBO |
| SliceReplReqInfo     | Clause 5.17.3.3.5   | Represents the AF requested Network Slice Replacement requirements information.                                   | AfNetSliceRepl    |
| SliceReplOutcomeInfo | 3GPP TS 29.534 [43] | Represents the Network Slice Replacement outcome related information.                                             | AfNetSliceRepl    |
| Snsai                | 3GPP TS 29.571 [8]  | Identifies the S-NSSAI.                                                                                           |                   |
| SupportedFeatures    | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features defined in table 5.18.4-1.                           |                   |
| WebsocketNotifConfig | 3GPP TS 29.122 [4]  | Contains the configuration parameters to set up notification delivery over WebSocket protocol.                    |                   |

### 5.18.3.3 Structured data types

#### 5.18.3.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.18.3.3.2 Type: AmInfluSub

This type represents an AM influence subscription. The same structure is used in the subscription request and subscription response.

**Table 5.18.3.3.2-1: Definition of type AMInfluSub**

| Attribute name  | Data type       | P | Cardinality | Description                                                                                                                                                                                                                                                            | Applicability (NOTE 1) |
|-----------------|-----------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| afTransld       | string          | M | 1           | Identifies an NEF Northbound interface transaction request, generated by the AF.                                                                                                                                                                                       |                        |
| gpsi            | Gpsi            | O | 0..1        | Identifies a user with GPSI.<br>(NOTE 3)                                                                                                                                                                                                                               |                        |
| externalGroupld | ExternalGroupld | O | 0..1        | Identifies a group of users.<br>(NOTE 3)                                                                                                                                                                                                                               |                        |
| anyUeInd        | boolean         | O | 0..1        | Identifies whether the AF request applies to any UE (i.e. all non-roaming UEs).<br><br>- Set to "true": the AF request is applicable to any UE (i.e. all non-roaming UEs).<br>- Set to "false": the AF request is not applicable to any UE (i.e. all non-roaming UEs). |                        |

|                         |                             |   |      |                                                                                                                                                                                          |                         |
|-------------------------|-----------------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
|                         |                             |   |      | - Default value is "false" if omitted.<br><br>(NOTE 2) (NOTE 3)                                                                                                                          |                         |
| roamUePlmnIds           | array(PlmnId)               | O | 1..N | Indicates a list of PLMNs representing the home PLMN for the inbound roaming UEs in LBO roaming scenarios.<br><br>(NOTE 3) (NOTE 5)                                                      | DCAMP_Roaming_LBO       |
| dnnSnssaiInfos          | array(DnnSnssaiInformation) | O | 1..N | Each of the element identifies a combination of (DNN, S-NSSAI).                                                                                                                          |                         |
| afAppIds                | array(string)               | O | 1..N | Identifies application(s).                                                                                                                                                               |                         |
| highThruInd             | boolean                     | C | 0..1 | Indicates whether high throughput is desired for UE traffic. Set to "true" if high throughput is desired; otherwise set to "false". Default value is "false" if omitted.<br><br>(NOTE 4) |                         |
| geoAreas                | array(Geographical Area)    | C | 1..N | Contains the geographical area(s) constituting the AF-requested service area coverage.<br><br>(NOTE 4)                                                                                   |                         |
| policyDuration          | DurationSec                 | O | 0..1 | Indicates the time duration that the policy shall last.                                                                                                                                  |                         |
| sliceReplReqInfo        | SliceReplReqInfo            | C | 0..1 | Represents the requested Network Slice Replacement requirements information.<br><br>(NOTE 4)                                                                                             | AfNetSliceRepl          |
| self                    | Link                        | C | 0..1 | Link to the created resource.<br><br>This parameter shall be supplied by the NEF in HTTP responses that include an object of AmInfluSub type.                                            |                         |
| subscribedEvents        | array(AmInfluEvent)         | O | 1..N | Identifies the requirement to be notified of the event(s).                                                                                                                               |                         |
| notificationDestination | Link                        | C | 0..1 | Contains the Callback URL to receive the notification from the NEF.<br>It shall be present if the "subscribedEvents" is present.                                                         |                         |
| requestTestNotification | boolean                     | O | 0..1 | Set to true by the AF to request the NEF to send a test notification as defined in clause 5.2.5.3 of 3GPP TS 29.122 [4]. The default value is "false" if omitted.                        | Notification_test_event |
| websocketNotifConfig    | WebsocketNotifConfig        | O | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol.                                                                                                        | Notification_websocket  |
| suppFeat                | SupportedFeatures           | C | 0..1 | Contains the list of supported feature(s) among the ones defined in clause 5.18.4.<br><br>This attribute shall be present only when feature negotiation needs to take place.             |                         |



|         |                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NOTE 1: | Properties marked with a feature as defined in clause 5.18.4 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property applies for all the features.                                                                                                                                                                                             |
| NOTE 2: | If target to any non-roaming UE, then "anyUeInd" attribute together with "dnnSnssailInfos" attribute or "afApplds" attribute shall be included.                                                                                                                                                                                                                                                            |
| NOTE 3: | One of individual UE identifier (i.e. "gpsi" attribute), External Group Identifier (i.e. "externalGroupId" attribute) or any UE indication (i.e. "anyUeInd" attribute) or any inbound roaming UEs PLMN ID (i.e. "roamUePlmnIds") shall be included. When the "AfNetSliceRepl" feature is supported and the "sliceReplReqInfo" attribute is present, then it is the "gpsi" attribute that shall be present. |
| NOTE 4: | At least one of these attributes shall be present.                                                                                                                                                                                                                                                                                                                                                         |
| NOTE 5: | "roamUePlmnIds" attribute is applicable only in LBO roaming scenarios and if "afApplds" attribute or "dnnSnssailInfos" is provided.                                                                                                                                                                                                                                                                        |

### 5.18.3.3.3 Type: AmInfluSubPatch

This type represents AM influence subscription parameters provided by the AF to the NEF. The structure is used for HTTP PATCH request.

**Table 5.18.3.3.3-1: Definition of type AmInfluSubPatch**

| Attribute name                                                                                                                                | Data type                | P | Cardinality | Description                                                                                                                                                                       | Applicability  |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| highThruInd                                                                                                                                   | boolean                  | O | 0..1        | Indicates whether high throughput is desired for UE traffic. Set to "true" if high throughput is desired; Set to "false" if low throughput is desired; Otherwise, set to "false". |                |
| geoAreas                                                                                                                                      | array(Geographical Area) | O | 1..N        | Contains the geographical area(s) constituting the AF-requested service area coverage.<br>(NOTE 1)                                                                                |                |
| policyDuration                                                                                                                                | DurationSecRm            | O | 0..1        | Indicates the time duration that the policy shall last. (NOTE 1)                                                                                                                  |                |
| sliceReplReqInfo                                                                                                                              | SliceReplReqInfoRm       | O | 0..1        | Represents the requested Network Slice Replacement requirements information.                                                                                                      | AfNetSliceRepl |
| dnnSnssailInfos                                                                                                                               | array(DnnSnssailInfo)    | O | 1..N        | Each of the element identifies a combination of (DNN, S-NSSAI).<br>(NOTE 1)                                                                                                       |                |
| subscribedEvents                                                                                                                              | array(AmInfluEvent)      | O | 1..N        | Identifies the requirement to be notified of the event(s).<br>(NOTE 1)                                                                                                            |                |
| notificationDestination                                                                                                                       | LinkRm                   | O | 0..1        | Contains the Callback URL to receive the notification from the NEF.<br>(NOTE 1, NOTE 2)                                                                                           |                |
| afApplds                                                                                                                                      | array(string)            | O | 1..N        | Identifies application(s).<br>(NOTE 1)                                                                                                                                            |                |
| NOTE 1: The value of the property shall be set to NULL for removal.                                                                           |                          |   |             |                                                                                                                                                                                   |                |
| NOTE 2: The notificationDestination attribute set to NULL may be included only if the subscribedEvents attribute is included and set to NULL. |                          |   |             |                                                                                                                                                                                   |                |

## 5.18.3.3.4 Type: AmInfluEventNotif

**Table 5.18.3.3.4-1: Definition of type AmInfluEventNotif**

| Attribute name                                                                                    | Data type               | P | Cardinality | Description                                                                                                                                                                                                     | Applicability           |
|---------------------------------------------------------------------------------------------------|-------------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| afTransId                                                                                         | string                  | M | 1           | Identifies the AF request for AM policy influence that the event report is related to.                                                                                                                          |                         |
| event                                                                                             | AmInfluEvent            | M | 1           | Notified event.                                                                                                                                                                                                 |                         |
| gpsis                                                                                             | array(Gpsi)             | O | 1..N        | Contains the identifier(s) of the UE(s) to which the notification is related.<br><br>(NOTE)                                                                                                                     | UeSpecificNotifications |
| geoAreas                                                                                          | array(GeographicalArea) | C | 1..N        | Contains the geographical area(s) constituting the allowed service area coverage by the network.<br><br>This attribute shall be present only when the "event" attribute is set to "SERVICE_AREA_COVRG_OUTCOME". |                         |
| sliceReplOut                                                                                      | SliceReplOutcomeInfo    | C | 0..1        | Represents the notification of the outcome of the AF requested Network Slice Replacement.<br><br>This attribute shall be present only when the "event" attribute is set to "SLICE_REPLACE_OUTCOME".             | AfNetSliceRepl          |
| NOTE: This attribute is not applicable to notifications of subscriptions that target a single UE. |                         |   |             |                                                                                                                                                                                                                 |                         |

## 5.18.3.3.5 Type: DnnSnssaiInformation

**Table 5.18.3.3.5-1: Definition of type DnnSnssaiInformation**

| Attribute name | Data type | P | Cardinality | Description                                                                                                                       | Applicability |
|----------------|-----------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------|
| dnn            | Dnn       | O | 0..1        | Identifies a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. |               |
| snssai         | Snssai    | O | 0..1        | Identifies an S-NSSAI.                                                                                                            |               |

## 5.18.3.3.6 Type: SliceReplReqInfoRm

This data type is defined in the same way as the SliceReplReqInfo data type specified in clause 5.17.3.3.5 but with the OpenAPI "nullable" property set to "true".

## 5.18.3.4 Simple data types and enumerations

## 5.18.3.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.18.3.4.2 Simple data types

The simple data types defined in table 5.18.3.4.2-1 shall be supported.

**Table 5.18.3.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.18.3.4.3 Enumeration: AmInfluEvent

The enumeration AmInfluEvent represents the events that the AF can subscribe. It shall comply with the provisions defined in table 5.18.3.4.3-1.

**Table 5.18.3.4.3-1: Enumeration AmInfluEvent**

| Enumeration value             | Description                                                                                                      | Applicability  |
|-------------------------------|------------------------------------------------------------------------------------------------------------------|----------------|
| SERVICE_AREA_COVERAGE_OUTCOME | Indicates that the AM Influence event is the service area coverage outcome.                                      |                |
| SLICE_REPLACE_OUTCOME         | Indicates that the AM Influence event is the notification of the AF requested Network Slice Replacement outcome. | AfNetSliceRepl |

## 5.18.4 Used Features

The table below defines the features applicable to the AMInfluence API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.18.4-1: Features used by AMInfluence API**

| Feature number                                                                                                                                                  | Feature Name            | Description                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                                                                                                               | Notification_websocket  | The delivery of notifications over Websocket is supported as described in 3GPP TS 29.122 [4]. This feature requires that the Notification_test_event feature is also supported.                                                                                                         |
| 2                                                                                                                                                               | Notification_test_event | The testing of notification connection is supported as described in 3GPP TS 29.122 [4].                                                                                                                                                                                                 |
| 3                                                                                                                                                               | DCAMP_Roaming_LBO       | This feature indicates support for dynamically changing AM policy for LBO roaming scenarios for inbound roaming UE(s).                                                                                                                                                                  |
| 4                                                                                                                                                               | AfNetSliceRepl          | This feature indicates support of the enhancements to support AF requested Network Slice Replacement services.<br><br>The following functionalities are supported:<br>- Support the provisioning and management of the AF requested Network Slice Replacement requirements information. |
| 5                                                                                                                                                               | UeSpecificNotifications | This feature indicates support for providing the identifier of the UE to which an AM Influence Event Notification applies.                                                                                                                                                              |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".<br>Description: A clear textual description of the feature. |                         |                                                                                                                                                                                                                                                                                         |

## 5.18.5 Error handling

### 5.18.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.18.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the AMInfluence API.

### 5.18.5.3 Application Errors

The application errors defined for AMInfluence API are listed in table 5.18.5.3-1.

Table 5.18.5.3-1: Application errors

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

5.19 MBSTMGI API

5.19.1 Introduction

The Nnef\_MBSTMGI service shall use the MBSTMGI API.

The API URI of MBSTMGI API shall be:

**{apiRoot}/3gpp-mbs-tmgi/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-mbs-tmgi".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

5.19.2 Resources

There are no resources defined for this API in this release of the specification.

5.19.3 Custom Operations without associated resources

5.19.3.1 Overview

The structure of the custom operation URIs of the MBSTMGI API is shown in Figure 5.19.3.1-1.

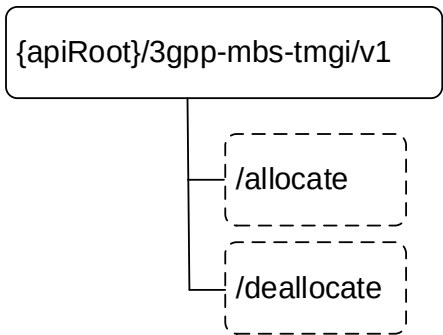


Figure 5.19.3.1-1: Custom operation URI structure of the MBSTMGI API

Table 5.19.3.1-1 provides an overview of the custom operations and applicable HTTP methods.

Table 5.19.3.1-1: Custom operations without associated resources

| Operation name | Custom operation URI | Mapped HTTP method | Description |
|----------------|----------------------|--------------------|-------------|
|----------------|----------------------|--------------------|-------------|

|            |             |      |                                                                                                                          |
|------------|-------------|------|--------------------------------------------------------------------------------------------------------------------------|
| Allocate   | /allocate   | POST | Request the allocation of TMGI(s) for new MBS session(s) or the refresh of the expiry time of already allocated TMGI(s). |
| Deallocate | /deallocate | POST | Request the deallocation of TMGI(s).                                                                                     |

### 5.19.3.2 Operation: Allocate

#### 5.19.3.2.1 Description

The custom operation enables an AF to request the allocation of TMGI(s) for new MBS session(s) or the refresh of the expiry time of already allocated TMGI(s).

#### 5.19.3.2.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.19.3.2.2-1 and table 5.19.3.2.2-2.

**Table 5.19.3.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type        | P | Cardinality | Description                                                                                                                                               |
|------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| TmgiAllocRequest | M | 1           | Represents the parameters to request the allocation of TMGI(s) for new MBS session(s) or the refresh of the expiry time of already allocated MBS TMGI(s). |

**Table 5.19.3.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TmgiAllocResponse                                                                                                           | M | 1           | 200 OK                 | Successful case: The TMGI allocation information (e.g. allocated MBS TMGIs, expiry time) or the refreshed expiry time for the concerned already allocated MBS TMGI(s) is/are returned to the requesting AF.                    |
| n/a                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetailsTmgiAlloc                                                                                                     | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                       |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |
| NOTE 2: Failure cases are described in clause 5.19.7.                                                                       |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.19.3.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**Table 5.19.3.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                          |
|----------|--------|---|---|--------------------------------------------------------------------------|
| Location | string | M | 1 | An alternative target URI of the resource located in an alternative NEF. |
|----------|--------|---|---|--------------------------------------------------------------------------|

### 5.19.3.3 Operation: Deallocate

#### 5.19.3.3.1 Description

The custom operation enables an AF to request the deallocation of TMGI(s).

#### 5.19.3.3.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.19.3.3.2-1 and table 5.19.3.3.2-2.

**Table 5.19.3.3.2-1: Data structures supported by the POST Request Body on this resource**

| Data type          | P | Cardinality | Description                                                                                               |
|--------------------|---|-------------|-----------------------------------------------------------------------------------------------------------|
| TmgiDeallocRequest | M | 1           | Represents the MBS TMGI(s) deallocation request information (e.g. list of MBS TMGI(s) to be deallocated). |

**Table 5.19.3.3.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                       |   |             | 204 No Content         | Successful case: The requested MBS TMGI(s) are deallocated.                                                                                                                                                                    |
| n/a                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]  |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.19.3.3.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**Table 5.19.3.3.2-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

## 5.19.4 Notifications

### 5.19.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.19.4.1-1: Notifications overview**

| Notification                                       | Callback URI      | HTTP method or custom operation | Description (service operation)                                                       |
|----------------------------------------------------|-------------------|---------------------------------|---------------------------------------------------------------------------------------|
| Notification of Allocated MBS TMGI(s) Timer Expiry | {notificationUri} | POST                            | Enable the NEF to notify an AF of the timer expiry for already allocated MBS TMGI(s). |

### 5.19.4.2 Notification of Allocated MBS TMGI(s) Timer Expiry

#### 5.19.4.2.1 Description

The Notification is used by the NEF to report timer expiry of already allocated TMGI(s) to the AF.

#### 5.19.4.2.2 Target URI

The Callback URI "{notificationUri}" shall be used with the callback URI variables defined in table 5.19.4.2.2-1.

**Table 5.19.4.2.2-1: Callback URI variables**

| Name            | Definition                                                                                                                         |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------|
| notificationUri | Callback URI provided by the AF during the MBS TMGI(s) allocation or expiry time refresh request as defined in table 5.19.5.2.2-1. |

#### 5.19.4.2.3 Operation Definition

##### 5.19.4.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.19.4.2.3.1-1 and the response data structures and response codes specified in table 5.19.4.2.3.1-2.

**Table 5.19.4.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type   | P | Cardinality | Description                                                                                                                  |
|-------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------|
| ExpiryNotif | M | 1           | Represents the MBS TMGI(s) timer expiry notification information (e.g. list of MBS TMGI(s) for which the timer has expired). |

**Table 5.19.4.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                                |
|-----------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | The notification is received successfully.                                                                                                                                                                                                                                                                 |
| n/a       |   |             | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a       |   |             | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing                                                                                                                                                                                            |

|                                                                                                                           |  |  |  |                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                           |  |  |  | an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |  |                                                                                                                                                                                            |

**Table 5.19.4.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.19.4.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

#### 5.19.4.2.3.2 Notification via Websocket

If supported by both AF and NEF and successfully negotiated, the Notification of Allocated MBS TMGI(s) Timer Expiry may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4 of 3GPP TS 29.122 [4].

## 5.19.5 Data Model

### 5.19.5.1 General

This clause specifies the application data model supported by the MBSTMGI API. Table 5.19.5.1-1 specifies the data types defined for the MBSTMGI API.

**Table 5.19.5.1-1: MBSTMGI specific Data Types**

| Data type               | Clause defined     | Description                                                                                                                                    | Applicability |
|-------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| ExpiryNotif             | 5.19.5.2.5         | Represents TMGI(s) timer expiry notification information.                                                                                      |               |
| ExternalMbsServiceArea  | 3GPP TS 29.571 [8] | Represents an external MBS service area.                                                                                                       |               |
| MbsServiceArea          | 3GPP TS 29.571 [8] | Represents an MBS service area.                                                                                                                |               |
| ProblemDetailsTmgiAlloc | 5.19.5.4.1         | Represents an extension to the ProblemDetails data structure with additional error information related to TMGI Allocation.                     |               |
| ReducedMbsServArea      | 5.19.5.2.6         | Represents the reduced MBS Service Area information.                                                                                           |               |
| TmgiAllocRequest        | 5.19.5.2.2         | Represents the full set of parameters to initiate a TMGI(s) allocation request or the refresh of the expiry time of already allocated TMGI(s). |               |
| TmgiAllocResponse       | 5.19.5.2.3         | Represents TMGI(s) allocation information or the refreshed expiry time for already allocated TMGI(s).                                          |               |
| TmgiDeallocRequest      | 5.19.5.2.4         | Represents information to request the deallocation of TMGI(s).                                                                                 |               |



Table 5.19.5.1-2 specifies data types re-used by the MBSTMGI API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the MBSTMGI API.

**Table 5.19.5.1-2: MBSTMGI API re-used Data Types**

| Data type            | Reference           | Comments                                                                                                                     | Applicability |
|----------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------|---------------|
| ProblemDetails       | 3GPP TS 29.122 [4]  | Represents error related information.                                                                                        |               |
| SupportedFeatures    | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features.             |               |
| Tmgi                 | 3GPP TS 29.571 [8]  | Contains a TMGI.                                                                                                             |               |
| TmgiAllocate         | 3GPP TS 29.532 [52] | Contains parameters to initiate a TMGI(s) allocation request or the refresh of the expiry time of already allocated TMGI(s). |               |
| TmgiAllocated        | 3GPP TS 29.532 [52] | Contains the TMGI(s) allocation information or the refreshed expiry time for already allocated TMGI(s).                      |               |
| Uri                  | 3GPP TS 29.122 [4]  | Contains a TMGI.                                                                                                             |               |
| WebsocketNotifConfig | 3GPP TS 29.122 [4]  | Contains the configuration parameters to set up notification delivery over Websocket protocol.                               |               |

## 5.19.5.2 Structured data types

### 5.19.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

### 5.19.5.2.2 Type: TmgiAllocRequest

**Table 5.19.5.2.2-1: Definition of type TmgiAllocRequest**

| Attribute name          | Data type              | P | Cardinality | Description                                                                                                                                                     | Applicability           |
|-------------------------|------------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| afId                    | string                 | M | 1           | Contains the identifier of the AF that is sending the request.                                                                                                  |                         |
| tmgiParams              | TmgiAllocate           | M | 1           | Contains the parameters to request the allocation of TMGI(s) for new MBS session(s) or the refresh of the expiry time of already allocated MBS TMGI(s).         |                         |
| notificationUri         | Uri                    | O | 0..1        | The notification URI via which the AF desires to receive notifications on timer expiry for MBS TMGI(s).                                                         |                         |
| mbsServiceArea          | MbsServiceArea         | O | 0..1        | Indicates the MBS service area for the TMGI(s) to be allocated.<br><br>This attribute may be provided by the AF for a local MBS service.<br><br>(NOTE)          |                         |
| extMbsServiceArea       | ExternalMbsServiceArea | O | 0..1        | Indicates the external MBS service area for the TMGI(s) to be allocated.<br><br>This attribute may be provided by the AF for a local MBS service.<br><br>(NOTE) |                         |
| requestTestNotification | boolean                | O | 0..1        | Indicates whether sending a test notification shall be performed.                                                                                               | Notification_test_event |

|                                                                                   |                      |   |      |                                                                                                                                                                        |                        |
|-----------------------------------------------------------------------------------|----------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
|                                                                                   |                      |   |      | Set to "true" by the AF to request the NEF to send a test notification as defined in clause 5.2.5.3 of 3GPP TS 29.122 [4].<br><br>Set to "false" or omitted otherwise. |                        |
| websocketNotifConfig                                                              | WebsocketNotifConfig | O | 0..1 | Represents configuration parameters to set up notification delivery over the Websocket protocol.                                                                       | Notification_websocket |
| suppFeat                                                                          | SupportedFeatures    | C | 0..1 | Indicates the features supported by the AF.<br><br>This attribute shall be provided if feature negotiation needs to take place.                                        |                        |
| NOTE: These attributes are mutually exclusive. Either one of them may be present. |                      |   |      |                                                                                                                                                                        |                        |

#### 5.19.5.2.3 Type: TmgiAllocResponse

**Table 5.19.5.2.3-1: Definition of type TmgiAllocResponse**

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                                                                      | Applicability |
|----------------|-------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| tmgInfo        | TmgiAllocated     | M | 1           | Contains the MBS TMGI(s) allocation information or the refreshed expiry time for already allocated MBS TMGI(s).                                                                                                  |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Indicates the features supported by both the AF and the NEF.<br><br>This attribute shall be provided if feature negotiation needs to take place and it was provided by the AF in the corresponding request body. |               |

#### 5.19.5.2.4 Type: TmgiDeallocRequest

**Table 5.19.5.2.4-1: Definition of type TmgiDeallocRequest**

| Attribute name | Data type   | P | Cardinality | Description                                                    | Applicability |
|----------------|-------------|---|-------------|----------------------------------------------------------------|---------------|
| afId           | string      | M | 1           | Contains the identifier of the AF that is sending the request. |               |
| tmgis          | array(Tmgi) | M | 1..N        | Contains the list of TMGI(s) to be deallocated.                |               |

#### 5.19.5.2.5 Type: ExpiryNotif

**Table 5.19.5.2.5-1: Definition of type ExpiryNotif**

| Attribute name | Data type   | P | Cardinality | Description                                                                        | Applicability |
|----------------|-------------|---|-------------|------------------------------------------------------------------------------------|---------------|
| tmgis          | array(Tmgi) | M | 1..N        | Contains the list of previously allocated MBS TMGI(s) for which the timer expired. |               |

## 5.19.5.2.6 Type: ReducedMbsServArea

**Table 5.19.5.2.6-1: Definition of type ReducedMbsServArea**

| Attribute name                                                                                                                                                                                                                                                                                                                                                                                                                             | Data type                     | P | Cardinality | Description                                                                                                                                                                                                    | Applicability |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| reducedMbsServArea                                                                                                                                                                                                                                                                                                                                                                                                                         | MbsServiceArea                | C | 0..1        | Represents the reduced MBS Service Area information that can be supported by a single MB-SMF.<br><br>(NOTE 1) (NOTE 3)                                                                                         |               |
| reducedExtMbsServArea                                                                                                                                                                                                                                                                                                                                                                                                                      | ExternalMbsServiceArea        | C | 0..1        | Represents the reduced external MBS Service Area information that can be supported by a single MB-SMF.<br><br>(NOTE 1) (NOTE 4)                                                                                |               |
| reducedMbsServAreas                                                                                                                                                                                                                                                                                                                                                                                                                        | array(MbsServiceArea)         | C | 1..N        | Represents the additional reduced MBS Service Areas. Each reduced MBS Service Area provided within each array element of this attribute can be supported by a single MB-SMF.<br><br>(NOTE 2) (NOTE 4)          |               |
| reducedExtMbsServAreas                                                                                                                                                                                                                                                                                                                                                                                                                     | array(ExternalMbsServiceArea) | C | 1..N        | Represents the additional reduced external MBS Service Areas. Each reduced MBS Service Area provided within each array element of this attribute can be supported by a single MB-SMF.<br><br>(NOTE 2) (NOTE 3) |               |
| NOTE 1: These attributes are mutually exclusive. Either one of them shall be present.<br>NOTE 2: These attributes are mutually exclusive. Either one of them may be present.<br>NOTE 3: If the "reducedMbsServArea" attribute is present, then the "reducedExtMbsServAreas" attribute shall not be present.<br>NOTE 4: If the "reducedExtMbsServArea" attribute is present, then the "reducedMbsServAreas" attribute shall not be present. |                               |   |             |                                                                                                                                                                                                                |               |

## 5.19.5.3 Simple data types and enumerations

## 5.19.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.19.5.3.2 Simple data types

The simple data types defined in Table 5.19.5.3.2-1 shall be supported.

**Table 5.19.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.19.5.4 Data types describing alternative data types or combinations of data types

### 5.19.5.4.1 Type: ProblemDetailsTmgiAlloc

**Table 5.19.5.4.1-1: Definition of type ProblemDetailsTmgiAlloc as a list of to be combined data types**

| Data type          | Cardinality | Description                                        | Applicability |
|--------------------|-------------|----------------------------------------------------|---------------|
| ProblemDetails     | 1           | Contains additional error related information.     |               |
| ReducedMbsServArea | 0..1        | Contains the reduced MBS Service Area information. |               |

## 5.19.6 Used Features

The table below defines the features applicable to the MBSTMGI API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.19.6-1: Features used by MBSTMGI API**

| Feature number | Feature Name            | Description                                                                                                                                                                     |
|----------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | Notification_websocket  | The delivery of notifications over Websocket is supported as described in 3GPP TS 29.122 [4]. This feature requires that the Notification_test_event feature is also supported. |
| 2              | Notification_test_event | The testing of notification connection is supported as described in 3GPP TS 29.122 [4].                                                                                         |

## 5.19.7 Error handling

### 5.19.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.19.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the MBSTMGI API.

### 5.19.7.3 Application Errors

The application errors defined for the MBSTMGI API are listed in table 5.19.7.3-1.

**Table 5.19.7.3-1: Application errors**

| Application Error              | HTTP status code | Description                                                                                                                                                                                                              |
|--------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBS_SERVICE_AREA_TOO_LARGE     | 403 Forbidden    | Indicates that the TMGI allocation request is rejected because the provided MBS Service Area cannot be supported by the network as it is too large to be served by a single MB-SMF.                                      |
| MBS_SERVICE_AREA_NOT_SUPPORTED | 403 Forbidden    | Indicates that the TMGI allocation request is rejected because the requested MBS Service Area is not supported (e.g., the MBS Service Area received from the AF cannot be covered by the service area(s) of any MB-SMF). |

## 5.20 MBSSession API

### 5.20.1 Introduction

The Nnef\_MBSSession service shall use the MBSSession API.

The API URI of MBSSession API shall be:

**{apiRoot}/3gpp-mbs-session/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-mbs-session".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.20.2 Resources

#### 5.20.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.20.2.1-1 and the resources and HTTP methods used for the MBSSession API.

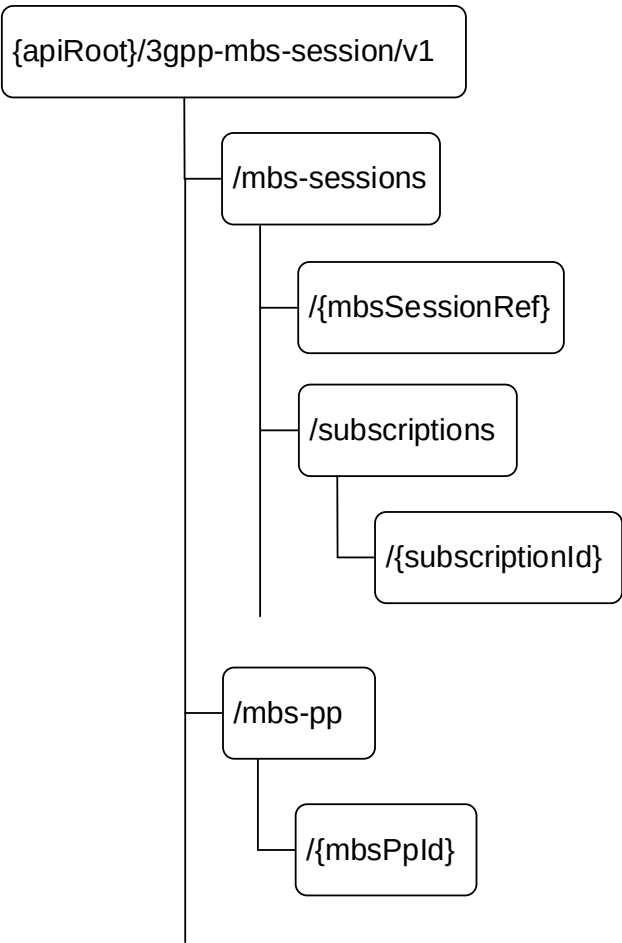


Figure 5.20.2.1-1: Resource URI structure of the MBSSession API

Table 5.20.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 5.20.2.1-1: Resources and methods overview

| Resource name                       | Resource URI (relative path under API URI)   | HTTP method or custom operation | Description (service operation)                                    |
|-------------------------------------|----------------------------------------------|---------------------------------|--------------------------------------------------------------------|
| MBS Sessions                        | /mbs-sessions                                | POST                            | Create an MBS Session.                                             |
| Individual MBS Session              | /mbs-sessions/{mbsSessionRef}                | PATCH                           | Modify an existing Individual MBS Session resource.                |
|                                     |                                              | DELETE                          | Delete an existing Individual MBS Session resource.                |
| MBS Session Subscriptions           | /mbs-sessions/subscriptions                  | GET                             | Retrieve all the MBS Session Subscriptions                         |
|                                     |                                              | POST                            | Create an MBS Session Subscription.                                |
| Individual MBS Session Subscription | /mbs-sessions/subscriptions/{subscriptionId} | GET                             | Retrieve an existing Individual MBS Session Subscription resource. |
|                                     |                                              | DELETE                          | Delete an existing Individual MBS Session Subscription resource.   |

|                                        |                   |        |                                                                                          |
|----------------------------------------|-------------------|--------|------------------------------------------------------------------------------------------|
| MBS Parameters Provisionings           | /mbs-pp           | GET    | Retrieve all the MBS Parameters Provisioning resources.                                  |
|                                        |                   | POST   | Request the creation of a new MBS Parameters Provisioning.                               |
| Individual MBS Parameters Provisioning | /mbs-pp/{mbsPpId} | GET    | Retrieve an existing individual MBS Parameters Provisioning resource.                    |
|                                        |                   | PUT    | Request the update of an existing Individual MBS Parameters Provisioning resource.       |
|                                        |                   | PATCH  | Request the modification of an existing Individual MBS Parameters Provisioning resource. |
|                                        |                   | DELETE | Request the deletion of an existing Individual MBS Parameters Provisioning resource.     |

## 5.20.2.2 Resource: MBS sessions

### 5.20.2.2.1 Introduction

This resource represents the collection of MBS sessions managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

### 5.20.2.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-mbs-session/v1/mbs-sessions**

This resource shall support the resource URI variables defined in table 5.20.2.2.2-1.

**Table 5.20.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.20.1. |

### 5.20.2.2.3 Resource Methods

#### 5.20.2.2.3.1 POST

This method enables an AF to request the creation of an MBS session resource at the NEF.

This method shall support the URI query parameters specified in table 5.20.2.2.3.1-1.

**Table 5.20.2.2.3.1-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| N/A  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.2.3.1-2 and the response data structures and response codes specified in table 5.20.2.2.3.1-3.

**Table 5.20.2.2.3.1-2: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
|-----------|---|-------------|-------------|

|                     |   |   |                                                             |
|---------------------|---|---|-------------------------------------------------------------|
| MbsSessionCreateReq | M | 1 | Representation of the MBS session to be created at the NEF. |
|---------------------|---|---|-------------------------------------------------------------|

**Table 5.20.2.2.3.1-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response codes  | Description                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MbsSessionCreateRsp                                                                                                        | M | 1           | 201 Created     | Successful case. A representation of the created Individual MBS Session resource is returned.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| ProblemDetails                                                                                                             | O | 0..1        | 400 Bad Request | (NOTE 2)                                                                                                                                                                             |
| ProblemDetailsTmgiAlloc                                                                                                    | O | 0..1        | 403 Forbidden   | (NOTE 2)                                                                                                                                                                             |
| ProblemDetails                                                                                                             | O | 0..1        | 404 Not Found   | (NOTE 2)                                                                                                                                                                             |
| NOTE 1: The mandatory HTTP error status code for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                 |                                                                                                                                                                                      |
| NOTE 2: Failure cases are described in clause 5.20.7.                                                                      |   |             |                 |                                                                                                                                                                                      |

**Table 5.20.2.2.3.1-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                            |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-mbs-session/v1/mbs-sessions/{mbsSessionRef} |

#### 5.20.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.20.2.3 Resource: Individual MBS Session

#### 5.20.2.3.1 Introduction

This resource represents an Individual MBS Session managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

#### 5.20.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-mbs-session/v1/mbs-sessions/{mbsSessionRef}

This resource shall support the resource URI variables defined in table 5.20.2.3.2-1.

**Table 5.20.2.3.2-1: Resource URI variables for this resource**

| Name          | Data type | Definition                                                                          |
|---------------|-----------|-------------------------------------------------------------------------------------|
| apiRoot       | string    | See clause 5.20.1.                                                                  |
| mbsSessionRef | string    | Contains the identifier of the Individual MBS Session resource assigned by the NEF. |

#### 5.20.2.3.3 Resource Standard Methods

##### 5.20.2.3.3.1 PATCH

The HTTP PATCH method enables an AF to request the modification of an existing Individual MBS Session resource at the NEF.

This method shall support the URI query parameters specified in table 5.20.2.3.3.1-1.



**Table 5.20.2.3.3.1-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.3.3.1-2 and the response data structures and response codes specified in table 5.20.2.3.3.1-3.

**Table 5.20.2.3.3.1-2: Data structures supported by the PATCH Request Body on this resource**

| Data type        | P | Cardinality | Description                                                                                                                                                            |
|------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(PatchItem) | M | 1..N        | Represents the list of modifications to be applied to the concerned existing Individual MBS Session resource, as specified in clause 4.6.1.1.3 of 3GPP TS 29.501 [32]. |

**Table 5.20.2.3.3.1-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                         |   |             | 204 No Content         | Successful response. The Individual MBS Session resource was successfully modified.                                                                                                                                            |
| MbsSessionUpdateResp                                                                                                        | M | 1           | 200 OK                 | Successful response. The Individual MBS Session was successfully updated and MBS Session update related information shall be returned in the response body.                                                                    |
| n/a                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                              | O | 0..1        | 400 Bad Request        | (NOTE 2)                                                                                                                                                                                                                       |
| ProblemDetails                                                                                                              | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                       |
| ProblemDetails                                                                                                              | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                       |
| NOTE 1: The mandatory HTTP error status code for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |
| NOTE 2: Failure cases are described in clause 5.20.7.                                                                       |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.20.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.20.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.20.2.3.3.3 DELETE

This method enables an AF to request the deletion of an Individual MBS Session resource at the NEF.

This method shall support the URI query parameters specified in table 5.20.2.3.3.3-1.

**Table 5.20.2.3.3.3-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.3.3.3-2 and the response data structures and response codes specified in table 5.20.2.3.3.3-3.

**Table 5.20.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.20.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                    | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                          |   |             | 204 No Content         | Successful response. The Individual MBS Session resource was successfully deleted.                                                                                                                                             |
|                                                                                                                              |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
|                                                                                                                              |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                               | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                       |
| NOTE 1: The mandatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |
| NOTE 2: Failure cases are described in clause 5.20.7.                                                                        |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.20.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.20.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.20.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.20.2.4 Resource: MBS Session Subscriptions

#### 5.20.2.4.1 Introduction

This resource represents the collection of MBS Session Subscriptions managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

#### 5.20.2.4.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-mbs-session/v1/mbs-sessions/subscriptions**

This resource shall support the resource URI variables defined in table 5.20.2.4.2-1.

**Table 5.20.2.4.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.20.1. |

#### 5.20.2.4.3 Resource Methods

##### 5.20.2.4.3.1 GET

This method enables an AF to request to retrieve all the MBS Session Subscription resources managed by the NEF.

This method shall support the URI query parameters specified in table 5.20.2.4.3.1-1.

**Table 5.20.2.4.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.4.3.1-2 and the response data structures and response codes specified in table 5.20.2.4.3.1-3.

**Table 5.20.2.4.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.20.2.4.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(MbsSessionSubsc)                                                                                                  | M | 0..N        | 200 OK                 | Successful case. All the MBS Session Subscription resources managed by the NEF are returned.                                                                                                                               |
| n/a                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                            |

**Table 5.20.2.4.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                          |
|----------|--------|---|---|--------------------------------------------------------------------------|
| Location | string | M | 1 | An alternative target URI of the resource located in an alternative NEF. |
|----------|--------|---|---|--------------------------------------------------------------------------|

**Table 5.20.2.4.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**5.20.2.4.3.2 POST**

This method enables an AF to request the creation of an MBS Session Subscription resource at the NEF.

This method shall support the URI query parameters specified in table 5.20.2.4.3.2-1.

**Table 5.20.2.4.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.4.3.2-2 and the response data structures and response codes specified in table 5.20.2.4.3.2-3.

**Table 5.20.2.4.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type       | P | Cardinality | Description                                                 |
|-----------------|---|-------------|-------------------------------------------------------------|
| MbsSessionSubsc | M | 1           | Representation of the MBS session to be created at the NEF. |

**Table 5.20.2.4.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes | Description                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MbsSessionSubsc                                                                                                          | M | 1           | 201 Created    | Successful case. A representation of the created Individual MBS Session Subscription resource is returned.<br><br>The URI of the created resource is returned in an HTTP "Location" header. |
| ProblemDetails                                                                                                           | O | 0..1        | 404 Not Found  | (NOTE 2)                                                                                                                                                                                    |
| NOTE: The mandatory HTTP error status code for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                                                                             |

**Table 5.20.2.4.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                              |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-mbs-session/v1/mbs-sessions/subscriptions/{subscriptionId} |

**5.20.2.4.4 Resource Custom Operations**

There are no resource custom operations defined for this resource in this release of the specification.

## 5.20.2.5 Resource: Individual MBS Session Subscription

### 5.20.2.5.1 Introduction

This resource represents an Individual MBS Session Subscription managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

### 5.20.2.5.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-mbs-session/v1/mbs-sessions/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 5.20.2.5.2-1.

**Table 5.20.2.5.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                                                      |
|----------------|-----------|-----------------------------------------------------------------|
| apiRoot        | string    | See clause 5.20.1.                                              |
| subscriptionId | string    | Identifier of the Individual MBS Session Subscription resource. |

### 5.20.2.5.3 Resource Methods

#### 5.20.2.5.3.1 GET

This method enables an AF to request to retrieve an existing Individual MBS Session Subscription resource at the NEF.

This method shall support the URI query parameters specified in table 5.20.2.5.3.1-1.

**Table 5.20.2.5.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.5.3.1-2 and the response data structures and response codes specified in table 5.20.2.5.3.1-3.

**Table 5.20.2.5.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.20.2.5.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MbsSessionSubsc                                                                                                         | M | 1           | 200 OK                 | Successful case. The requested Individual MBS Session Subscription resource is returned.                                                                                                                                       |
| n/a                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.20.2.5.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**Table 5.20.2.5.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**5.20.2.5.3.2 DELETE**

This method enables an AF to request the deletion of an existing Individual MBS Session Subscription resource at the NEF.

This method shall support the URI query parameters specified in table 5.20.2.5.3.2-1.

**Table 5.20.2.5.3.2-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.5.3.2-2 and the response data structures and response codes specified in table 5.20.2.5.3.2-3.

**Table 5.20.2.5.3.2-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.20.2.5.3.2-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                        |   |             | 204 No Content         | Successful case. The concerned Individual MBS Session Subscription resource is successfully deleted.                                                                                                                           |
| n/a                                                                                                                        |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                        |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.20.2.5.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**Table 5.20.2.5.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

#### 5.20.2.5.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.20.2.6 Resource: MBS Parameters Provisionings

#### 5.20.2.6.1 Introduction

This resource represents the collection of MBS Parameters Provisionings managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

#### 5.20.2.6.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-mbs-session/v1/mbs-pp**

This resource shall support the resource URI variables defined in table 5.20.2.6.2-1.

**Table 5.20.2.6.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.20.1. |

#### 5.20.2.6.3 Resource Methods

##### 5.20.2.6.3.1 GET

This method enables an AF to request to retrieve all the MBS Parameters Provisionings resources managed by the NEF.

This method shall support the URI query parameters specified in table 5.20.2.6.3.1-1.

**Table 5.20.2.6.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.6.3.1-2 and the response data structures and response codes specified in table 5.20.2.6.3.1-3.

**Table 5.20.2.6.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.20.2.6.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(MbsPpData)                                                                                                        | M | 1..N        | 200 OK                 | Successful case. All the Individual MBS Parameters Provisionings resources managed by the NEF are returned.                                                                                                                    |
| n/a                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.20.2.6.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**Table 5.20.2.6.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

### 5.20.2.6.3.2 POST

This method enables an AF to request the creation of a new MBS Parameters Provisioning at the NEF.

This method shall support the URI query parameters specified in table 5.20.2.6.3.2-1.

**Table 5.20.2.6.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.6.3.2-2 and the response data structures and response codes specified in table 5.20.2.6.3.2-3.

**Table 5.20.2.6.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description                                                                                 |
|-----------|---|-------------|---------------------------------------------------------------------------------------------|
| MbsPpData | M | 1           | Contain the representation of the new MBS Parameters Provisioning to be created at the NEF. |

**Table 5.20.2.6.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
|-----------|---|-------------|----------------|-------------|



|                                                                                                                          |   |   |             |                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------|---|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MbsPpData                                                                                                                | M | 1 | 201 Created | Successful case. A representation of the created Individual MBS Parameters Provisioning resource is returned.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status code for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |   |             |                                                                                                                                                                                                      |

**Table 5.20.2.6.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-mbs-session/v1/mbs-pp/{mbsPpId} |

#### 5.20.2.6.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.20.2.7 Resource: Individual MBS Parameters Provisioning

#### 5.20.2.7.1 Introduction

This resource represents an Individual MBS Parameters Provisioning resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

#### 5.20.2.7.2 Resource Definition

Resource URI: {apiRoot}/3gpp-mbs-session/v1/mbs-pp/{mbsPpId}

This resource shall support the resource URI variables defined in table 5.20.2.7.2-1.

**Table 5.20.2.7.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                                                         |
|---------|-----------|--------------------------------------------------------------------|
| apiRoot | string    | See clause 5.20.1.                                                 |
| mbsPpId | string    | Identifier of the Individual MBS Parameters Provisioning resource. |

#### 5.20.2.7.3 Resource Methods

##### 5.20.2.7.3.1 GET

This method enables an AF to request to retrieve an existing Individual MBS Parameters Provisioning resource managed by the NEF.

This method shall support the URI query parameters specified in table 5.20.2.7.3.1-1.

**Table 5.20.2.7.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.7.3.1-2 and the response data structures and response codes specified in table 5.20.2.7.3.1-3.

**Table 5.20.2.7.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.20.2.7.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MbsPpData                                                                                                               | M | 1           | 200 OK                 | Successful case. The requested Individual MBS Parameters Provisioning resource is successfully returned.                                                                                                                   |
| n/a                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                            |

**Table 5.20.2.7.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**Table 5.20.2.7.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

### 5.20.2.7.3.2 PUT

This method enables an AF to request the update of an existing Individual MBS Parameters Provisioning resource at the NEF.

This method shall support the URI query parameters specified in table 5.20.2.7.3.2-1.

**Table 5.20.2.7.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.7.3.2-2 and the response data structures and response codes specified in table 5.20.2.7.3.2-3.

**Table 5.20.2.7.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type | P | Cardinality | Description                                                                            |
|-----------|---|-------------|----------------------------------------------------------------------------------------|
| MbsPpData | M | 1           | Represents the updated Individual MBS Parameters Provisioning resource representation. |

**Table 5.20.2.7.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MbsPpData                                                                                                                 | M | 1           | 200 OK                 | Successful response. The Individual MBS Parameters Provisioning resource is successfully updated and a representation of the updated resource is returned in the response body.                                                |
| n/a                                                                                                                       |   |             | 204 No Content         | Successful response. The Individual MBS Parameters Provisioning resource is successfully updated and no content is to be returned in the response body.                                                                        |
| n/a                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE 1: The mandatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.20.2.7.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.20.2.7.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.20.2.7.3.3 PATCH

This method enables an AF to request the modification of an existing Individual MBS Parameters Provisioning resource at the NEF.

This method shall support the URI query parameters specified in table 5.20.2.7.3.3-1.

**Table 5.20.2.7.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.7.3.3-2 and the response data structures and response codes specified in table 5.20.2.7.3.3-3.

**Table 5.20.2.7.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type      | P | Cardinality | Description                                                                                    |
|----------------|---|-------------|------------------------------------------------------------------------------------------------|
| MbsPpDataPatch | M | 1           | Represents the requested modifications to the Individual MBS Parameters Provisioning resource. |

**Table 5.20.2.7.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MbsPpData                                                                                                                   | M | 1           | 200 OK                 | Successful response. The Individual MBS Parameters Provisioning resource is successfully modified and a representation of the updated resource is returned in the response body.                                               |
| n/a                                                                                                                         |   |             | 204 No Content         | Successful response. The Individual MBS Parameters Provisioning resource is successfully modified and no content is to be returned in the response body.                                                                       |
| n/a                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE 1: The mandatory HTTP error status code for the PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.20.2.7.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.20.2.7.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.20.2.7.3.4 DELETE

This method enables an AF to request the deletion of an existing Individual MBS Parameters Provisioning resource at the NEF.

This method shall support the URI query parameters specified in table 5.20.2.7.3.4-1.

**Table 5.20.2.7.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.20.2.7.3.4-2 and the response data structures and response codes specified in table 5.20.2.7.3.4-3.

**Table 5.20.2.7.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.20.2.7.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                        |   |             | 204 No Content         | Successful case. The concerned Individual MBS Parameters Provisioning resource is successfully deleted.                                                                                                                        |
| n/a                                                                                                                        |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                        |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.20.2.7.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**Table 5.20.2.7.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

#### 5.20.2.7.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.20.3 Custom Operations without associated resources

There are no customoperations without associated resources defined for this API in this release of the specification.

## 5.20.4 Notifications

### 5.20.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.20.4.1-1: Notifications overview**

| Notification                    | Callback URI      | HTTP method or custom operation | Description (service operation)                                                 |
|---------------------------------|-------------------|---------------------------------|---------------------------------------------------------------------------------|
| MBS Session Status Notification | {notificationUri} | POST                            | Enables to notify a previously subscribed AF on MBS session status information. |

## 5.20.4.2 MBS Session Status Notification

### 5.20.4.2.1 Description

The MBS Session Status Notification is used by the NEF to report MBS session status information to a subscribed AF.

### 5.20.4.2.2 Target URI

The Callback URI "{notificationUri}" shall be used with the callback URI variables defined in table 5.20.4.2.2-1.

**Table 5.20.4.2.2-1: Callback URI variables**

| Name            | Data type | Definition                                                                            |
|-----------------|-----------|---------------------------------------------------------------------------------------|
| notificationUri | Uri       | Callback URI provided by the AF during the creation/modification of the subscription. |

### 5.20.4.2.3 Operation Definition

#### 5.20.4.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.20.4.2.3.1-1 and the response data structures and response codes specified in table 5.20.4.2.3.1-2.

**Table 5.20.4.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type             | P | Cardinality | Description                                                             |
|-----------------------|---|-------------|-------------------------------------------------------------------------|
| MbsSessionStatusNotif | M | 1           | Represents the MBS Session Status information to be reported to the AF. |

**Table 5.20.4.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                       |   |             | 204 No Content         | The MBS Session Status notification is successfully received.                                                                                                                                                                                                                   |
| n/a                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                 |

**Table 5.20.4.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.20.4.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.20.5 Data Model

### 5.20.5.1 General

This clause specifies the application data model supported by the MBSSession API. Table 5.20.5.1-1 specifies the data types defined for the MBSSession API.

**Table 5.20.5.1-1: MBSSession specific Data Types**

| Data type             | Clause defined | Description                                                                         | Applicability      |
|-----------------------|----------------|-------------------------------------------------------------------------------------|--------------------|
| MbsPpData             | 5.20.5.2.6     | Represents MBS Parameters Provisioning data.                                        |                    |
| MbsPpDataPatch        | 5.20.5.2.8     | Represents the requested modification to existing MBS Parameters Provisioning data. |                    |
| MbsSessAuthData       | 5.20.5.2.7     | Represents the MBS Session Authorization data.                                      |                    |
| MbsSessAssistInfo     | 5.20.5.2.9     | Represents the MBS Session Assistance information data set(s).                      | 5MBS2              |
| MbsSessionCreateReq   | 5.20.5.2.2     | Represents the parameters to request MBS Session creation.                          |                    |
| MbsSessionCreateResp  | 5.20.5.2.3     | Represents the parameters to be returned in an MBS Session creation response.       |                    |
| MbsSessionSubsc       | 5.20.5.2.4     | Represents an MBS Session Subscription.                                             |                    |
| MbsSessionStatusNotif | 5.20.5.2.5     | Represents an MBS Session Status notification.                                      |                    |
| MbsSessionUpdateResp  | 5.20.5.2.10    | Represents MBS Session update related information.                                  | ReducedMbsServArea |

Table 5.20.5.1-2 specifies data types re-used by the MBSSession API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the MBSSession API.

**Table 5.20.5.1-2: Re-used Data Types**

| Data type                 | Reference           | Comments                                                                   | Applicability |
|---------------------------|---------------------|----------------------------------------------------------------------------|---------------|
| 5MbsAuthorizationInfo     | 3GPP TS 29.503 [17] | Contains the MBS Session authorization information.                        |               |
| DateTime                  | 3GPP TS 29.122 [4]  | Represents a date and a time                                               |               |
| ExternalGroupId           | 3GPP TS 29.122 [4]  | Represents the External Group Identifier for a user group.                 |               |
| ExternalMbsServiceArea    | 3GPP TS 29.571 [8]  | Represents an external MBS service area.                                   |               |
| Gpsi                      | 3GPP TS 29.571 [8]  | Represents a GPSI.                                                         |               |
| MbsServiceArea            | 3GPP TS 29.571 [8]  | Represents an MBS service area.                                            |               |
| MbsAssistanceInfo         | 3GPP TS 29.503 [17] | Represents the MBS Session Assistance information.                         | 5MBS2         |
| MbsSession                | 3GPP TS 29.571 [8]  | Represents MBS session information.                                        |               |
| MbsSessionId              | 3GPP TS 29.571 [8]  | Represents the identifier of an MBS Session.                               |               |
| MbsSessionEventReportList | 3GPP TS 29.571 [8]  | Represents the list of MBS Session Event Report(a).                        |               |
| MbsSessionSubscription    | 3GPP TS 29.571 [8]  | Represents an MBS Session Subscription                                     |               |
| MtcProviderInformation    | 3GPP TS 29.571 [8]  | Represents the MTC provider information.                                   | enNB1         |
| PatchItem                 | 3GPP TS 29.571 [8]  | Represents the requested modifications to a resource via the PATCH method. |               |
| ProblemDetails            | 3GPP TS 29.122 [4]  | Represents error related information.                                      |               |

|                         |                    |                                                                                                               |  |
|-------------------------|--------------------|---------------------------------------------------------------------------------------------------------------|--|
| ProblemDetailsTmgiAlloc | 5.19.5.4.1         | Represents an extension to the ProblemDetails data structure with additional information.                     |  |
| SupportedFeatures       | 3GPP TS 29.571 [8] | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features. |  |
| Tmgi                    | 3GPP TS 29.571 [8] | Represents a TMGI.                                                                                            |  |
| TunnelAddress           | 3GPP TS 29.571 [8] | Represents a Tunnel Address (UDP/IP).                                                                         |  |
| Uri                     | 3GPP TS 29.122 [4] | Represents a URI.                                                                                             |  |

## 5.20.5.2 Structured data types

### 5.20.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

### 5.20.5.2.2 Type: MbsSessionCreateReq

**Table 5.20.5.2.2-1: Definition of type MbsSessionCreateReq**

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                                        | Applicability |
|----------------|-------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId           | string            | M | 1           | Contains the identifier of the AF that is sending the request.                                                                                                                     |               |
| mbsSession     | MbsSession        | M | 1           | MBS session to be created.                                                                                                                                                         |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Contains the list of supported features.<br><br>This attribute shall be provided in the HTTP POST request to create a new MBS session, if feature negotiation needs to take place. |               |

### 5.20.5.2.3 Type: MbsSessionCreateRsp

**Table 5.20.5.2.3-1: Definition of type MbsSessionCreateRsp**

| Attribute name | Data type                 | P | Cardinality | Description                                                                                                                                                                                                    | Applicability |
|----------------|---------------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| mbsSession     | MbsSession                | M | 1           | Represents the created MBS session.                                                                                                                                                                            |               |
| eventList      | MbsSessionEventReportList | C | 0..1        | Contains a list of MBS Session Status Event(s) report(s), if available.                                                                                                                                        |               |
| suppFeat       | SupportedFeatures         | C | 0..1        | Contains the list of supported features.<br><br>This attribute shall be provided in the HTTP POST response to a request to create a new MBS session, if it was present in the corresponding HTTP POST request. |               |

### 5.20.5.2.4 Type: MbsSessionSubsc

**Table 5.20.5.2.4-1: Definition of type MbsSessionSubsc**

| Attribute name | Data type              | P | Cardinality | Description                                                                          | Applicability |
|----------------|------------------------|---|-------------|--------------------------------------------------------------------------------------|---------------|
| afId           | string                 | M | 1           | Contains the identifier of the AF that is sending the request.                       |               |
| subscription   | MbsSessionSubscription | M | 1           | Represents the parameters of the MBS Session Status subscription to be created       |               |
| subscriptionId | string                 | C | 0..1        | Contains the identifier of the created Individual MBS Session Subscription resource. |               |



|  |  |  |  |                                                                                                    |  |
|--|--|--|--|----------------------------------------------------------------------------------------------------|--|
|  |  |  |  | This attribute shall only be present in the HTTP POST response to an MBS session creation request. |  |
|--|--|--|--|----------------------------------------------------------------------------------------------------|--|

## 5.20.5.2.5 Type: MbsSessionStatusNotif

Table 5.20.5.2.5-1: Definition of type MbsSessionStatusNotif

| Attribute name | Data type                 | P | Cardinality | Description                                                             | Applicability |
|----------------|---------------------------|---|-------------|-------------------------------------------------------------------------|---------------|
| eventList      | MbsSessionEventReportList | M | 1           | Contains the reported MBS session event(s) and the related information. |               |

## 5.20.5.2.6 Type: MbsPpData

Table 5.20.5.2.6-1: Definition of type MbsPpData

| Attribute name    | Data type              | P | Cardinality | Description                                                                                                                                                                                                                            | Applicability |
|-------------------|------------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId              | string                 | M | 1           | Contains the identifier of the AF that is sending the request.                                                                                                                                                                         |               |
| mtcProviderId     | MtcProviderInformation | O | 0..1        | Identifies the MTC Service Provider and/or MTC Application.                                                                                                                                                                            | enNB1         |
| mbsSessAuthData   | MbsSessAuthData        | C | 0..1        | Contains the MBS Session Authorization data that the AF requests to provision.<br><br>This attribute shall be present when the AF requests to provision MBS Session Authorization data.                                                |               |
| mbsSessAssistInfo | MbsSessAssistInfo      | C | 0..1        | Contains the MBS Session Assistance information data set(s) that the AF requests to provision.<br><br>This attribute shall be present when the AF requests to provision one or several MBS Session Assistance information data set(s). | 5MBS2         |
| suppFeat          | SupportedFeatures      | C | 0..1        | Contains the list of supported features among the ones defined in clause 5.20.6.<br><br>This attribute shall be present only when feature negotiation needs to take place.                                                             |               |

## 5.20.5.2.7 Type: MbsSessAuthData

Table 5.20.5.2.7-1: Definition of type MbsSessAuthData

| Attribute name   | Data type             | P | Cardinality | Description                                                                                                                                                                                                                                                                                                     | Applicability |
|------------------|-----------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| extGroupId       | ExternalGroupId       | M | 1           | Represents the external group identifier of the targeted multicast MBS Group.                                                                                                                                                                                                                                   |               |
| gpsiList         | map(Gpsi)             | C | 1..N        | Represents the list of the GPSI(s) of the member UE(s) constituting the multicast MBS group.<br><br>Any value of type string can be used as a key of the map.<br><br>This attribute shall be present only if the multicast MBS group has not yet been created or the list of its member(s) needs to be updated. |               |
| mbsSessionIdList | 5MbsAuthorizationInfo | M | 1           | Contains the identifier(s) of the multicast MBS Session(s) that the                                                                                                                                                                                                                                             |               |

|  |  |  |  |                                            |  |
|--|--|--|--|--------------------------------------------|--|
|  |  |  |  | multicast MBS group is authorized to join. |  |
|--|--|--|--|--------------------------------------------|--|

#### 5.20.5.2.8 Type: MbsPpDataPatch

**Table 5.20.5.2.8-1: Definition of type MbsPpDataPatch**

| Attribute name    | Data type         | P | Cardinality | Description                                                                                            | Applicability |
|-------------------|-------------------|---|-------------|--------------------------------------------------------------------------------------------------------|---------------|
| mbsSessAuthData   | MbsSessAuthData   | O | 0..1        | Contains the updated MBS Session Authorization data that the AF requests to provision.                 |               |
| mbsSessAssistInfo | MbsSessAssistInfo | O | 0..1        | Contains the updated MBS Session Assistance information data set(s) that the AF requests to provision. | 5MBS2         |

#### 5.20.5.2.9 Type: MbsSessAssistInfo

**Table 5.20.5.2.9-1: Definition of type MbsSessAssistInfo**

| Attribute name    | Data type                | P | Cardinality | Description                                                                                               | Applicability |
|-------------------|--------------------------|---|-------------|-----------------------------------------------------------------------------------------------------------|---------------|
| mbsSessAssistData | array(MbsAssistanceInfo) | M | 1..N        | Contains one or several MBS Session Assistance information data set(s) for one or several MBS Session(s). |               |

#### 5.20.5.2.10 Type: MbsSessionUpdateResp

**Table 5.20.5.2.10-1: Definition of type MbsSessionUpdateResp**

| Attribute name        | Data type              | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                  | Applicability |
|-----------------------|------------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| reducedMbsServArea    | MbsServiceArea         | C | 0..1        | <p>This attribute shall be present only if the requested MBS Service Area cannot be covered by the MB-SMF Service Area of a single MB-SMF, and the MB-SMF reduced the MBS Service Area accordingly.</p> <p>When present, it shall contain the reduced MBS Service Area in which the MBS session has been updated.</p> <p>(NOTE)</p>          |               |
| reducedExtMbsServArea | ExternalMbsServiceArea | C | 0..1        | <p>This attribute shall be present only if the requested MBS Service Area cannot be covered by the MB-SMF Service Area of a single MB-SMF, and the MB-SMF reduced the MBS Service Area accordingly.</p> <p>When present, it shall contain the reduced external MBS Service Area in which the MBS session has been updated.</p> <p>(NOTE)</p> |               |

NOTE: These attributes are mutually exclusive. Either one of them may be present.

### 5.20.5.3 Simple data types and enumerations

#### 5.20.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.20.5.3.2 Simple data types

The simple data types defined in table 5.20.5.3.2-1 shall be supported.

**Table 5.20.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.20.6 Used Features

The table below defines the features applicable to the MBSSession API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.20.6-1: Supported Features**

| Feature number | Feature Name        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | 5MBS2               | <p>This feature indicates the support of the Rel-18 enhancements to the 5G Multicast/Broadcast services.</p> <p>The following functionalities are supported:</p> <ul style="list-style-type: none"> <li>- MBS Session Assistance information provisioning.</li> <li>- Support the provisioning of the Associated Session Identifier to enable 5MBS MOCN Network Sharing scenarios (e.g., MOCN with multiple broadcast MBS sessions transmitting the same content via different Core Networks).</li> <li>- NR RedCap UE information provisioning during MBS Session creation/update.</li> </ul> |
| 2              | ReducedMbsServ Area | <p>This feature indicates the support of the MBS Service Area reduction functionality.</p> <p>The following sub-functionalities are supported:</p> <ul style="list-style-type: none"> <li>- Support to return the reduced MBS Service Area in an MBS Session creation/update response.</li> </ul>                                                                                                                                                                                                                                                                                              |
| 3              | enNB1               | <p>This feature indicates the support of Rel-18 enhancements to this northbound API.</p> <p>The following sub-functionalities are supported:</p> <ul style="list-style-type: none"> <li>- Support the provisioning of the MTC provider ID.</li> </ul>                                                                                                                                                                                                                                                                                                                                          |

### 5.20.7 Error handling

#### 5.20.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

#### 5.20.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the MBSSession API.

### 5.20.7.3 Application Errors

The application errors defined for the MBSSession API are listed in table 5.20.7.3-1.

**Table 5.20.7.3-1: Application errors**

| Application Error                | HTTP status code | Description                                                                                                                                                                                                                  |
|----------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INVALID_MBS_SERVICE_INFO         | 400 Bad Request  | The provided MBS Service Information is invalid (e.g. invalid QoS reference), incorrect or insufficient to perform MBS policy authorization.                                                                                 |
| FILTER_RESTRICTIONS_NOT_OBSERVED | 400 Bad Request  | The MBS IP flow(s) description provided within the MBS Service Information cannot be handled due to the restrictions defined in clause 5.3.8 of 3GPP TS 29.214 [64] not being observed.                                      |
| MBS_SERVICE_AREA_TOO_LARGE       | 403 Forbidden    | Indicates that the MBS Session creation request is rejected because the provided MBS Service Area cannot be supported by the network as it is too large to be served by a single MB-SMF.                                     |
| MBS_SERVICE_AREA_NOT_SUPPORTED   | 403 Forbidden    | Indicates that the MBS Session Creation/Update is rejected because the requested MBS Service Area is not supported (e.g., the MBS Service Area received from the AF cannot be covered by the service area(s) of any MB-SMF). |
| MBS_SERVICE_INFO_NOT_AUTHORIZED  | 403 Forbidden    | The provided MBS Service Information is rejected.                                                                                                                                                                            |
| MBS_SESSION_ALREADY_CREATED      | 403 Forbidden    | The requested MBS session has already been created at the NEF/MB-SMF.                                                                                                                                                        |
| OVERLAPPING_MBS_SERVICE_AREA     | 403 Forbidden    | The provided MBS service area overlaps with the MBS service area of an existing MBS Session that shares the same MBS session Identifier.                                                                                     |
| UNKNOWN_TMGI                     | 404 Not Found    | The TMGI provided in the request does not exist.                                                                                                                                                                             |
| MBS_SESSION_CONTEXT_NOT_FOUND    | 404 Not Found    | The targeted Individual MBS Session does not exist.                                                                                                                                                                          |
| UNKNOWN_MBS_SERVICE_AREA         | 404 Not Found    | The requested MBS service area (e.g. identified by the Area Session ID) cannot be found.                                                                                                                                     |

## 5.21 EASDeployment API

### 5.21.0 Introduction

The Nnef\_EASDeployment service shall use the EASDeployment API.

The API URI of EASDeployment API shall be:

**{apiRoot}/3gpp-eas-deployment/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-eas-deployment".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

## 5.21.1 Resources

### 5.21.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.21.1.1-1 and the resources and HTTP methods used for AF provisioned EAS Deployment information management in the northbound EASDeployment API.

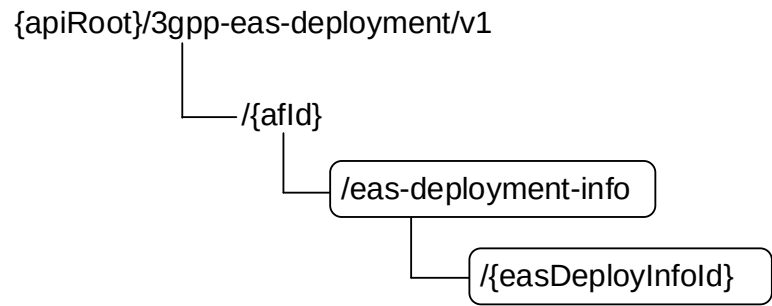


**Figure 5.21.1.1-1: Resource URI structure of the northbound EASDeployment API**

Table 5.21.1.1-1 provides an overview of the resources and HTTP methods applicable for the northbound EASDeployment API.

**Table 5.21.1.1-1: Resources and methods overview**

| Resource name                         | Resource URI                                 | HTTP method | Description                                                         |
|---------------------------------------|----------------------------------------------|-------------|---------------------------------------------------------------------|
| EAS Deployment Information            | /{afld}/eas-deployment-info                  | GET         | Read all EAS Deployment information for a given AF.                 |
|                                       |                                              | POST        | Create a new Individual EAS Deployment information resource.        |
| Individual EAS Deployment Information | /{afld}/eas-deployment-info/{easDeployInfld} | GET         | Reads an active Individual EAS Deployment Information resource.     |
|                                       |                                              | PUT         | Update an existing Individual EAS Deployment Information resource.  |
|                                       |                                              | DELETE      | Deletes an existing Individual EAS Deployment Information resource. |

### 5.21.1.2 Resource: EAS Deployment Information

#### 5.21.1.2.1 Introduction

This resource allows an AF to request the creation of a new Individual EAS Deployment Information resource.

#### 5.21.1.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-eas-deployment/v1/{afld}/eas-deployment-info

This resource shall support the resource URI variables defined in table 5.21.1.2.2-1.

**Table 5.21.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |

|      |        |                       |
|------|--------|-----------------------|
| afld | string | Identifier of the AF. |
|------|--------|-----------------------|

### 5.21.1.2.3 Resource Methods

#### 5.21.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.21.1.2.2.

#### 5.21.1.2.3.2 GET

The GET method allows to read all active EAS Deployment information for a given AF and subscription. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.21.1.2.3.2-1.

**Table 5.21.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.21.1.2.3.2-2, the response data structures and response codes specified in table 5.21.1.2.3.2-3, and the location headers specified in table 5.21.1.2.3.2-4 and table 5.21.1.2.3.2-5.

**Table 5.21.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.21.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes               | Description                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(EasDeployl<br>nfo)                                                                                                 | M | 0..N        | 200 OK                       | The configuration information for the AF in the request URI are returned.                                                                                                                                                                                                     |
| N/A                                                                                                                      |   |             | 307<br>Temporary<br>Redirect | Temporary redirection, during EAS deployment information retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308<br>Permanent<br>Redirect | Permanent redirection, during EAS deployment information retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                              |                                                                                                                                                                                                                                                                               |

**Table 5.21.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.21.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

#### 5.21.1.2.3.3 POST

The POST method creates a new resource of Individual EAS Deployment Information for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.21.1.2.3.3-1, the response data structures and response codes specified in table 5.21.1.2.3.3-2, and the Location Headers specified in table 5.21.1.2.3.3-3.

**Table 5.21.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type     | P | Cardinality | Description                                                                            |
|---------------|---|-------------|----------------------------------------------------------------------------------------|
| EasDeployInfo | M | 1           | EAS Deployment Information, indicates how edge services are deployed in each Local DN. |

**Table 5.21.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EasDeployInfo                                                                                                             | M | 1           | 201 Created    | The Individual EAS Deployment Information resource was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                                                  |

**Table 5.21.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                               |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-eas-deployment/v1/{afId}/eas-deployment-info/{easDeployInfoId} |

### 5.21.1.3 Resource: Individual EAS Deployment Information

#### 5.21.1.3.1 Introduction

This resource allows an AF to read, update or delete an existing Individual EAS Deployment Information.

#### 5.21.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-eas-deployment/v1/{afId}/eas-deployment-info/{easDeployInfoId}

This resource shall support the resource URI variables defined in table 5.21.1.3.2-1.

**Table 5.21.1.3.2-1: Resource URI variables for this resource**

| Name            | Data type | Definition                                                                              |
|-----------------|-----------|-----------------------------------------------------------------------------------------|
| apiRoot         | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].                                                     |
| afId            | string    | Identifier of the AF.                                                                   |
| easDeployInfoId | string    | Identifier of the EAS Deployment Information formatted according to IETF RFC 3986 [44]. |

### 5.21.1.3.3 Resource Methods

#### 5.21.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.21.1.3.2.

#### 5.21.1.3.3.2 GET

The GET method allows to read the existing EAS Deployment Information for a given AF and a given EAS Deployment Information Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.21.1.3.3.2-1.

**Table 5.21.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.21.1.3.3.2-2, the response data structures and response codes specified in table 5.21.1.3.3.2-3, and the Location Headers specified in table 5.21.1.3.3.2-4 and table 5.21.1.3.3.2-5.

**Table 5.21.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.21.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EasDeployInfo                                                                                                            | M | 1           | 200 OK                 | Successful case.<br>The exposure information of an existing Individual EAS Deployment Information in the request URI is returned.                                                                                                                                                    |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during the EAS Deployment Information retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during the EAS Deployment Information retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                      |

**Table 5.21.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.21.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|



|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

#### 5.21.1.3.3.3 PUT

The PUT method is used to modify an existing Individual EAS Deployment Information resource. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.21.1.3.3.3-1.

**Table 5.21.1.3.3.3-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.21.1.3.3.3-2, the response data structures and response codes specified in table 5.21.1.3.3.3-3, and the Location Headers specified in table 5.21.1.3.3.3-4 and table 5.21.1.3.3.3-5.

**Table 5.21.1.3.3.3-2: Data structures supported by the PUT Request Body on this resource**

| Data type     | P | Cardinality | Description                                                |
|---------------|---|-------------|------------------------------------------------------------|
| EasDeployInfo | M | 1           | Modify the Individual EAS Deployment Information resource. |

**Table 5.21.1.3.3.3-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EasDeployInfo                                                                                                            | M | 1           | 200 OK                 | Successful case.<br>The exposure information of the updated EAS Deployment Information.                                                                                                                                                                                                 |
| N/A                                                                                                                      |   |             | 204 No Content         | The EAS Deployment change was updated successfully.                                                                                                                                                                                                                                     |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during the EAS Deployment Information modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during the EAS Deployment Information modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                         |

**Table 5.21.1.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.21.1.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

#### 5.21.1.3.3.4 DELETE

The DELETE method deletes an existing Individual EAS Deployment Information resource. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.21.1.3.3.4-1.

**Table 5.21.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.21.1.3.3.4-2, the response data structures and response codes specified in table 5.21.1.3.3.4-3, and the Location Headers specified in table 5.21.1.3.3.4-4 and table 5.21.1.3.3.4-5.

**Table 5.21.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.21.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |   |             | 204 No Content         | The Individual EAS Deployment Information resource was terminated successfully.                                                                                                                                                                          |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection, during the termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection, during the termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                          |

**Table 5.21.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.21.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

# 5.21.2 Custom Operations without associated resources

## 5.21.2.1 Overview

The structure of the custom operation URIs of the Nnef\_EASDeployment service is shown in Figure 5.21.2.1-1.

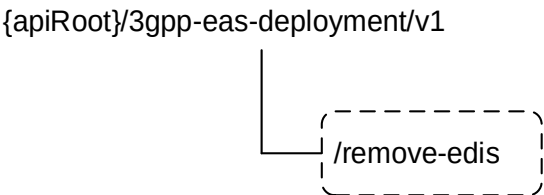


**Figure 5.21.2.1-1: Custom operation URI structure of the Nnef\_EASDeployment API**

Table 5.21.2.1-1 provides an overview of the custom operations and applicable HTTP methods.

**Table 5.21.2.1-1: Custom operations without associated resources**

| Custom operation URI                                   | Mapped HTTP method | Description                                                                     |
|--------------------------------------------------------|--------------------|---------------------------------------------------------------------------------|
| {apiRoot}/3gpp-eas-deployment/<apiVersion>/remove-edis | POST               | Request the NEF to delete EAS Deployment Information based on given attributes. |

## 5.21.2.2 Operation: remove-edis

### 5.21.2.2.1 Description

The operation is used by the AF to delete EAS Deployment Information based on given attributes.

### 5.21.2.2.2 Operation Definition

This operation shall support the request data structures shown in Table 5.21.2.2.2-1 and the response data structures and error codes specified in Table 5.21.2.2.2-2.

**Table 5.21.2.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type         | P | Cardinality | Description                                                                        |
|-------------------|---|-------------|------------------------------------------------------------------------------------|
| EdiDeleteCriteria | M | 1           | Information about the criteria to be used for EAS Deployment Information deletion. |

**Table 5.21.2.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                      |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|----------------------------------------------------------------------------------|
| n/a                                                                                                                       |   |             | 204 No Content | Successful request to remove EAS Deployment Information based on given criteria. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                  |

# 5.21.3 Notifications

There are no notifications defined for this API in this release of the specification.

## 5.21.4 Data Model

### 5.21.4.1 General

This clause specifies the application data model supported by the EASDeployment API. Table 5.21.4.1-1 specifies the data types defined for the EASDeployment API.

**Table 5.21.4.1-1: EASDeployment API specific Data Types**

| Data type              | Clause defined | Description                                                                                 | Applicability      |
|------------------------|----------------|---------------------------------------------------------------------------------------------|--------------------|
| EasDeployInfo          | 5.21.4.3.2     | EAS Deployment Information, indicates how edge services are deployed in each Local DN.      |                    |
| EdiDeleteCriteria      | 5.21.4.3.5     | Contains criteria for deleting EAS Deployment Information.                                  |                    |
| DnaiInformation        | 5.21.4.3.3     | list of DNS server identifier and/or IP address(s) of the EAS in the local DN for the DNAI. |                    |
| DnsServerIdentifier    | 5.21.4.3.4     | DNS server identifier (consisting of IP address and port).                                  |                    |
| N6DelayMeasurementInfo | 5.21.4.3.7     | Represents N6 delay measurement assistance information.                                     | N6DelayMeasurement |
| N6DelayPerDnaiEas      | 5.21.4.3.6     | Represents N6 delay measurement assistance information per DNAI and/or EAS.                 | N6DelayMeasurement |

### 5.21.4.2 Reused data types

The data types reused by the EASDeployment API from other specifications are listed in table 5.21.4.2-1.

**Table 5.21.4.2-1: Re-used Data Types**

| Data type                | Reference          | Comments                                                                                                      |
|--------------------------|--------------------|---------------------------------------------------------------------------------------------------------------|
| Afid                     | 5.14.5.4.2         | Represents an AF identifier.                                                                                  |
| DelayMeasurementProtocol | 3GPP TS 29.571 [8] | Represents a delay measurement protocol.                                                                      |
| Dnai                     | 3GPP TS 29.571 [8] | Identifies a DNAI.                                                                                            |
| Dnn                      | 3GPP TS 29.571 [8] | Identifies a DNN.                                                                                             |
| DnnSnssaiInformation     | 5.18.3.3.5         | Contains DNN and S-NSSAI information.                                                                         |
| EasServerAddress         | 3GPP TS 29.571 [8] | Identifies an EAS server.                                                                                     |
| ExternalGroupId          | 3GPP TS 29.122 [4] | External Group Identifier for a user group.                                                                   |
| FqdnPatternMatchingRule  | 3GPP TS 29.571 [8] | Identifies the FQDN pattern matching rule.                                                                    |
| IpAddr                   | 3GPP TS 29.571 [8] | IP Address.                                                                                                   |
| Snssai                   | 3GPP TS 29.571 [8] | Identifies the S-NSSAI.                                                                                       |
| SupportedFeatures        | 3GPP TS 29.571 [8] | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features. |
| UInteger                 | 3GPP TS 29.571 [8] | Unsigned integer.                                                                                             |
| Link                     | 3GPP TS 29.122 [4] | Identifies a referenced resource.                                                                             |

### 5.21.4.3 Structured data types

#### 5.21.4.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.21.4.3.2 Type: EasDeployInfo

**Table 5.21.4.3.2-1: Definition of type EasDeployInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
|----------------|-----------|---|-------------|-------------|---------------|

|                   |                                |   |      |                                                                                                                                                                              |                    |
|-------------------|--------------------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| self              | Link                           | C | 0..1 | Identifies the individual EAS Deployment information resource.<br>Shall be present in the HTTP GET response when reading all the configurations for an AF.                   |                    |
| afServiceId       | string                         | O | 0..1 | Identifies a service on behalf of which the AF is issuing the request.                                                                                                       |                    |
| fqdnPatternList   | array(FqdnPatternMatchingRule) | M | 1..N | Contains the supported FQDN pattern(s) for application(s) deployed in the Local part of the DN where each FQDN pattern is described by a FQDN Pattern Matching Rule.         |                    |
| appld             | string                         | O | 0..1 | Identifies the application for which the EAS Deployment Information corresponds to.                                                                                          |                    |
| dnn               | Dnn                            | O | 0..1 | Contains the DNN for the EAS Deployment Information.                                                                                                                         |                    |
| snssai            | Snssai                         | O | 0..1 | Contains the S-NSSAI for the EAS Deployment Information.                                                                                                                     |                    |
| externalGroupId   | ExternalGroupId                | O | 0..1 | Contains the external Group ID for the EAS Deployment Information.                                                                                                           |                    |
| dnaiInfos         | map(DnaiInformation)           | O | 1..N | Contains the list of DNS server identifier (consisting of IP address and port) and/or IP address(s) of the EAS in the local DN for each DNAI. The key of map is the DNAI.    |                    |
| targetAfId        | string                         | O | 0..1 | Identifier of the AF that is responsible for the EAS associated with this EAS deployment information.                                                                        | EasRelocationEnh   |
| n6DelayPerDnaiEas | array(N6DelayPerDnaiEas)       | O | 1..N | Contains N6 delay measurement assistance information per DNAI and/or EAS.                                                                                                    | N6DelayMeasurement |
| suppFeat          | SupportedFeatures              | C | 0..1 | Contains the list of supported feature(s) among the ones defined in clause 5.21.5.<br><br>This attribute shall be present only when feature negotiation needs to take place. |                    |

#### 5.21.4.3.3 Type: DnaiInformation

**Table 5.21.4.3.3-1: Definition of type DnaiInformation**

| Attribute name                                                                      | Data type                  | P | Cardinality | Description                                                                      | Applicability |
|-------------------------------------------------------------------------------------|----------------------------|---|-------------|----------------------------------------------------------------------------------|---------------|
| dnai                                                                                | Dnai                       | M | 1           | Identify the DNAI.                                                               |               |
| dnsServIds                                                                          | array(DnsServerIdentifier) | C | 1..N        | list of DNS server identifier (consisting of IP address and port) for each DNAI. |               |
| easIpAddrs                                                                          | array(IpAddr)              | C | 1..N        | IP address(s) of the EASs in the local DN for each DNAI.                         |               |
| NOTE: At least one of the "dnsServIds" or "easIpAddrs" attribute shall be provided. |                            |   |             |                                                                                  |               |

## 5.21.4.3.4 Type: DnsServerIdentifier

**Table 5.21.4.3.4-1: Definition of type DnsServerIdentifier**

| Attribute name | Data type | P | Cardinality | Description            | Applicability |
|----------------|-----------|---|-------------|------------------------|---------------|
| dnsServIpAddr  | IpAddr    | M | 1           | DNS server IP address. |               |
| portNumber     | UInteger  | M | 1           | DNS port number.       |               |

## 5.21.4.3.5 Type: EdiDeleteCriteria

**Table 5.21.4.3.5-1: Definition of type EdiDeleteCriteria**

| Attribute name                                            | Data type           | P | Cardinality | Description                                                          | Applicability |
|-----------------------------------------------------------|---------------------|---|-------------|----------------------------------------------------------------------|---------------|
| afld                                                      | Afld                | C | 0..1        | AF identifier to be used as deletion criterion. (NOTE)               |               |
| dnnSnsai                                                  | DnnSnsaiInformation | C | 0..1        | DNN and S-NSSAI information to be used as deletion criterion. (NOTE) |               |
| NOTE: At least one of those attributes shall be provided. |                     |   |             |                                                                      |               |

## 5.21.4.3.6 Type: N6DelayPerDnaiEas

**Table 5.21.4.3.6-1: Definition of type N6DelayPerDnaiEas**

| Attribute name                                                              | Data type              | P | Cardinality | Description                                                                                                             | Applicability |
|-----------------------------------------------------------------------------|------------------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|---------------|
| dnai                                                                        | Dnai                   | C | 0..1        | Contains the DNAI to which this N6 delay measurement assistance information applies.<br>(NOTE)                          |               |
| eas                                                                         | EasServerAddress       | C | 0..1        | Contains addressing information of the EAS to which this N6 delay measurement assistance information applies.<br>(NOTE) |               |
| n6DelayMeasureInfo                                                          | N6DelayMeasurementInfo | M | 1           | Contains N6 delay measurement assistance information.                                                                   |               |
| NOTE: At least one of the "dnai" and/or "eas" attributes shall be provided. |                        |   |             |                                                                                                                         |               |

## 5.21.4.3.7 Type: N6DelayMeasurementInfo

**Table 5.21.4.3.7-1: Definition of type N6DelayMeasurementInfo**

| Attribute name         | Data type                       | P | Cardinality | Description                                                                                                    | Applicability |
|------------------------|---------------------------------|---|-------------|----------------------------------------------------------------------------------------------------------------|---------------|
| measureEndpointAddress | IpAddr                          | M | 1           | Contains the measurement endpoint address information.                                                         |               |
| measureEndpointPort    | UInteger                        | O | 0..1        | Contains the measurement endpoint port information.                                                            |               |
| suppMeasProtocs        | array(DelayMeasurementProtocol) | O | 1..N        | Contains the supported N6 delay measurement protocols.                                                         |               |
| configParams           | string                          | O | 0..1        | Contains protocol-specific configuration parameters. The contents and the format are up to the implementation. |               |

Editor's Note: The contents and format of configParams is FFS.

## 5.21.4.4 Simple data types and enumerations

### 5.21.4.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.21.4.4.2 Simple data types

The simple data types defined in table 5.21.4.4.2-1 shall be supported.

**Table 5.21.4.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.21.4.4.3 Void

## 5.21.5 Used Features

The table below defines the features applicable to the EASDeployment API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.21.5-1: Features used by EASDeployment API**

| Feature number | Feature Name       | Description                                                                                                                                         |
|----------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | EasRelocationEnh   | This feature indicates enhanced support of EAS relocation procedures via additional information about the AFs that are responsible for certain EAS. |
| 2              | EasDnaiConsistency | This feature indicates support of consistency checking between AF-provisioned and operator-configured data related to EAS Deployment.               |
| 3              | N6DelayMeasurement | This feature indicates support of provisioning N6 delay measurement assistance information.                                                         |

## 5.21.6 Error handling

### 5.21.6.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.21.6.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the EASDeployment API.

### 5.21.6.3 Application Errors

The application errors defined for EASDeployment API are listed in table 5.21.6.3-1.

**Table 5.21.6.3-1: Application errors**

| Application Error    | HTTP status code | Description                                                                                 | Applicability      |
|----------------------|------------------|---------------------------------------------------------------------------------------------|--------------------|
| CONFLICT_CONFIG_DATA | 403 Forbidden    | The provided EAS Deployment Information is in conflict with the OAM-configured information. | EasDnaiConsistency |

## 5.22 ASTI API

### 5.22.0 Introduction

The Nnef\_ASTI service shall use the ASTI API.

The API URI of ASTI API shall be:

**{apiRoot}/3gpp-asti/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-asti".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.22.1 Resources

#### 5.22.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.22.1.1-1 and the resources and HTTP methods used for the ASTI API.

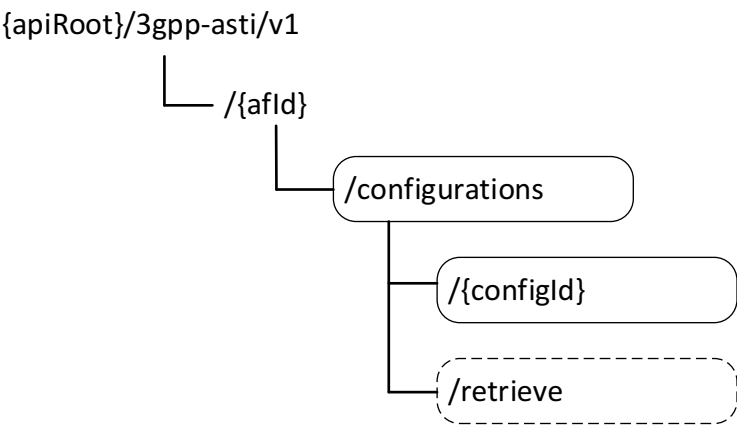


**Figure 5.22.1.1-1: Resource URI structure of the ASTI API**

Table 5.22.1.1-1 provides an overview of the resources and HTTP methods applicable for the ASTI API.

**Table 5.22.1.1-1: Resources and methods overview**

| Resource name       | Resource URI           | HTTP method | Description                                                                                     |
|---------------------|------------------------|-------------|-------------------------------------------------------------------------------------------------|
| ASTI Configurations | /{afId}/configurations | GET         | Read all configurations of 5G access stratum time distribution for a given AF and subscription. |
|                     |                        | POST        | Create a new configuration of 5G access stratum time distribution.                              |



|                               |                                       |                 |                                                                |
|-------------------------------|---------------------------------------|-----------------|----------------------------------------------------------------|
|                               | /{{afld}}/configurations/retrieve     | retrieve (POST) | Retrieval of the status of access stratum time distribution.   |
| Individual ASTI Configuration | /{{afld}}/configurations/{{configld}} | PUT             | Modify a configuration of 5G access stratum time distribution. |
|                               |                                       | DELETE          | Delete a configuration of 5G access stratum time distribution. |
|                               |                                       | GET             | Query the status of the access time distribution               |

## 5.22.1.2 Resource: ASTI Configurations

### 5.22.1.2.1 Introduction

This resource allows an AF to read all active configurations of 5G access stratum time distribution for a given AF, or allows an AF to create a new new configuration of 5G access stratum time distribution.

### 5.22.1.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-asti/v1/{{afld}}/configurations**

This resource shall support the resource URI variables defined in table 5.22.1.2.2-1.

**Table 5.22.1.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afld    | string    | Identifier of the AF.               |

### 5.22.1.2.3 Resource Methods

#### 5.22.1.2.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.22.1.2.2.

#### 5.22.1.2.3.2 GET

The GET method allows to read all active configurations of 5G access stratum time distribution for a given AF and subscription. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.22.1.2.3.2-1.

**Table 5.22.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.22.1.2.3.2-2 and the response data structures and response codes specified in table 5.22.1.2.3.2-3.

**Table 5.22.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.22.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(AccessTimeDistributionData)                                                                                        | M | 0..N        | 200 OK                 | The configuration information for the AF are returned.                                                                                                                                                                                                           |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                  |

**Table 5.22.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.22.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.22.1.2.3.3 POST

The POST method creates a new configuration of 5G access stratum time distribution for a given AF. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the request data structures specified in table 5.22.1.2.3.3-1 and the response data structures and response codes specified in table 5.22.1.2.3.3-2.

**Table 5.22.1.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type                  | P | Cardinality | Description                                                                  |
|----------------------------|---|-------------|------------------------------------------------------------------------------|
| AccessTimeDistributionData | M | 1           | Parameters to create a configuration of 5G access stratum time distribution. |

**Table 5.22.1.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes | Description                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------|
| AccessTimeDistributionData                                                                                                  | M | 1           | 201 Created    | The configuration was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| ProblemDetails                                                                                                              | O | 0..1        | 403 Forbidden  | (NOTE 2)                                                                                                                        |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                 |
| NOTE 2: Failure causes are described in clause 5.22.6.                                                                      |   |             |                |                                                                                                                                 |

**Table 5.22.1.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                         |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-asti/v1/{afId}/configurations/{configId} |

#### 5.22.1.2.4 Resource Custom Operations

##### 5.22.1.2.4.1 Overview

**Table 5.22.1.2.4.1-1: Custom operations**

| Operation Name | Custom operation URI     | Mapped HTTP method | Description                                                                      |
|----------------|--------------------------|--------------------|----------------------------------------------------------------------------------|
| retrieve       | /configurations/retrieve | retrieve (POST)    | Request the status of the 5G access stratum time distribution for a list of UEs. |

##### 5.22.1.2.4.2 Operation: retrieve

##### 5.22.1.2.4.2.1 Description

This custom operation retrieves the status of the access stratum time distribution for a list of UEs.

##### 5.22.1.2.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 5.22.1.2.4.2.2-1 and the response data structure and response codes specified in table 5.22.1.2.4.2.2-2.

**Table 5.22.1.2.4.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type         | P | Cardinality | Description                                                                                                                |
|-------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------|
| StatusRequestData | M | 1           | Parameters to be sent by the AF when the status of the 5G access stratum time distribution for a list of UEs is requested. |

**Table 5.22.1.2.4.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes | Description                                                                      |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|----------------------------------------------------------------------------------|
| StatusResponseData                                                                                                        | M | 1           | 200 OK         | Status of the 5G access stratum time distribution for a list of UEs is returned. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                  |

#### 5.22.1.3 Resource: Individual ASTI Configuration

##### 5.22.1.3.1 Introduction

This resource allows an AF to read/modify/cancel a configuration of 5G access stratum time distribution with the NEF.

##### 5.22.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-asti/v1/{afId}/configurations/{configId}

This resource shall support the resource URI variables defined in table 5.22.1.3.2-1.

**Table 5.22.1.3.2-1: Resource URI variables for this resource**

| Name | Data type | Definition |
|------|-----------|------------|
|------|-----------|------------|

|          |        |                                           |
|----------|--------|-------------------------------------------|
| apiRoot  | string | Clause 5.2.4 of 3GPP TS 29.122 [4].       |
| afld     | string | Identifier of the AF.                     |
| configld | string | Identifier of the configuration resource. |

### 5.22.1.3.3 Resource Methods

#### 5.22.1.3.3.1 General

The following clauses specify the resource methods supported by the resource as described in clause 5.22.1.3.2.

#### 5.22.1.3.3.2 GET

The GET method allows to read the active configuration for a given AF and configuration Id. The AF shall initiate the HTTP GET request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.22.1.3.3.2-1.

**Table 5.22.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.22.1.3.3.2-2 and the response data structures and response codes specified in table 5.22.1.3.3.2-3.

**Table 5.22.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.22.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AccessTimeDistributionData                                                                                               | M | 1           | 200 OK                 | The configuration information for the AF in the request URI are returned.                                                                                                                                                                                        |
| N/A                                                                                                                      |   |             | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                      |   |             | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                  |

**Table 5.22.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.22.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

#### 5.22.1.3.3.3 PUT

The PUT method modifies an existing configuration resource to update a configuration. The AF shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the request data structures specified in table 5.22.1.3.3.3-1 and the response data structures and response codes specified in table 5.22.1.3.3.3-2.

**Table 5.22.1.3.3.3-1: Data structures supported by the PUT Request Body on this resource**

| Data type                  | P | Cardinality | Description                                                              |
|----------------------------|---|-------------|--------------------------------------------------------------------------|
| AccessTimeDistributionData | M | 1           | Modify an existing configuration of 5G access stratum time distribution. |

**Table 5.22.1.3.3.3-2: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AccessTimeDistributionData                                                                                                 | M | 1           | 200 OK                 | The configuration was updated successfully.                                                                                                                                                                                                                         |
| N/A                                                                                                                        |   |             | 204 No Content         | The configuration was updated successfully.                                                                                                                                                                                                                         |
| N/A                                                                                                                        |   |             | 307 Temporary Redirect | Temporary redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                        |   |             | 308 Permanent Redirect | Permanent redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                             | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                                                            |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                     |
| NOTE 2: Failure causes are described in clause 5.22.6.                                                                     |   |             |                        |                                                                                                                                                                                                                                                                     |

**Table 5.22.1.3.3.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.22.1.3.3.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.22.1.3.3.4 DELETE

The DELETE method deletes the configuration of 5G access stratum time distribution for a given AF. The AF shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.22.1.3.3.4-1.

**Table 5.22.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.22.1.3.3.4-2 and the response data structures and response codes specified in table 5.22.1.3.3.4-3.

**Table 5.22.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.22.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                         |   |             | 204 No Content         | The configuration was terminated successfully.                                                                                                                                                                                                                     |
| N/A                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                    |

**Table 5.22.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.22.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.22.2 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.22.3 Notifications

### 5.22.3.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.22.3.1-1: Notifications overview**

| Notification      | Callback URI   | HTTP method or custom operation | Description (service operation) |
|-------------------|----------------|---------------------------------|---------------------------------|
| ASTI Notification | {astiNotifUri} | POST                            | ASTI notification.              |

### 5.22.3.2 ASTI Notification

#### 5.22.3.2.1 Description

The ASTI Notification is used by the NEF to report the changes on the ASTI service to a previously subscribed AF.

#### 5.22.3.2.2 Target URI

The Callback URI "{astiNotifUri}" shall be used with the callback URI variables defined in table 5.22.3.2.2-1.

**Table 5.22.3.2.2-1: Callback URI variables**

| Name         | Definition                                                                                                                        |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------|
| astiNotifUri | Callback reference provided by the AF during the creation/update/modification of the corresponding Individual ASTI Configuration. |

#### 5.22.3.2.3 Operation Definition

##### 5.22.3.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.22.3.2.3.1-1 and the response data structures and response codes specified in table 5.22.3.2.3.1-2.

**Table 5.22.3.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type              | P | Cardinality | Description                                                                                                                       |
|------------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
| AstiConfigNotification | M | 1           | Provides information about the change in the 5G Access Stratum Time Distribution configuration notification by the NEF to the AF. |

**Table 5.22.3.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                     |
|-----------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | The event notification is successfully received.                                                                                                                                                                                                                                |
| n/a       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.                                                                                  |

|                                                                                                                           |  |  |  |                                                                           |
|---------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------|
|                                                                                                                           |  |  |  | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |  |                                                                           |

**Table 5.22.3.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.22.3.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

5.22.3.2.3.2            Void

## 5.22.4 Data Model

### 5.22.4.1 General

This clause specifies the application data model supported by the ASTI API.

Table 5.22.4.1-1 specifies the data types defined for the ASTI API.

**Table 5.22.4.1-1: ASTI API specific Data Types**

| Data type                   | Clause defined | Description                                                                                                                                                           | Applicability    |
|-----------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| AccessTimeDistributionData  | 5.22.4.3.2     | Contains the parameters for the creation of 5G access stratum time distribution configuration and for the subscription of 5G access stratum time distribution status. |                  |
| ActiveUe                    | 5.22.4.3.5     | Contains the UE identifier whose status of the access stratum time distribution is active and the optional requested time synchronization error budget.               |                  |
| AstiConfigNotification      | 5.22.4.3.6     | Contains the report of a change in the 5G Access Stratum Time Distribution parameters applied to the UE(s).                                                           | ASTIConfigReport |
| AstiConfigStateNotification | 5.22.4.3.7     | Contains the report about a change in the 5G Access Stratum Time Distribution parameters for a UE                                                                     | ASTIConfigReport |
| StatusRequestData           | 5.22.4.3.3     | Contains the parameters for retrieval of the status of the access stratum time distribution for a list of UEs.                                                        |                  |
| StatusResponseData          | 5.22.4.3.4     | Contains the parameters for the status of the access stratum time distribution for a list of UEs.                                                                     |                  |

### 5.22.4.2 Reused data types

The data types reused by the ASTI API from other specifications are listed in table 5.22.4.2-1.



**Table 5.22.4.2-1: Re-used Data Types**

| Data type                 | Reference           | Comments                                                                                | Applicability    |
|---------------------------|---------------------|-----------------------------------------------------------------------------------------|------------------|
| AstiEvent                 | 3GPP TS 29.565 [50] | Contains the ASTI Event.                                                                | ASTIConfigReport |
| AfAsTimeDistributionParam | 3GPP TS 29.565 [50] | Contains the 5G AF requested access stratum time distribution parameters.               |                  |
| ExternalGroupId           | 3GPP TS 29.122 [4]  | External Group Identifier for a user group.                                             |                  |
| Gpsi                      | 3GPP TS 29.571 [8]  | Identifies a GPSI.                                                                      |                  |
| ProblemDetails            | 3GPP TS 29.122 [4]  | Represents error related information.                                                   |                  |
| SpatialValidityCond       | 3GPP TS 29.571 [8]  | Represents the Spatial Validity Condition.                                              | CoverageArea     |
| SupportedFeatures         | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features defined in table 5.22.5-1. |                  |
| Uri                       | 3GPP TS 29.571 [8]  | Identifies a referenced resource.                                                       | ASTIConfigReport |

### 5.22.4.3 Structured data types

#### 5.22.4.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.22.4.3.2 Type: AccessTimeDistributionData

**Table 5.22.4.3.2-1: Definition of type AccessTimeDistributionData**

| Attribute name | Data type                 | P | Cardinality | Description                                                                                                                                                                                                                           | Applicability    |
|----------------|---------------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| gpsis          | array(Gpsi)               | C | 1..N        | Identifies a list of UE(s).<br>(NOTE 1)                                                                                                                                                                                               |                  |
| exterGroupId   | ExternalGroupId           | C | 0..1        | Represents a group of users. (NOTE 1)                                                                                                                                                                                                 |                  |
| asTimeDisParam | AfAsTimeDistributionParam | M | 1           | 5G access stratum time distribution parameters.<br><br>(NOTE 3)                                                                                                                                                                       |                  |
| coverageArea   | SpatialValidityCondition  | O | 0..1        | Time Synchronization Coverage Area. (NOTE 2)                                                                                                                                                                                          | CoverageArea     |
| astiNotifUri   | Uri                       | C | 0..1        | Notification URI for reporting changes in 5G access stratum time distribution status, and/or reporting the 5G access stratum time distribution information.<br><br>It shall be provided if the feature ASTIConfigReport is supported. | ASTIConfigReport |
| astiNotifId    | string                    | C | 0..1        | Notification Correlation ID assigned by the AF. It shall be provided if the ASTIConfigReport feature is supported.                                                                                                                    | ASTIConfigReport |
| suppFeat       | SupportedFeatures         | C | 0..1        | Contains the list of supported feature(s) among the ones defined in clause 5.22.5.<br><br>This attribute shall be present only when feature negotiation needs to take place.                                                          |                  |

NOTE 1: One of "gpsis" or "exterGroupId" attribute shall be provided.

NOTE 2: The "trackingAreaList" attribute within the "coverageArea" attribute is not applicable for the untrusted AF.

NOTE 3: The "clkQltDetLvl" attribute and the "clkQltAcptCri" attribute (if applicable) within the "asTimeDisParam" attribute may be provided only if the "NetTimeSyncStatus" feature is supported.

## 5.22.4.3.3 Type: StatusRequestData

Table 5.22.4.3.3-1: Definition of type StatusRequestData

| Attribute name | Data type   | P | Cardinality | Description                 | Applicability |
|----------------|-------------|---|-------------|-----------------------------|---------------|
| gpsis          | array(Gpsi) | M | 1..N        | Identifies a list of UE(s). |               |

## 5.22.4.3.4 Type: StatusResponseData

Table 5.22.4.3.4-1: Definition of type StatusResponseData

| Attribute name | Data type       | P | Cardinality | Description                                                                                                                                                | Applicability |
|----------------|-----------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| inactiveUes    | array(Gpsi)     | O | 1..N        | Indicate the UE(s) whose status of the access stratum time distribution is inactive.                                                                       |               |
| activeUes      | array(ActiveUe) | O | 1..N        | Contains the UE identifier(s) whose status of the access stratum time distribution is active and the optional requested time synchronization error budget. |               |

## 5.22.4.3.5 Type: ActiveUe

Table 5.22.4.3.5-1: Definition of type ActiveUe

| Attribute name  | Data type | P | Cardinality | Description                                                                            | Applicability |
|-----------------|-----------|---|-------------|----------------------------------------------------------------------------------------|---------------|
| gpsi            | Gpsi      | M | 1           | Indicate the UE whose status of the access stratum time distribution is active.        |               |
| timeSyncErrBdgt | UInteger  | O | 0..1        | Indicates the time synchronization error budget in terms of time units of nanoseconds. |               |

## 5.22.4.3.6 Type: AstiConfigNotification

Table 5.22.4.3.6-1: Definition of type AstiConfigNotification

| Attribute name | Data type                          | P | Cardinality | Description                                                                                   | Applicability |
|----------------|------------------------------------|---|-------------|-----------------------------------------------------------------------------------------------|---------------|
| astiNotifId    | string                             | M | 1           | It is used to set the value of Notification Correlation ID in the corresponding notification. |               |
| stateConfigs   | array(AstiConfigStateNotification) | M | 1..N        | Contains change of state of 5G access stratum time distribution configuration.                |               |

## 5.22.4.3.7 Type: AstiConfigStateNotification

Table 5.22.4.3.7-1: Definition of type AstiConfigStateNotification

| Attribute name | Data type | P | Cardinality | Description                                        | Applicability |
|----------------|-----------|---|-------------|----------------------------------------------------|---------------|
| gpsi           | Gpsi      | M | 1           | Identifies the UE to which the status below apply. |               |
| event          | AstiEvent | M | 1           | Indicates the reported event.                      |               |

## 5.22.4.4 Simple data types and enumerations

### 5.22.4.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.22.4.4.2 Simple data types

The simple data types defined in table 5.22.4.4.2-1 shall be supported.

**Table 5.22.4.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.22.5 Used Features

The table below defines the features applicable to the ASTI API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.22.5-1: Features used by ASTI API**

| Feature number | Feature Name      | Description                                                                                                                                                            |
|----------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | CoverageArea      | Indicates support of the inclusion of the Time Synchronization Coverage Area in ASTI requests.                                                                         |
| 2              | ASTIConfigReport  | This feature indicates the support of the report of changes in 5G access stratum time distribution status.                                                             |
| 3              | NetTimeSyncStatus | This feature indicates the support of network timing synchronization status and reporting.<br><br>This feature requires the support of the "ASTIConfigReport" feature. |
| 4              | SupportReport     | This feature indicates the support of the report of whether the AF requested Time Synchronization is authorized for the requested UE's.                                |

## 5.22.6 Error handling

### 5.22.6.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.22.6.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the ASTI API.

### 5.22.6.3 Application Errors

The application errors defined for the ASTI API are listed in table 5.22.6.3-1.

**Table 5.22.6.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

|                           |               |                                                                                                                                |               |
|---------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------|---------------|
| UE_SERVICE_NOT_AUTHORIZED | 403 Forbidden | The AF request is not authorized or the AF requested parameter(s) are not authorized by UE's Time Synchronization Data in UDM. | SupportReport |
|---------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------|---------------|

## 5.23 DataReporting API

### 5.23.1 Introduction

The Nnef\_DataReporting service shall use the DataReporting API.

The API URI of DataReporting API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-data-reporting".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.23.2 Resources

#### 5.23.2.1 Overview

This clause describes the structure for the Resource URIs as shown in Figure 5.23.2.1-1 and the resources and HTTP methods used for the DataReporting API.

The structure of the resource URIs of the DataReporting API is shown in Figure 5.23.2.1-1.

{apiRoot}/3gpp-data-reporting/<apiVersion>

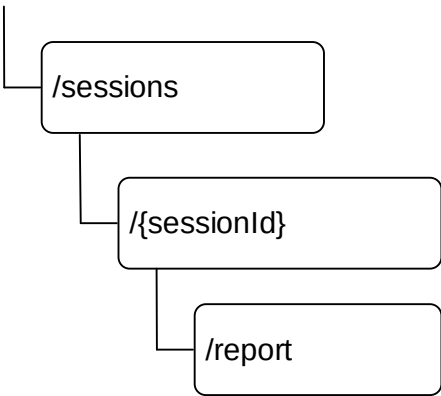


Figure 5.23.2.1-1: Resource URI structure of the DataReporting API

Table 5.23.2.1-1 provides an overview of the resources and applicable HTTP methods applicable for the DataReporting API.

Table 5.23.2.1-1: Resources and methods overview

| Resource name                     | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                  |
|-----------------------------------|--------------------------------------------|---------------------------------|------------------------------------------------------------------|
| Data Reporting Sessions           | /sessions                                  | POST                            | Create a Data Reporting Session                                  |
| Individual Data Reporting Session | /sessions/{sessionId}                      | GET                             | Retreive an existing Individual Data Reporting Session resource. |
|                                   |                                            | PUT                             | Update an Individual existing Data Reporting Session resource.   |
|                                   |                                            | DELETE                          | Delete an existing Individual Data Reporting Session resource.   |
|                                   |                                            | report (POST)                   | Report data.                                                     |

5.23.2.2 Resource: Data Reporting Sessions

5.23.2.2.1 Introduction

This resource represents the collection of Data Reporting Sessions managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

## 5.23.2.2.2 Resource definition

Resource URI: {apiRoot}/3gpp-data-reporting/<apiVersion>/sessions

This resource shall support the resource URI variables defined in table 5.23.2.2.2-1.

**Table 5.23.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.23.1. |

## 5.23.2.2.3 Resource Methods

## 5.23.2.2.3.1 POST

This method enables an AF to request the creation of a Data Reporting Session at the NEF.

This method shall support the URI query parameters specified in table 5.23.2.2.3.1-1.

**Table 5.23.2.2.3.1-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.23.2.2.3.1-2 and the response data structures and response codes specified in table 5.23.2.2.3.1-4.

**Table 5.23.2.2.3.1-2: Data structures supported by the POST request body on this resource**

| Data type                                                                                                            | P | Cardinality | Description                                                                          |
|----------------------------------------------------------------------------------------------------------------------|---|-------------|--------------------------------------------------------------------------------------|
| DataReportingSession                                                                                                 | M | 1           | Representation of the Data Reporting Session to be created in the NEF.<br><br>(NOTE) |
| NOTE: The "sessionId" attribute of the DataReportingSession data type shall not be provided as it is not applicable. |   |             |                                                                                      |

**Table 5.23.2.2.3.1-3: Data structures supported by the POST response body on this resource**

| Data type                                                                                                                        | P | Cardinality | Response codes | Description                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DataReportingSession                                                                                                             | M | 1           | 201 Created    | Successful case. A representation of the created "Individual Data Reporting Session" resource is returned.<br><br>An HTTP "Location" header that contains the URI of the created resource shall be returned in the response body.<br><br>(NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                                                                                                                                   |
| NOTE 2: The "sessionId" attribute of the DataReportingSession data type shall not be provided as it is not applicable.           |   |             |                |                                                                                                                                                                                                                                                   |

**Table 5.23.2.2.3.1-4: Headers supported by the 201 response code on this resource**

| HTTP response header | Data type | P | Cardinality | Description                                                                                                                           |
|----------------------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Location             | string    | M | 1           | The URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-data-reporting/<apiVersion>/sessions/{sessionId} |

### 5.23.2.3 Resource: Individual Data Reporting Session

#### 5.23.2.3.1 Introduction

This resource represents an Individual Data Reporting Session managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

#### 5.23.2.3.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-data-reporting/<apiVersion>/sessions/{sessionId}**

This resource shall support the resource URI variables defined in table 5.23.2.3.2-1.

**Table 5.23.2.3.2-1: Resource URI variables for this resource**

| Name      | Data type | Definition                                                                     |
|-----------|-----------|--------------------------------------------------------------------------------|
| apiRoot   | string    | See clause 5.23.1.                                                             |
| sessionId | string    | Represents the identifier of the "Individual Data Reporting Session" resource. |

#### 5.23.2.3.3 Resource standard methods

##### 5.23.2.3.3.1 GET

This method enables an AF to retrieve an existing "Individual Data Reporting Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.23.2.3.3.1-1.

**Table 5.23.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.23.2.3.3.1-2 and the response data structures and response codes specified in table 5.23.2.3.3.1-3.

**Table 5.23.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.23.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type            | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                |
|----------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DataReportingSession | M | 1           | 200 OK                 | Successful case. The requested "Individual Data Reporting Session" resource is returned to the AF.<br>(NOTE 2)                                                                                                             |
| n/a                  |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                  |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE 1: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

NOTE 2: The "sessionId" attribute of the DataReportingSession data type shall not be provided as it is not applicable.

**Table 5.23.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI located in an alternative NEF. |

**Table 5.23.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.23.2.3.3.2 PUT

This method enables an AF to request the update of an existing "Individual Data Reporting Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.23.2.3.3.2-1.

**Table 5.23.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|      |           |   |             |             |

This method shall support the request data structures specified in table 5.23.2.3.3.2-2 and the response data structures and response codes specified in table 5.23.2.3.3.2-3.

**Table 5.23.2.3.3.2-2: Data structures supported by the PUT request body on this resource**

| Data type                                                                                                            | P | Cardinality | Description                                                            |
|----------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------------------------------------------------------|
| DataReportingSession                                                                                                 | M | 1           | Parameters to update the "Individual Data Reporting Session" resource. |
| NOTE: The "sessionId" attribute of the DataReportingSession data type shall not be provided as it is not applicable. |   |             |                                                                        |

**Table 5.23.2.3.3.2-3: Data structures supported by the PUT response body on this resource**

| Data type            | P | Cardinality | Response codes         | Description                                                                                                                                                                                   |
|----------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DataReportingSession | M | 1           | 200 OK                 | Successful response. The "Individual Data Reporting Session" resource was updated successfully and a representation of the created resource is returned in the response body.<br><br>(NOTE 2) |
| n/a                  |   |             | 204 No Content         | Successful response. The "Individual Data Reporting Session" resource was successfully updated and no content is to be returned in the response body.                                         |
| n/a                  |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.                                                 |



|                                                                                                                                 |  |  |                        |                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                 |  |  |                        | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                                                                      |
| n/a                                                                                                                             |  |  | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                |
| NOTE 2: The "sessionId" attribute of the DataReportingSession data type shall not be provided as it is not applicable.          |  |  |                        |                                                                                                                                                                                                                                |

**Table 5.23.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.23.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.23.2.3.3.3 DELETE**

This method enables an AF to request the deletion of an existing "Individual Data Reporting Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.23.2.3.3.3-1.

**Table 5.23.2.3.3.3-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.23.2.3.3.3-2 and the response data structures and response codes specified in table 5.23.2.3.3.3-3.

**Table 5.23.2.3.3.3-2: Data structures supported by the DELETE request body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.23.2.3.3.3-3: Data structures supported by the DELETE response body on this resource**

| Data type | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                    |
|-----------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful response. The "Individual Data Reporting Session" resource is successfully deleted.                                                                                                                                 |
|           |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

|                                                                                                                                  |  |  |                        |                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                  |  |  | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                |

**Table 5.23.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.23.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.23.2.3.4 Resource custom operations

##### 5.23.2.3.4.1 Overview

**Table 5.23.2.3.4.1-1: Custom operations**

| Operation name | Custom operation URI         | Mapped HTTP method | Description                                |
|----------------|------------------------------|--------------------|--------------------------------------------|
| Report         | /sessions/{sessionId}/report | POST               | Enables to send collected UE data reports. |

##### 5.23.2.3.4.2 Operation: Report

###### 5.23.2.3.4.2.1 Description

The custom operation enables an AF to send collected UE data reports to the NEF.

###### 5.23.2.3.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 5.23.2.3.4.2.2-1 and the response data structures and response codes specified in table 5.23.2.3.4.2.2-2.

**Table 5.23.2.3.4.2.2-1: Data structures supported by the POST request body on this resource**

| Data type  | P | Cardinality | Description                                     |
|------------|---|-------------|-------------------------------------------------|
| DataReport | M | 1           | UE data reported by the data collection client. |

**Table 5.23.2.3.4.2.2-2: Data structures supported by the POST response body on this resource**

| Data type            | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|----------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DataReportingSession | O | 0..1        | 200 OK                 | The UE data report was successfully received.                                                                                                                                                                                  |
| n/a                  |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

|                                                                                                                            |  |  |                              |                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                        |  |  | 308<br>Permanent<br>Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4] |
| NOTE 1: The mandatory HTTP error status code for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                              |                                                                                                                                                                                                                               |
| NOTE 2: The "sessionId" attribute of the DataReportingSession data type shall not be provided as it is not applicable.     |  |  |                              |                                                                                                                                                                                                                               |

**Table 5.23.2.3.4.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.23.2.3.4.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.23.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.23.4 Notifications

There are no notifications defined for this API in this release of the specification.

### 5.23.5 Data Model

#### 5.23.5.1 General

This clause specifies the application data model supported by the DataReporting API. Table 5.23.5.1-1 specifies the data types defined for the DataReporting API.

**Table 5.23.5.1-1: DataReporting specific Data Types**

| Data type | Clause defined | Description |
|-----------|----------------|-------------|
| n/a       |                |             |

Table 5.23.5.1-2 specifies data types re-used by the DataReporting API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the DataReporting API.

**Table 5.23.5.1-2: Re-used Data Types**

| Data type            | Reference           | Comments                                                    | Applicability |
|----------------------|---------------------|-------------------------------------------------------------|---------------|
| DataReport           | 3GPP TS 26.532 [60] | Reported data by the AF.                                    |               |
| DataReportingSession | 3GPP TS 26.532 [60] | Configuration by the AF specifying the data to be reported. |               |

### 5.23.6 Used Features

The table below defines the features applicable to the DataReporting API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.23.6-1: Features used by DataReporting API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.23.7 Error handling

### 5.23.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.23.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the DataReporting API.

### 5.23.7.3 Application Errors

The application errors defined for the DataReporting API are listed in table 5.23.7.3-1.

**Table 5.23.7.3-1: Application errors**

| Application Error | HTTP status code | Description |
|-------------------|------------------|-------------|
|                   |                  |             |

## 5.24 DataReportingProvisioning API

### 5.24.1 Introduction

The Nnef\_DataReportingProvisioning service shall use the DataReportingProvisioning API.

The API URI of the DataReportingProvisioning API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-data-reporting-provisioning".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

5.24.2 Resources

5.24.2.1 Overview

This clause describes the structure for the Resource URIs as shown in Figure 5.24.2.1-1 and the resources and HTTP methods used for the DataReportingProvisioning API.

The structure of the resource URIs of the DataReportingProvisioning API is shown in Figure 5.24.2.1-1.

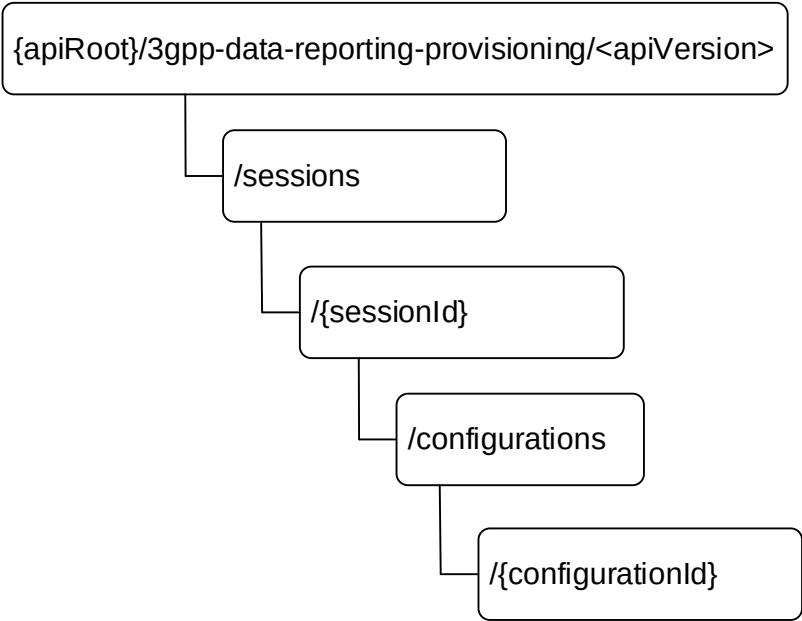


**Figure 5.24.2.1-1: Resource URI structure of the DataReportingProvisioning API**

Table 5.24.2.1-1 provides an overview of the resources and applicable HTTP methods applicable for the DataReportingProvisioning API.

**Table 5.24.2.1-1: Resources and methods overview**

| Resource name                                  | Resource URI (relative path under API URI) | HTTP method | Description (service operation)                                                 |
|------------------------------------------------|--------------------------------------------|-------------|---------------------------------------------------------------------------------|
| Data Reporting Provisioning Sessions           | /sessions                                  | POST        | Create a Data Reporting Provisioning Session.                                   |
| Individual Data Reporting Provisioning Session | /sessions/{sessionId}                      | GET         | Retreive an existing "Individual Data Reporting Provisioning Session" resource. |
|                                                |                                            | DELETE      | Delete an existing "Individual Data Reporting Provisioning Session" resource.   |

|                                         |                                                        |        |                                                                           |
|-----------------------------------------|--------------------------------------------------------|--------|---------------------------------------------------------------------------|
| Data Reporting Configurations           | /sessions/{sessionId}/configurations                   | POST   | Create a new Data Reporting Configuration.                                |
| Individual Data Reporting Configuration | /sessions/{sessionId}/configurations/{configurationId} | GET    | Retrieves an existing "Individual Data Reporting Configuration" resource. |
|                                         |                                                        | PUT    | Update an existing "Individual Data Reporting Configuration" resource.    |
|                                         |                                                        | PATCH  | Modify an existing "Individual Data Reporting Configuration" resource.    |
|                                         |                                                        | DELETE | Delete an existing "Individual Data Reporting Configuration" resource.    |

## 5.24.2.2 Resource: Data Reporting Provisioning Sessions

### 5.24.2.2.1 Introduction

This resource represents the collection of Data Reporting Provisioning Sessions managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

### 5.24.2.2.2 Resource definition

Resource URL: {apiRoot}/3gpp-data-reporting-provisioning/v1/sessions

This resource shall support the resource URI variables defined in table 5.24.2.2.2-1.

**Table 5.24.2.2.2-1: Resource URL variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.24.1. |

### 5.24.2.2.3 Resource Methods

#### 5.24.2.2.3.1 POST

This method enables an AF to request the creation of a Data Reporting Provisioning Session at the NEF.

This method shall support the URI query parameters specified in table 5.24.2.2.3.1-1.

**Table 5.24.2.2.3.1-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.24.2.2.3.1-2 and the response data structures and response codes specified in table 5.24.2.2.3.1-4.

**Table 5.24.2.2.3.1-2: Data structures supported by the POST request body on this resource**

| Data type                                                                                                                                    | P | Cardinality | Description                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|-----------------------------------------------------------------------------------------------|
| DataReportingProvisioningSession                                                                                                             | M | 1           | Representation of the Data Reporting Provisioning Session to be created in the NEF.<br>(NOTE) |
| NOTE: The "provisioningSessionId" attribute of the DataReportingProvisioningSession data type shall not be provided as it is not applicable. |   |             |                                                                                               |

**Table 5.24.2.2.3.1-3: Data structures supported by the POST response body on this resource**

| Data type                                                                                                                                      | P | Cardinality | Response codes | Description                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DataReportingProvisioningSession (NOTE 2)                                                                                                      | M | 1           | 201 Created    | Successful case. A representation of the created "Individual Data Reporting Provisioning Session" resource is returned.<br><br>An HTTP "Location" header that contains the URI of the created "Individual Data Reporting Provisioning Session" resource shall be returned. |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.               |   |             |                |                                                                                                                                                                                                                                                                            |
| NOTE 2: The "provisioningSessionId" attribute of the DataReportingProvisioningSession data type shall not be provided as it is not applicable. |   |             |                |                                                                                                                                                                                                                                                                            |

**Table 5.24.2.2.3.1-4: Headers supported by the 201 response code on this resource**

| HTTP response header | Data type | P | Cardinality | Description                                                                                                                                     |
|----------------------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Location             | string    | M | 1           | The URI of the newly created resource, according to the structure: {apiRoot}/3gpp-data-reporting-provisioning/<apiVersion>/sessions/{sessionId} |

## 5.24.2.3 Resource: Individual Data Reporting Provisioning Session

### 5.24.2.3.1 Introduction

This resource represents an "Individual Data Reporting Provisioning Session" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

### 5.24.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-data-reporting-provisioning/<apiVersion>/sessions/{sessionId}

This resource shall support the resource URI variables defined in table 5.24.2.3.2-1.

**Table 5.24.2.3.2-1: Resource URI variables for this resource**

| Name      | Data type | Definition                                                                                  |
|-----------|-----------|---------------------------------------------------------------------------------------------|
| apiRoot   | string    | See clause 5.24.1.                                                                          |
| sessionId | string    | Represents the identifier of the "Individual Data Reporting Provisioning Session" resource. |

### 5.24.2.3.3 Resource standard methods

#### 5.24.2.3.3.1 GET

This method enables an AF to retrieve an existing "Individual Data Reporting Provisioning Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.24.2.3.3.1-1.

**Table 5.24.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.24.2.3.3.1-2 and the response data structures and response codes specified in table 5.24.2.3.3.1-3.

**Table 5.24.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.24.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                                      | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DataReportingProvisioningSession                                                                                                               | M | 1           | 200 OK                 | Successful case. The requested "Individual Data Reporting Provisioning Session" resource is successfully returned to the AF.<br><br>(NOTE 2)                                                                                          |
| n/a                                                                                                                                            |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                            |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE 1: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.                |   |             |                        |                                                                                                                                                                                                                                       |
| NOTE 2: The "provisioningSessionId" attribute of the DataReportingProvisioningSession data type shall not be provided as it is not applicable. |   |             |                        |                                                                                                                                                                                                                                       |

**Table 5.24.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI located in an alternative NEF. |

**Table 5.24.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |



5.24.2.3.3.2 Void

5.24.2.3.3.3 DELETE

This method enables an AF to request the deletion of an existing "Individual Data Reporting Provisioning Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.24.2.3.3.3-1.

**Table 5.24.2.3.3.3-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.24.2.3.3.3-2 and the response data structures and response codes specified in table 5.24.2.3.3.3-3.

**Table 5.24.2.3.3.3-2: Data structures supported by the DELETE request body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.24.2.3.3.3-3: Data structures supported by the DELETE response body on this resource**

| Data type                                                                                                                        | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                              |   |             | 204 No Content         | Successful response. The "Individual Data Reporting Provisioning Session" resource was successfully deleted.                                                                                                                          |
|                                                                                                                                  |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
|                                                                                                                                  |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                       |

**Table 5.24.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                 |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located on an alternative service instance within the same NEF. |

**Table 5.24.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                 |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------|
| Location | String    | M | 1           | Contains an alternative URI of the resource located on an alternative service instance within the same NEF. |

## 5.24.2.4 Resource: Data Reporting Configurations

### 5.24.2.4.1 Introduction

This resource represents the collection of Data Reporting Configurations managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

### 5.24.2.4.2 Resource definition

Resource URIL: **{apiRoot}/3gpp-data-reporting-provisioning/<apiVersion>/sessions/{sessionId}/configurations**

This resource shall support the resource URI variables defined in table 5.24.2.4.2-1.

**Table 5.24.2.4.2-1: Resource URI variables for this resource**

| Name      | Data type | Definition                                                                                           |
|-----------|-----------|------------------------------------------------------------------------------------------------------|
| apiRoot   | string    | See clause 5.24.1.                                                                                   |
| sessionId | string    | Represents the identifier of the existing "Individual Data Reporting Provisioning Session" resource. |

### 5.24.2.4.3 Resource Methods

#### 5.24.2.4.3.1 POST

This method enables an AF to request the creation of a Data Reporting Configuration at the NEF.

This method shall support the URI query parameters specified in table 5.24.2.4.3.1-1.

**Table 5.24.2.4.3.1-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.24.2.4.3.1-2 and the response data structures and response codes specified in table 5.24.2.4.3.1-4.

**Table 5.24.2.4.3.1-2: Data structures supported by the POST request body on this resource**

| Data type                                                                                                                                     | P | Cardinality | Description                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|--------------------------------------------------------------------------------------------|
| DataReportingConfiguration                                                                                                                    | M | 1           | Representation of the Data Reporting Configuration to be created in the NEF.<br><br>(NOTE) |
| NOTE: The "dataReportingConfigurationId" attribute of the DataReportingConfiguration data type shall not be provided as it is not applicable. |   |             |                                                                                            |

**Table 5.24.2.4.3.1-3: Data structures supported by the POST response body on this resource**

| Data type                  | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                             |
|----------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DataReportingConfiguration | M | 1           | 201 Created            | Successful case. A representation of the created "Individual Data Reporting Configuration" resource is returned.<br><br>An HTTP "Location" header that contains the URI of the created resource shall be returned in the response body.<br><br>(NOTE 2) |
| n/a                        |   |             | 307 Temporary Redirect | Temporary redirection.                                                                                                                                                                                                                                  |

|                                                                                                                                                                                                                                                                                                |  |  |                        |                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                |  |  |                        | <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p>                               |
| n/a                                                                                                                                                                                                                                                                                            |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| <p>NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.</p> <p>NOTE 2: The "dataReportingConfigurationId" attribute of the DataReportingConfiguration data type shall not be provided as it is not applicable.</p> |  |  |                        |                                                                                                                                                                                                                                                              |

**Table 5.24.2.4.3.1-4: Headers supported by the 201 response code on this resource**

| HTTP response header | Data type | P | Cardinality | Description                                                                                                                                                                         |
|----------------------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location             | string    | M | 1           | The URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-data-reporting-provisioning/<apiVersion>/sessions/{sessionId}/configurations/{configurationId} |

**Table 5.24.2.4.3.1-5: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.24.2.4.3.1-6: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

## 5.24.2.5 Resource: Individual Data Reporting Configuration

### 5.24.2.5.1 Introduction

This resource represents an Individual Data Reporting Configuration resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

### 5.24.2.5.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-data-reporting-provisioning/<apiVersion>/sessions/{sessionId}/configurations/{configurationId}**

This resource shall support the resource URI variables defined in table 5.24.2.5.2-1.

**Table 5.24.2.5.2-1: Resource URI variables for this resource**

| Name            | Data type | Definition                                                                                  |
|-----------------|-----------|---------------------------------------------------------------------------------------------|
| apiRoot         | string    | See clause 5.24.1                                                                           |
| sessionId       | string    | Represents the identifier of the "Individual Data Reporting Provisioning Session" resource. |
| configurationId | string    | Represents the identifier of the "Individual Data Reporting Configuration" resource.        |

### 5.24.2.5.3 Resource standard methods

#### 5.24.2.5.3.2 GET

This method enables an AF to retrieve an existing "Individual Data Reporting Configuration" resource at the NEF.

This method shall support the URI query parameters specified in table 5.24.2.5.3.2-1.

**Table 5.24.2.5.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.24.2.5.3.2-2 and the response data structures and response codes specified in table 5.24.2.5.3.2-3.

**Table 5.24.2.5.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.24.2.5.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                                       | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DataReportingConfiguration                                                                                                                      | M | 1           | 200 OK                 | Successful case. The requested Individual Data Reporting Configuration resource is returned.<br>(NOTE 2)                                                                                                                              |
| n/a                                                                                                                                             |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                             |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE 1: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.                 |   |             |                        |                                                                                                                                                                                                                                       |
| NOTE 2: The "dataReportingConfigurationId" attribute of the DataReportingConfiguration data type shall not be provided as it is not applicable. |   |             |                        |                                                                                                                                                                                                                                       |

**Table 5.24.2.5.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI located in an alternative NEF. |

**Table 5.24.2.5.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                                   |
|----------|--------|---|---|-----------------------------------------------------------------------------------|
| Location | string | M | 1 | Contains an alternative target URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-----------------------------------------------------------------------------------|

#### 5.24.2.5.3.3 PUT

This method enables an AF to update an existing "Individual Data Reporting Configuration" resource at the NEF.

This method shall support the URI query parameters specified in table 5.24.2.5.3.3-1.

**Table 5.24.2.5.3.3-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|      |           |   |             |             |

This method shall support the request data structures specified in table 5.24.2.5.3.3-2 and the response data structures and response codes specified in table 5.24.2.5.3.3-3.

**Table 5.24.2.5.3.3-2: Data structures supported by the PUT request body on this resource**

| Data type                                                                                                                                     | P | Cardinality | Description                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|--------------------------------------------------------------------------------------|
| DataReportingConfiguration                                                                                                                    | M | 1           | Parameters to update the Individual Data Reporting Configuration resource.<br>(NOTE) |
| NOTE: The "dataReportingConfigurationId" attribute of the DataReportingConfiguration data type shall not be provided as it is not applicable. |   |             |                                                                                      |

**Table 5.24.2.5.3.3-3: Data structures supported by the PUT response body on this resource**

| Data type                                                                                                                                       | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DataReportingConfiguration                                                                                                                      | M | 1           | 200 OK                 | Successful case. The "Individual Data Reporting Configuration" resource was updated successfully and a representation of the updated resource is returned in the response body.<br>(NOTE 2)                                           |
| n/a                                                                                                                                             |   |             | 204 No Content         | Successful case. The "Individual Data Reporting Configuration" resource was successfully updated and no content is to be returned in the response body.                                                                               |
| n/a                                                                                                                                             |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                             |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.                 |   |             |                        |                                                                                                                                                                                                                                       |
| NOTE 2: The "dataReportingConfigurationId" attribute of the DataReportingConfiguration data type shall not be provided as it is not applicable. |   |             |                        |                                                                                                                                                                                                                                       |

**Table 5.24.2.5.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.24.2.5.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.24.2.5.3.3A PATCH

The PATCH method is used to modify an existing "Individual Data Reporting Configuration" resource.

This method shall support the request data structures specified in table 5.24.2.5.3.3A-1, and the response data structures and response codes specified in table 5.24.2.5.3.3A-2.

**Table 5.24.2.5.3.3A-1: Data structures supported by the PATCH request body on this resource**

| Data type                       | P | Cardinality | Description                                                                                                    |
|---------------------------------|---|-------------|----------------------------------------------------------------------------------------------------------------|
| DataReportingConfigurationPatch | M | 1           | Contains the parameters to request the modification of the "Individual Data Reporting Configuration" resource. |

**Table 5.24.2.5.3.3A-2: Data structures supported by the PATCH response body on this resource**

| Data type                                                                                                                                       | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DataReportingConfiguration                                                                                                                      | M | 1           | 200 OK                 | Successful case. The "Individual Data Reporting Configuration" resource was updated successfully by configuration data provided.<br><br>(NOTE 2)                                                                                      |
| n/a                                                                                                                                             |   |             | 204 No Content         | Successful case. The "Individual Data Reporting Configuration" resource was successfully updated and no content is to be returned in the response body.                                                                               |
| n/a                                                                                                                                             |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                             |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.               |   |             |                        |                                                                                                                                                                                                                                       |
| NOTE 2: The "dataReportingConfigurationId" attribute of the DataReportingConfiguration data type shall not be provided as it is not applicable. |   |             |                        |                                                                                                                                                                                                                                       |

**Table 5.24.2.5.3.3A-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.24.2.5.3.3A-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.24.2.5.3.4 DELETE

This method enables an AF to request the deletion of an existing "Individual Data Reporting Configuration" resource at the NEF.

This method shall support the URI query parameters specified in table 5.24.2.5.3.4-1.

**Table 5.24.2.5.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.24.2.5.3.4-2 and the response data structures and response codes specified in table 5.24.2.5.3.4-3.

**Table 5.24.2.5.3.4-2: Data structures supported by the DELETE request body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.24.2.5.3.4-3: Data structures supported by the DELETE response body on this resource**

| Data type                                                                                                                        | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                              |   |             | 204 No Content         | Successful response. The "Individual Data Reporting Configuration" resource was successfully deleted.                                                                                                                                 |
|                                                                                                                                  |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
|                                                                                                                                  |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                       |

**Table 5.24.2.5.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.24.2.5.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

### 5.24.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.24.4 Notifications

There are no notifications defined for this API in this release of the specification.

### 5.24.5 Data Model

#### 5.24.5.1 General

This clause specifies the application data model supported by the DataReportingProvisioning API. Table 5.24.5.1-1 specifies the data types defined for the DataReportingProvisioning API.

**Table 5.24.5.1-1: DataReportingProvisioning specific Data Types**

| Data type | Clause defined | Description |
|-----------|----------------|-------------|
| n/a       |                |             |

Table 5.24.5.1-2 specifies data types re-used by the DataReportingProvisioning API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the DataReportingProvisioning API.

**Table 5.24.5.1-2: DataReportingProvisioning re-used Data Types**

| Data type                        | Reference           | Comments                                                                                                   | Applicability |
|----------------------------------|---------------------|------------------------------------------------------------------------------------------------------------|---------------|
| DataReportingProvisioningSession | 3GPP TS 26.532 [60] | Configuration by the AF specifying the data to be collected, processed and reported.                       |               |
| DataReportingConfiguration       | 3GPP TS 26.532 [60] | Configuration data related to UE data collection and reporting.                                            |               |
| DataReportingConfigurationPatch  | 3GPP TS 26.532 [60] | Contains the requested modifications to the configuration data regarding UE data collection and reporting. |               |

### 5.24.6 Used Features

The table below defines the features applicable to the DataReportingProvisioning API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.24.6-1: Features used by DataReportingProvisioning API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |



## 5.24.7 Error handling

### 5.24.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.24.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the DataReportingProvisioning API.

### 5.24.7.3 Application Errors

The application errors defined for the DataReportingProvisioning API are listed in table 5.24.7.3-1.

**Table 5.24.7.3-1: Application errors**

| Application Error | HTTP status code | Description |
|-------------------|------------------|-------------|
|                   |                  |             |

## 5.25 UEId API

### 5.25.1 Introduction

The Nnef\_UEId service shall use the UEId API.

The API URI of UEId API shall be:

**{apiRoot}/3gpp-ueid/v1**

with the following components:

- "apiRoot" is set as described in clause 5.2.4 in 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-ueid".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.25.2 Resources

#### 5.25.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.25.2.1-1 and the resources and HTTP methods used for the UEId API.

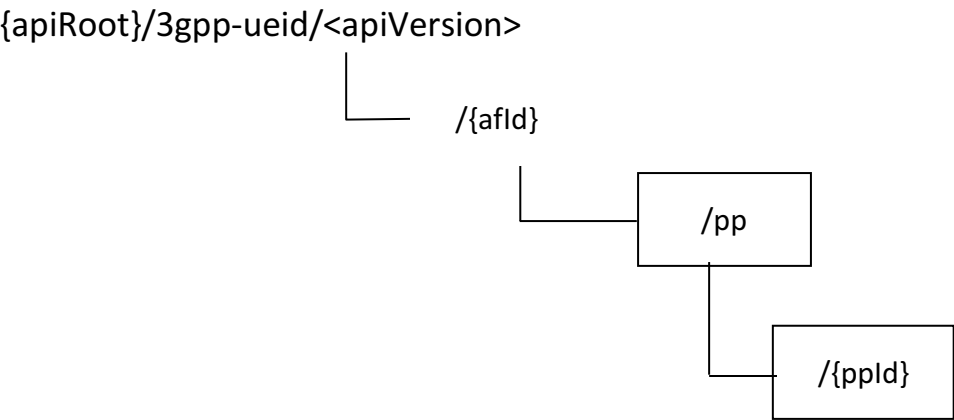


Figure 5.25.2.1-1: Resource URI structure of the UEId API

Table 5.25.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 5.25.2.1-1: Resources and methods overview

| Resource name                                     | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                                              |
|---------------------------------------------------|--------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------|
| UE ID Mapping Information Provisionings           | /{afld}/pp                                 | GET                             | Retrieve all the active UE ID Mapping Information Provisionings managed by the NEF.          |
|                                                   |                                            | POST                            | Request the creation of a new UE ID Mapping Information Provisioning at the NEF.             |
| Individual UE ID Mapping Information Provisioning | /{afld}/pp/{ppld}                          | GET                             | Retrieve an existing "Individual UE ID Mapping Information Provisioning" managed by the NEF. |
|                                                   |                                            | PUT                             | Update an existing "Individual UE ID Mapping Information Provisioning" managed by the NEF.   |
|                                                   |                                            | PATCH                           | Modify an existing "Individual UE ID Mapping Information Provisioning" managed by the NEF.   |
|                                                   |                                            | DELETE                          | Delete an existing "Individual UE ID Mapping Information Provisioning" managed by the NEF.   |

5.25.2.2 Resource: UE ID Mapping Information Provisionings

5.25.2.2.1 Introduction

This resource represents the collection of UE ID Mapping Information Provisionings managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [32]).

5.25.2.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-ueid/<apiVersion>/{afld}/pp

This resource shall support the resource URI variables defined in table 5.25.2.2.2-1.

**Table 5.25.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                           |
|---------|-----------|--------------------------------------|
| apiRoot | string    | See clause 5.25.1.                   |
| afId    | string    | Represents the identifier of the AF. |

### 5.25.2.2.3 Resource Methods

#### 5.25.2.2.3.1 GET

This method enables to request to retrieve all the active UE ID Mapping Information Provisionings managed by the NEF.

This method shall support the URI query parameters specified in table 5.25.2.2.3.1-1.

**Table 5.25.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.25.2.2.3.1-2 and the response data structures and response codes specified in table 5.25.2.2.3.1-3.

**Table 5.25.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.25.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(UeIdMappingInfo)                                                                                                              | M | 0..N        | 200 OK                 | Successful case. All the "Individual UE ID Mapping Information Provisioning" resource(s) managed by the NEF are returned.<br><br>If there are no existing "Individual UE ID Mapping Information Provisioning" resources managed at the NEF, an empty array is returned. |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                   |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                   |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                                         |

**Table 5.25.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.25.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.25.2.2.3.2 POST

This method enables an AF to request the creation of a new UE ID Mapping Information Provisioning at the NEF.

This method shall support the URI query parameters specified in table 5.25.2.2.3.2-1.

**Table 5.25.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.25.2.2.3.2-2 and the response data structures and response codes specified in table 5.25.2.2.3.2-3.

**Table 5.25.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type       | P | Cardinality | Description                                                                                         |
|-----------------|---|-------------|-----------------------------------------------------------------------------------------------------|
| UeldMappingInfo | M | 1           | Contains the representation of the UE ID Mapping Information Provisioning to be created at the NEF. |

**Table 5.25.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                      | P | Cardinality | Response codes | Description                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UeldMappingInfo                                                                                                                | M | 1           | 201 Created    | Successful case. A representation of the created "Individual UE ID Mapping Information Provisioning" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                                                                                                                        |

**Table 5.25.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-ueid/<apiVersion>/{afId}/pp/{ppId} |

#### 5.25.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.25.2.3 Resource: Individual UE ID Mapping Provisioning

#### 5.25.2.3.1 Introduction

This resource represents an "Individual UE ID Mapping Provisioning" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [32]).

#### 5.25.2.3.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-ueid/<apiVersion>/{afId}/pp/{ppId}**

This resource shall support the resource URI variables defined in table 5.25.2.3.2-1.

**Table 5.25.2.3.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                                                                         |
|---------|-----------|------------------------------------------------------------------------------------|
| apiRoot | string    | See clause 5.25.1.                                                                 |
| afId    | string    | Represents the identifier of the AF.                                               |
| ppId    | string    | Represents the identifier of the "Individual UE ID Mapping Provisioning" resource. |

#### 5.25.2.3.3 Resource Methods

##### 5.25.2.3.3.1 GET

This method enables an AF to request to retrieve an existing "Individual UE ID Mapping Information Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.25.2.3.3.1-1.

**Table 5.25.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.25.2.3.3.1-2 and the response data structures and response codes specified in table 5.25.2.3.3.1-3.

**Table 5.25.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.25.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type       | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-----------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UeldMappingInfo | M | 1           | 200 OK                 | Successful case. The requested "Individual UE ID Mapping Information Provisioning" resource is returned in the response body.                                                                                                                         |
| n/a             |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

|                                                                                                                                     |  |  |                        |                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                 |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                              |

**Table 5.25.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.25.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.25.2.3.3.2 PUT

This method enables an AF to request the update of an existing "Individual UE ID Mapping Information Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.25.2.3.3.2-1.

**Table 5.25.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.25.2.3.3.2-2 and the response data structures and response codes specified in table 5.25.2.3.3.2-3.

**Table 5.25.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type       | P | Cardinality | Description                                                                                         |
|-----------------|---|-------------|-----------------------------------------------------------------------------------------------------|
| UeldMappingInfo | M | 1           | Represents the updated "Individual UE ID Mapping Information Provisioning" resource representation. |

**Table 5.25.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type       | P | Cardinality | Response codes         | Description                                                                                                                                                                                  |
|-----------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UeldMappingInfo | M | 1           | 200 OK                 | Successful response. The "Individual UE ID Mapping Information Provisioning" resource is successfully updated and a representation of the updated resource is returned in the response body. |
| n/a             |   |             | 204 No Content         | Successful response. The "Individual UE ID Mapping Information Provisioning" resource is successfully updated and no content is returned in the response body.                               |
| n/a             |   |             | 307 Temporary Redirect | <p>Temporary redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p>                  |

|                                                                                                                                     |  |  |                        |                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                     |  |  |                        | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                                                                                             |
| n/a                                                                                                                                 |  |  | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                       |

**Table 5.25.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.25.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**5.25.2.3.3.3 PATCH**

This method enables an AF to request the modification of an existing "Individual UE ID Mapping Information Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.25.2.3.3.3-1.

**Table 5.25.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.25.2.3.3.3-2 and the response data structures and response codes specified in table 5.25.2.3.3.3-3.

**Table 5.25.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type             | P | Cardinality | Description                                                                                                 |
|-----------------------|---|-------------|-------------------------------------------------------------------------------------------------------------|
| UeldMappingInfo Patch | M | 1           | Represents the requested modifications to the "Individual UE ID Mapping Information Provisioning" resource. |

**Table 5.25.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type       | P | Cardinality | Response codes         | Description                                                                                                                                                                                   |
|-----------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UeldMappingInfo | M | 1           | 200 OK                 | Successful response. The "Individual UE ID Mapping Information Provisioning" resource is successfully modified and a representation of the updated resource is returned in the response body. |
| n/a             |   |             | 204 No Content         | Successful response. The "Individual UE ID Mapping Information Provisioning" resource is successfully modified and no content is returned in the response body.                               |
| n/a             |   |             | 307 Temporary Redirect | Temporary redirection.                                                                                                                                                                        |

|                                                                                                                                       |  |  |                        |                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                       |  |  |                        | <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p>                               |
| n/a                                                                                                                                   |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                              |

**Table 5.25.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.25.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.25.2.3.3.4 DELETE**

This method enables an AF to request the deletion of an existing "Individual UE ID Mapping Information Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.25.2.3.3.4-1.

**Table 5.25.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.25.2.3.3.4-2 and the response data structures and response codes specified in table 5.25.2.3.3.4-3.

**Table 5.25.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.25.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                 |
|-----------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful case. The "Individual UE ID Information Mapping Provisioning" resource is successfully deleted.                                                                  |
| n/a       |   |             | 307 Temporary Redirect | <p>Temporary redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> |



|                                                                                                                                        |  |  |                        |                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                        |  |  |                        | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                                                                                             |
| n/a                                                                                                                                    |  |  | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                       |

Table 5.25.2.3.3.4-4: Headers supported by the 307 Response Code on this resource

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

Table 5.25.2.3.3.4-5: Headers supported by the 308 Response Code on this resource

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.25.3 Custom Operations without associated resources

#### 5.25.3.1 Overview

The structure of the custom operation URIs of the UEId API is shown in Figure 5.25.3.1-1.

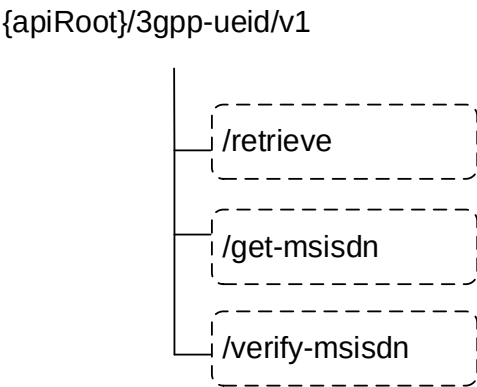


Figure 5.25.3.1-1: Custom operation URI structure of the UEId API

Table 5.25.3.1-1 provides an overview of the custom operations and applicable HTTP methods.

Table 5.25.3.1-1: Custom operations without associated resources

| Operation name | Custom operation URI | Mapped HTTP method | Description                                               |
|----------------|----------------------|--------------------|-----------------------------------------------------------|
| Retrieve       | /retrieve            | POST               | Request to retrieve AF specific UE ID information.        |
| GetMsisdn      | /get-msisdn          | POST               | Request to get the UE ID in the form of MSISDN of the UE. |

|              |                |      |                                                                                                                              |
|--------------|----------------|------|------------------------------------------------------------------------------------------------------------------------------|
| VerifyMsisdn | /verify-msisdn | POST | Request to verify whether the UE's MSISDN provided by the AF matches the UE ID in the form of MSISDN retrieved from the UDM. |
|--------------|----------------|------|------------------------------------------------------------------------------------------------------------------------------|

### 5.25.3.2 Operation: Retrieve

#### 5.25.3.2.1 Description

The custom operation allows a service consumer to retrieve AF specific UE ID information via the NEF.

#### 5.25.3.2.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.25.3.2.2-1 and table 5.25.3.2.2-2.

**Table 5.25.3.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description                                                      |
|-----------|---|-------------|------------------------------------------------------------------|
| UeldReq   | M | 1           | Parameters to request to retrieve AF specific UE ID information. |

**Table 5.25.3.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                        | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UeldInfo                                                                                                                         | M | 1           | 200 OK                 | The requested AF specific UE ID information was returned successfully.                                                                                                                                                                                |
| n/a                                                                                                                              |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                              |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                   | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                                              |
| ProblemDetails                                                                                                                   | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                                              |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                       |
| NOTE 2: Failure cases are described in clause 5.25.7.                                                                            |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.25.3.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.25.3.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

5.25.3.2.3 Void

5.25.3.3 Operation: GetMsisdn

5.25.3.3.1 Description

The custom operation allows a service consumer to retrieve the UE ID in the form of MSISDN via the NEF.

5.25.3.3.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.25.3.3.2-1 and table 5.25.3.3.2-2.

**Table 5.25.3.3.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description                                                                               |
|-----------|---|-------------|-------------------------------------------------------------------------------------------|
| MsisdnReq | M | 1           | Contains the parameters to request to retrieve the UE ID in the form of MSISDN of the UE. |

**Table 5.25.3.3.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MsisdnInfo                                                                                                                             | M | 1           | 200 OK                 | Successful case. The requested UE ID in the form of MSISDN of the UE is returned successfully.                                                                                                                                                 |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                         | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                                       |
| ProblemDetails                                                                                                                         | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                                       |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                |
| NOTE 2: Failure cases are described in clause 5.25.7.                                                                                  |   |             |                        |                                                                                                                                                                                                                                                |

**Table 5.25.3.3.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.25.3.3.2-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

### 5.25.3.4 Operation: VerifyMsisdn

#### 5.25.3.4.1 Description

The custom operation allows a service consumer to request MSISDN verification to the NEF.

#### 5.25.3.4.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.25.3.4.2-1 and table 5.25.3.4.2-2.

**Table 5.25.3.4.2-1: Data structures supported by the POST Request Body on this resource**

| Data type      | P | Cardinality | Description                                                           |
|----------------|---|-------------|-----------------------------------------------------------------------|
| MsisdnVerifReq | M | 1           | Contains the necessary parameters to request for MSISDN verification. |

**Table 5.25.3.4.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MsisdnVerifResp                                                                                                                        | M | 1           | 200 OK                 | Successful case. The MSISDN verification request is successfully received and processed, and the MSISDN verification outcome is returned in the response body.                                                                                 |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                         | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                                       |
| ProblemDetails                                                                                                                         | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                                       |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                |
| NOTE 2: Failure cases are described in clause 5.25.7.                                                                                  |   |             |                        |                                                                                                                                                                                                                                                |

**Table 5.25.3.4.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.25.3.4.2-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

## 5.25.4 Notifications

There are no Notifications defined for this API in this release of the specification.

## 5.25.5 Data Model

### 5.25.5.1 General

This clause specifies the application data model supported by the UEId API. Table 5.25.5.1-1 specifies the data types defined for the UEId API.

**Table 5.25.5.1-1: UEId service specific Data Types**

| Data type            | Clause defined | Description                                                                                              | Applicability |
|----------------------|----------------|----------------------------------------------------------------------------------------------------------|---------------|
| MsisdnReq            | 5.25.5.2.4     | Represents the parameters to request to retrieve the UE ID in the form of MSISDN of the UE.              |               |
| MsisdnInfo           | 5.25.5.2.5     | Represents the UE ID in the form of MSISDN information.                                                  |               |
| MsisdnVerifReq       | 5.25.5.2.9     | Represents the MSISDN verification request.                                                              |               |
| MsisdnVerifResp      | 5.25.5.2.10    | Represents the MSISDN verification response.                                                             |               |
| UeldReq              | 5.25.5.2.2     | Represents the parameters to requestAF specific UE ID retrieval.                                         |               |
| UeldInfo             | 5.25.5.2.3     | Represents AF specific UE ID information.                                                                |               |
| UeldMappingInfo      | 5.25.5.2.6     | Represents the UE ID Mapping Information Provisioning.                                                   |               |
| UeldMappingInfoPatch | 5.25.5.2.8     | Represents the requested modifications to a UE ID Mapping Information Provisioning.                      |               |
| RangSIUeldMappInfo   | 5.25.5.2.7     | Represents the Ranging/Sidelink UE ID mapping information between the Application Layer ID and the GPSI. |               |

Table 5.25.5.1-2 specifies data types re-used by the UEId API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the UEId API.

**Table 5.25.5.1-2: Re-used Data Types**

| Data type              | Reference          | Comments                                                                                                      | Applicability |
|------------------------|--------------------|---------------------------------------------------------------------------------------------------------------|---------------|
| ApplicationlayerId     | 3GPP TS 29.571 [8] | Represents an Application Layer ID.                                                                           |               |
| Dnn                    | 3GPP TS 29.571 [8] | Identifies a DNN.                                                                                             |               |
| ExternalId             | 3GPP TS 29.122 [4] | Represents an External Identifier.                                                                            |               |
| Gpsi                   | 3GPP TS 29.571 [8] | Represents a GPSI.                                                                                            |               |
| IpAddr                 | 3GPP TS 29.571 [8] | Identifies an IP address.                                                                                     |               |
| MacAddr48              | 3GPP TS 29.571 [8] | Identifies a MAC address.                                                                                     |               |
| Msisdn                 | 3GPP TS 29.122 [4] | Represents the MSISDN.                                                                                        |               |
| MtcProviderInformation | 3GPP TS 29.571 [8] | Indicates MTC provider information.                                                                           |               |
| Port                   | 3GPP TS 29.122 [4] | Identifies a port, unsigned integer with valid values between 0 and 65535.                                    | PortNumber    |
| ProblemDetails         | 3GPP TS 29.122 [4] | Represents error related information.                                                                         |               |
| Snssai                 | 3GPP TS 29.571 [8] | Identifies the S-NSSAI.                                                                                       |               |
| SupportedFeatures      | 3GPP TS 29.571 [8] | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features. |               |
| UInteger               | 3GPP TS 29.571 [8] | Represents a unsigned integer.                                                                                |               |

## 5.25.5.2 Structured data types

### 5.25.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

### 5.25.5.2.2 Type: UeldReq

**Table 5.25.5.2.2-1: Definition of type UeldReq**

| Attribute name                                                                                                                                                                                              | Data type              | P | Cardinality | Description                                                                                                                                                        | Applicability (NOTE 1) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| afId                                                                                                                                                                                                        | string                 | M | 1           | Represents the identifier of the AF that is sending the request.                                                                                                   |                        |
| appPortId                                                                                                                                                                                                   | Port                   | O | 0..1        | Identifies an application port ID. See clause 9.2.3.24.4 of 3GPP TS 23.040 [62] for further details.                                                               |                        |
| dnn                                                                                                                                                                                                         | Dnn                    | O | 0..1        | Identifies a DNN.                                                                                                                                                  |                        |
| ipDomain                                                                                                                                                                                                    | string                 | O | 0..1        | The IPv4 address domain identifier.<br><br>The attribute may only be present if the IPv4 address is provided in the "uelpAddr" attribute.                          |                        |
| mtcProviderId                                                                                                                                                                                               | MtcProviderInformation | O | 0..1        | Indicates MTC provider information.                                                                                                                                |                        |
| portNumber                                                                                                                                                                                                  | Port                   | O | 0..1        | Indicates the UDP or TCP port number associated with the UE IP address as provided in the "uelpAddr" attribute.                                                    | PortNumber             |
| snssai                                                                                                                                                                                                      | Snssai                 | O | 0..1        | Identifies an S-NSSAI.                                                                                                                                             |                        |
| uelpAddr                                                                                                                                                                                                    | IpAddr                 | C | 0..1        | Identifies a UE IP Address.<br><br>(NOTE 2)                                                                                                                        |                        |
| ueMacAddr                                                                                                                                                                                                   | MacAddr48              | C | 0..1        | Identifies a UE MAC Address.<br><br>(NOTE 2)                                                                                                                       |                        |
| suppFeat                                                                                                                                                                                                    | SupportedFeatures      | C | 0..1        | Indicates the list of Supported features used as described in clause 5.25.6.<br><br>This attribute shall be provided when feature negotiation needs to take place. |                        |
| NOTE 1: Properties marked with a feature as defined in clause 5.25.6 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property is always applied. |                        |   |             |                                                                                                                                                                    |                        |
| NOTE 2: One of the "uelpAddr" attribute or "ueMacAddr" attribute shall be included.                                                                                                                         |                        |   |             |                                                                                                                                                                    |                        |

### 5.25.5.2.3 Type: UeldInfo

**Table 5.25.5.2.3-1: Definition of type UeldInfo**

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                          | Applicability |
|----------------|-------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| externalId     | ExternalId        | M | 1           | Contains the AF specific UE ID in the form of an external identifier uniquely identifying the user.                                                                  |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Represents the features supported by both the AF and the NEF.<br><br>This attribute shall be provided if feature negotiation needs to take place and it was provided |               |

|  |  |  |  |                                              |  |
|--|--|--|--|----------------------------------------------|--|
|  |  |  |  | by the AF in the corresponding request body. |  |
|--|--|--|--|----------------------------------------------|--|

## 5.25.5.2.4 Type: MsisdnReq

Table 5.25.5.2.4-1: Definition of type MsisdnReq

| Attribute name                                                                    | Data type              | P | Cardinality | Description                                                                                                                                                        | Applicability |
|-----------------------------------------------------------------------------------|------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId                                                                              | string                 | M | 1           | Represents the identifier of the AF that is sending the request.                                                                                                   |               |
| appPortId                                                                         | Port                   | O | 0..1        | Identifies an application port ID. See clause 9.2.3.24.4 of 3GPP TS 23.040 [62] for further details.                                                               |               |
| dnn                                                                               | Dnn                    | O | 0..1        | Identifies a DNN.                                                                                                                                                  |               |
| ipDomain                                                                          | string                 | O | 0..1        | The IPv4 address domain identifier.<br><br>The attribute may only be present if the IPv4 address is provided in the "ueIpAddr" attribute.                          |               |
| mtcProviderId                                                                     | MtcProviderInformation | O | 0..1        | Indicates MTC provider information.                                                                                                                                |               |
| portNumber                                                                        | Port                   | O | 0..1        | Indicates the UDP or TCP port number associated with the UE IP address as provided in the "ueIpAddr" attribute.                                                    |               |
| snssai                                                                            | Snssai                 | O | 0..1        | Identifies an S-NSSAI.                                                                                                                                             |               |
| ueIpAddr                                                                          | IpAddr                 | C | 0..1        | Identifies a UE IP Address.<br><br>(NOTE)                                                                                                                          |               |
| ueMacAddr                                                                         | MacAddr48              | C | 0..1        | Identifies a UE MAC Address.<br><br>(NOTE)                                                                                                                         |               |
| suppFeat                                                                          | SupportedFeatures      | C | 0..1        | Indicates the list of Supported features used as described in clause 5.25.6.<br><br>This attribute shall be provided when feature negotiation needs to take place. |               |
| NOTE: One of the "ueIpAddr" attribute or "ueMacAddr" attribute shall be included. |                        |   |             |                                                                                                                                                                    |               |

## 5.25.5.2.5 Type: MsisdnInfo

Table 5.25.5.2.5-1: Definition of type MsisdnInfo

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                        | Applicability |
|----------------|-------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| msisdn         | Msisdn            | M | 1           | Contains the MSISDN of the UE.                                                                                                                                     |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Indicates the list of Supported features used as described in clause 5.25.6.<br><br>This attribute shall be provided when feature negotiation needs to take place. |               |

## 5.25.5.2.6 Type: UeldMappingInfo

**Table 5.25.5.2.6-1: Definition of type UeldMappingInfo**

| Attribute name    | Data type             | P | Cardinality | Description                                                                                                                                                                                         | Applicability |
|-------------------|-----------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| rsUeldMappingInfo | RangSIUeldMappingInfo | C | 0..1        | Contains the Ranging/Sidelink UE ID Mapping information between the Application Layer ID and the GPSI.<br><br>This attribute shall be present only for Ranging/Sidelink UE ID Mapping provisioning. |               |
| supFeat           | SupportedFeatures     | C | 0..1        | Indicates the list of supported features.<br><br>This attribute shall be present only when feature negotiation needs to take place.                                                                 |               |

## 5.25.5.2.7 Type: RangSIUeldMappingInfo

**Table 5.25.5.2.7-1: Definition of type RangSIUeldMappingInfo**

| Attribute name | Data type          | P | Cardinality | Description                        | Applicability |
|----------------|--------------------|---|-------------|------------------------------------|---------------|
| appLayerId     | ApplicationlayerId | M | 1           | Contains the Application Layer ID. |               |
| gpsi           | Gpsi               | M | 1           | Contains the GPSI.                 |               |

## 5.25.5.2.8 Type: UeldMappingInfoPatch

**Table 5.25.5.2.8-1: Definition of type UeldMappingInfoPatch**

| Attribute name    | Data type             | P | Cardinality | Description                                                                                                                                                                                               | Applicability |
|-------------------|-----------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| rsUeldMappingInfo | RangSIUeldMappingInfo | O | 0..1        | Contains the updated Ranging/Sidelink UE ID Mapping information between the Application Layer ID and the GPSI.<br><br>This attribute may be present only for Ranging/Sidelink UE ID Mapping provisioning. |               |

## 5.25.5.2.9 Type: MsisdNVerifReq

**Table 5.25.5.2.4-1: Definition of type MsisdNVerificationReq**

| Attribute name | Data type | P | Cardinality | Description                                                                                          | Applicability |
|----------------|-----------|---|-------------|------------------------------------------------------------------------------------------------------|---------------|
| afId           | string    | M | 1           | Represents the identifier of the AF that is sending the request.                                     |               |
| msisdN         | MsisdN    | M | 1           | Identifies the MSISDN to be verified.                                                                |               |
| appPortId      | Port      | O | 0..1        | Identifies an application port ID. See clause 9.2.3.24.4 of 3GPP TS 23.040 [62] for further details. |               |
| dnn            | Dnn       | O | 0..1        | Identifies a DNN.                                                                                    |               |
| ipDomain       | string    | O | 0..1        | The IPv4 address domain identifier.                                                                  |               |



|                                                                                       |                        |   |      |                                                                                                                                                                                  |  |
|---------------------------------------------------------------------------------------|------------------------|---|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                                                       |                        |   |      | The attribute may only be present if the IPv4 address is provided in the "uelpAddr" attribute.                                                                                   |  |
| mtcProviderId                                                                         | MtcProviderInformation | O | 0..1 | Indicates MTC provider information.                                                                                                                                              |  |
| portNumber                                                                            | Port                   | O | 0..1 | Indicates the UDP or TCP port number associated with the UE IP address as provided in the "uelpAddr" attribute.                                                                  |  |
| snssai                                                                                | Snssai                 | O | 0..1 | Identifies an S-NSSAI.                                                                                                                                                           |  |
| uelpAddr                                                                              | IpAddr                 | C | 0..1 | Identifies a UE IP Address.                                                                                                                                                      |  |
| ueMacAddr                                                                             | MacAddr48              | C | 0..1 | (NOTE)<br>Identifies a UE MAC Address.                                                                                                                                           |  |
| suppFeat                                                                              | SupportedFeatures      | C | 0..1 | (NOTE)<br>Indicates the list of Supported features used as described in clause 5.25.6.<br><br>This attribute shall be present only when feature negotiation needs to take place. |  |
| NOTE: Only one of the "uelpAddr" attribute or "ueMacAddr" attribute shall be present. |                        |   |      |                                                                                                                                                                                  |  |

#### 5.25.5.2.10 Type: MsisdNVerifResp

**Table 5.25.5.2.4-1: Definition of type MsisdNVerifResp**

| Attribute name | Data type | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                                                                                              | Applicability |
|----------------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| verifResult    | boolean   | M | 1           | Indicates the verification result on whether the UE's MSISDN provided by the AF matches the UE's MSISDN retrieved from the UDM or not.<br><ul style="list-style-type: none"> <li>- Set to "true" if the UE's MSISDN provided by the AF matches the UE's MSISDN retrieved from the UDM.</li> <li>- Set to "false" if the UE's MSISDN provided by the AF does not match the UE's MSISDN retrieved from the UDM.</li> </ul> |               |

### 5.25.5.3 Simple data types and enumerations

#### 5.25.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.25.5.3.2 Simple data types

The simple data types defined in table 5.25.5.3.2-1 shall be supported.

**Table 5.25.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.25.6 Used Features

The table below defines the features applicable to the UEId API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.25.6-1: Features used by UEId API**

| Feature number | Feature Name       | Description                                                                                                  |
|----------------|--------------------|--------------------------------------------------------------------------------------------------------------|
| 1              | PortNumber         | This feature indicates supporting AF providing Port Number associated with the UE IP address in the request. |
| 2              | MsisdnVerification | This feature indicates the support of MSISDN verification.                                                   |

## 5.25.7 Error handling

### 5.25.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.25.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the UEId API.

### 5.25.7.3 Application Errors

The application errors defined for the UEId API are listed in table 5.25.7.3-1.

**Table 5.25.7.3-1: Application errors**

| Application Error        | HTTP status code | Description                                                                 | Applicability |
|--------------------------|------------------|-----------------------------------------------------------------------------|---------------|
| REQUEST_NOT_AUTHORIZED   | 403 Forbidden    | Indicates that the AF specific UE ID retrieval request is not authorized.   |               |
| UE_ID_NOT_AVAILABLE      | 404 Not Found    | Indicates that the requested AF specific UE ID is not available.            |               |
| UE_NOT_FOUND             | 404 Not Found    | Indicates that the requested UE address is not found.                       |               |
| USER_CONSENT_NOT_GRANTED | 403 Forbidden    | Indicates that the request is rejected because user consent is not granted. |               |

## 5.25.8 Security

The provisions of clause 6 and 7.2 of shall apply for the Nnef\_UeId API. In addition:

- For the "GetMsisdn" custom operation defined in clause 5.25.3.3, RNAA procedures specified in clause 5.6.2.3.2 of 3GPP TS 29.222 [12] may be supported and the "authorization code" grant type may be supported in addition to the "Client Credentials".

## 5.26 MBSUserService API

### 5.26.1 Introduction

The Nnef\_MBSUserService service shall use the MBSUserService API.

The API URI of MBSUserService API shall be:

**{apiRoot}/3gpp-mbs-us/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-mbs-us".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

5.26.2 Resources

5.26.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.26.2.1-1 and the resources and HTTP methods used for the MBSUserService API.

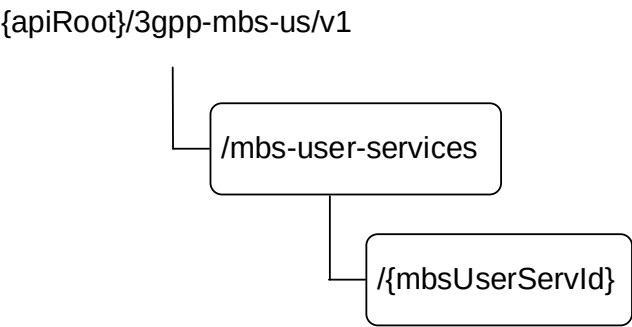


**Figure 5.26.2.1-1: Resource URI structure of the MBSUserService API**

Table 5.26.2.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 5.26.2.1-1: Resources and methods overview**

| Resource name               | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                               |
|-----------------------------|--------------------------------------------|---------------------------------|---------------------------------------------------------------|
| MBS User Services           | /mbs-user-services                         | GET                             | Retrieve all the active MBS User Services managed by the NEF. |
|                             |                                            | POST                            | Request the creation of a new MBS User Service.               |
| Individual MBS User Service | /mbs-user-services/{mbsUserServId}         | GET                             | Retrieve an existng MBS User Service managed by the NEF.      |
|                             |                                            | PUT                             | Update an existng MBS User Service managed by the NEF.        |
|                             |                                            | PATCH                           | Modify an existng MBS User Service managed by the NEF.        |
|                             |                                            | DELETE                          | Delete an existng MBS User Service managed by the NEF.        |

## 5.26.2.2 Resource: MBS User Services

### 5.26.2.2.1 Introduction

This resource represents the collection of MBS User Services managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

### 5.26.2.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-mbs-us/v1/mbs-user-services

This resource shall support the resource URI variables defined in table 5.26.2.2.2-1.

**Table 5.26.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.26.1. |

### 5.26.2.2.3 Resource Standard Methods

#### 5.26.2.2.3.1 GET

This method allows an AF to retrieve all the active MBS User Service resources at the NEF.

This method shall support the URI query parameters specified in table 5.26.2.2.3.1-1.

**Table 5.26.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.26.2.2.3.1-2 and the response data structures and response codes specified in table 5.26.2.2.3.1-3.

**Table 5.26.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.26.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(MBSUserService)                                                                                                   | M | 0..N        | 200 OK                 | Successful case. All the active MBS User Services managed by the NEF are returned.                                                                                                                                             |
| n/a                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.26.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.26.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.26.2.2.3.2 POST

This method enables an AF to request the creation of an MBS User Service resource at the NEF.

This method shall support the URI query parameters specified in table 5.26.2.2.3.2-1.

**Table 5.26.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.26.2.2.3.2-2 and the response data structures and response codes specified in table 5.26.2.2.3.2-3.

**Table 5.26.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type      | P | Cardinality | Description                                                                           |
|----------------|---|-------------|---------------------------------------------------------------------------------------|
| MBSUserService | M | 1           | Contains the parameters to request the creation of a new MBS User Service at the NEF. |

**Table 5.26.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response codes | Description                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserService                                                                                                           | M | 1           | 201 Created    | Successful case. A new MBS User Service is successfully created and a representation of the created Individual MBS User Service resource is returned.<br><br>An HTTP "Location" header that contains the resource URI of the created Individual MBS User Service resource shall also be included. |
| NOTE: The mandatory HTTP error status code for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                                                                                                                                                                                   |

**Table 5.26.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                           |
|----------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-mbs-us/v1/mbs-user-services/{mbsUserId} |

#### 5.26.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.26.2.3 Resource: Individual MBS User Service

#### 5.26.2.3.1 Introduction

This resource represents an Individual MBS User Service managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

#### 5.26.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-mbs-us/v1/mbs-user-services/{mbsUserServId}

This resource shall support the resource URI variables defined in table 5.26.2.3.2-1.

**Table 5.26.2.3.2-1: Resource URI variables for this resource**

| Name          | Data type | Definition                                                                                      |
|---------------|-----------|-------------------------------------------------------------------------------------------------|
| apiRoot       | string    | See clause 5.26.1.                                                                              |
| mbsUserServId | string    | Contains the unique identifier of the Individual MBS User Service resource assigned by the NEF. |

#### 5.26.2.3.3 Resource Standard Methods

##### 5.26.2.3.3.1 GET

This method allows an AF to retrieve an existing Individual MBS User Service resource at the NEF.

This method shall support the URI query parameters specified in table 5.26.2.3.3.1-1.

**Table 5.26.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.26.2.3.3.1-2 and the response data structures and response codes specified in table 5.26.2.3.3.1-3.

**Table 5.26.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.26.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type      | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|----------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserService | M | 1           | 200 OK                 | Successful case. The requested Individual MBS User Service resource is successfully returned.                                                                                                                                  |
| n/a            |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a            |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

**Table 5.26.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.26.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.26.2.3.3.2 PUT

This method enables an AF to request the update of an existing Individual MBS User Service resource at the NEF.

This method shall support the URI query parameters specified in table 5.26.2.3.3.2-1.

**Table 5.26.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.26.2.3.3.2-2 and the response data structures and response codes specified in table 5.26.2.3.3.2-3.

**Table 5.26.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type      | P | Cardinality | Description                                                                                            |
|----------------|---|-------------|--------------------------------------------------------------------------------------------------------|
| MBSUserService | M | 1           | Contains the updated representation of the Individual MBS User Service resource that is to be updated. |

**Table 5.26.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type      | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|----------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserService | M | 1           | 200 OK                 | Successful case. The concerned Individual MBS User Service resource is successfully updated and a representation of the updated resource is returned in the response body.                                                     |
| n/a            |   |             | 204 No Content         | Successful case. The concerned Individual MBS User Service resource is successfully updated and no content is returned in the response body.                                                                                   |
| n/a            |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a            |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE: The mandatory HTTP error status code for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

**Table 5.26.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.26.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.26.2.3.3.3 PATCH

This method enables an AF to request the modification of an existing Individual MBS User Service resource at the NEF.

This method shall support the URI query parameters specified in table 5.26.2.3.3.3-1.

**Table 5.26.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.26.2.3.3.3-2 and the response data structures and response codes specified in table 5.26.2.3.3.3-3.

**Table 5.26.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type           | P | Cardinality | Description                                                                                      |
|---------------------|---|-------------|--------------------------------------------------------------------------------------------------|
| MBSUserServicePatch | M | 1           | Contains the parameters to request the modification of the Individual MBS User Service resource. |

**Table 5.26.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserService                                                                                                            | M | 1           | 200 OK                 | Successful case. The concerned Individual MBS User Service resource is successfully modified and a representation of the updated resource is returned in the response body.                                                    |
| n/a                                                                                                                       |   |             | 204 No Content         | Successful response. The Individual MBS User Service resource was successfully modified and no content is returned in the response body.                                                                                       |
| n/a                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |



**Table 5.26.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.26.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.26.2.3.3.4 DELETE

This method enables an AF to request the deletion of an existing Individual MBS User Service resource at the NEF.

This method shall support the URI query parameters specified in table 5.26.2.3.3.4-1.

**Table 5.26.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.26.2.3.3.4-2 and the response data structures and response codes specified in table 5.26.2.3.3.4-3.

**Table 5.26.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.26.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                        |   |             | 204 No Content         | Successful response. The Individual MBS User Service resource is successfully deleted.                                                                                                                                         |
|                                                                                                                            |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
|                                                                                                                            |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.26.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.26.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.26.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.26.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

#### 5.26.4 Notifications

There are no notifications defined for this API in this release of the specification.

### 5.26.5 Data Model

#### 5.26.5.1 General

This clause specifies the application data model supported by the MBSUserService API. Table 5.26.5.1-1 specifies the data types defined for the MBSUserService API.

**Table 5.26.5.1-1: MBSUserService specific Data Types**

| Data type | Clause defined | Description | Applicability |
|-----------|----------------|-------------|---------------|
|           |                |             |               |

Table 5.26.5.1-2 specifies data types re-used by the MBSUserService API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the MBSUserService API.

**Table 5.26.5.1-2: Re-used Data Types**

| Data type           | Reference           | Comments                                                                               | Applicability |
|---------------------|---------------------|----------------------------------------------------------------------------------------|---------------|
| MBSUserService      | 3GPP TS 29.580 [66] | Represents MBS User Service parameters.                                                |               |
| MBSUserServicePatch | 3GPP TS 29.580 [66] | Represents the requested modifications to an MBS User Service resource representation. |               |

#### 5.26.5.2 Structured data types

##### 5.26.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

There are no structured data types defined for this API in this release of the specification.

#### 5.26.5.3 Simple data types and enumerations

##### 5.26.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.26.5.3.2 Simple data types

The simple data types defined in table 5.26.5.3.2-1 shall be supported.

**Table 5.26.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.26.6 Used Features

The table below defines the features applicable to the MBSUserService API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.26.6-1: Features used by MBSUserService API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |
|                |              |             |

## 5.26.7 Error handling

### 5.26.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.26.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the MBSUserService API.

### 5.26.7.3 Application Errors

The application errors defined for the MBSUserService API are listed in table 5.26.7.3-1.

**Table 5.26.7.3-1: Application errors**

| Application Error | HTTP status code | Description |
|-------------------|------------------|-------------|
|                   |                  |             |

## 5.27 MBSUserDataIngestSession API

### 5.27.1 Introduction

The Nnef\_MBSUserDataIngestSession service shall use the MBSUserDataIngestSession API.

The API URI of MBSUserDataIngestSession API shall be:

**{apiRoot}/3gpp-mbs-ud-ingest/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-mbs-ud-ingest".

- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

## 5.27.2 Resources

### 5.27.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.27.2.1-1 and the resources and HTTP methods used for the MBSUserDataIngestSession API.

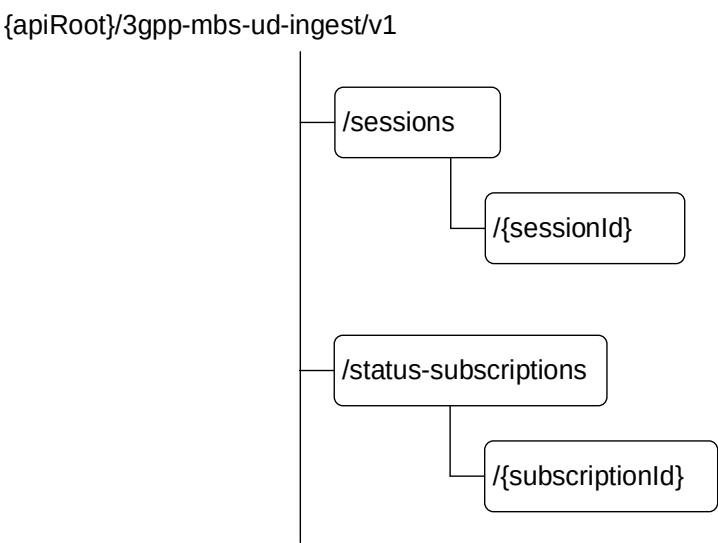


**Figure 5.27.2.1-1: Resource URI structure of the MBSUserDataIngestSession API**

Table 5.27.2.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 5.27.2.1-1: Resources and methods overview**

| Resource name                           | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                                             |
|-----------------------------------------|--------------------------------------------|---------------------------------|---------------------------------------------------------------------------------------------|
| MBS User Data Ingest Sessions           | /sessions                                  | GET                             | Retrieve all the active MBS User Data Ingest Session(s) managed by the NEF.                 |
|                                         |                                            | POST                            | Request the creation of a new MBS User Data Ingest Session.                                 |
| Individual MBS User Data Ingest Session | /sessions/{sessionId}                      | GET                             | Retrieve an existing "Individual MBS User Data Ingest Session" resource managed by the NEF. |
|                                         |                                            | PUT                             | Update an existing "Individual MBS User Data Ingest Session" resource managed by the NEF.   |
|                                         |                                            | PATCH                           | Modify an existing "Individual MBS User Data Ingest Session" resource managed by the NEF.   |

|                                                             |                                        |        |                                                                                                                 |
|-------------------------------------------------------------|----------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------|
|                                                             |                                        | DELETE | Delete an existing "Individual MBS User Data Ingest Session" resource managed by the NEF.                       |
| MBS User Data Ingest Session Status Subscriptions           | /status-subscriptions                  | GET    | Retrieve all the active MBS User Data Ingest Session Status Subscription(s) managed by the NEF.                 |
|                                                             |                                        | POST   | Request the creation of a new MBS User Data Ingest Session Status Subscription.                                 |
| Individual MBS User Data Ingest Session Status Subscription | /status-subscriptions/{subscriptionId} | GET    | Retrieve an existing "Individual MBS User Data Ingest Session Status Subscription" resource managed by the NEF. |
|                                                             |                                        | PUT    | Update an existing "Individual MBS User Data Ingest Session Status Subscription" resource managed by the NEF.   |
|                                                             |                                        | PATCH  | Modify an existing "Individual MBS User Data Ingest Session Status Subscription" resource managed by the NEF.   |
|                                                             |                                        | DELETE | Delete an existing "Individual MBS User Data Ingest Session Status Subscription" resource managed by the NEF.   |

## 5.27.2.2 Resource: MBS User Data Ingest Sessions

### 5.27.2.2.1 Introduction

This resource represents the collection of MBS User Data Ingest Sessions managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

### 5.27.2.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-mbs-ud-ingest/v1/sessions**

This resource shall support the resource URI variables defined in table 5.27.2.2.2-1.

**Table 5.27.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.27.1. |

### 5.27.2.2.3 Resource Standard Methods

#### 5.27.2.2.3.1 GET

This method allows an AF to retrieve all the active MBS User Data Ingest Sessions managed by the NEF.

This method shall support the URI query parameters specified in table 5.27.2.2.3.1-1.

**Table 5.27.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.2.3.1-2 and the response data structures and response codes specified in table 5.27.2.2.3.1-3.

**Table 5.27.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.27.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(MBSUserDataIngestSession)                                                                                         | M | 0..N        | 200 OK                 | Successful case. All the active MBS User Data Ingest Sessions managed by the NEF are returned.                                                                                                                                          |
| n/a                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                         |

**Table 5.27.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.27.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.27.2.2.3.2 POST

This method enables an AF to request the creation of an MBS User Data Ingest Session at the NEF.

This method shall support the URI query parameters specified in table 5.27.2.2.3.2-1.

**Table 5.27.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.2.3.2-2 and the response data structures and response codes specified in table 5.27.2.2.3.2-3.

**Table 5.27.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type             | P | Cardinality | Description                                                                                       |
|-----------------------|---|-------------|---------------------------------------------------------------------------------------------------|
| MBSUserDataIngSession | M | 1           | Contains the parameters to request the creation of a new MBS User Data Ingest Session at the NEF. |

**Table 5.27.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                  | P | Cardinality | Response Codes  | Description                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------|---|-------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngSession                                                                                                      | M | 1           | 201 Created     | Successful case. A new MBS User Data Ingest Session is successfully created and a representation of the created Individual MBS User Data Ingest Session resource is returned.<br><br>An HTTP "Location" header that contains the URI of the created Individual MBS User Data Ingest Session resource is also included. |
| ProblemDetailsMBS                                                                                                          | O | 0..1        | 400 Bad Request | (NOTE 2)                                                                                                                                                                                                                                                                                                               |
| ProblemDetailsMBS                                                                                                          | O | 0..1        | 403 Forbidden   | (NOTE 2)                                                                                                                                                                                                                                                                                                               |
| ProblemDetailsMBS                                                                                                          | O | 0..1        | 404 Not Found   | (NOTE 2)                                                                                                                                                                                                                                                                                                               |
| NOTE 1: The mandatory HTTP error status code for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                 |                                                                                                                                                                                                                                                                                                                        |
| NOTE 2: Failure cases are described in clause 5.27.7.                                                                      |   |             |                 |                                                                                                                                                                                                                                                                                                                        |

**Table 5.27.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                         |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-mbs-ud-ingest/v1/sessions/{sessionId} |

#### 5.27.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.27.2.3 Resource: Individual MBS User Data Ingest Session

#### 5.27.2.3.1 Introduction

This resource represents an Individual MBS User Data Ingest Session resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

#### 5.27.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-mbs-ud-ingest/v1/sessions/{sessionId}

This resource shall support the resource URI variables defined in table 5.27.2.3.2-1.

**Table 5.27.2.3.2-1: Resource URI variables for this resource**

| Name      | Data type | Definition                                                                                                  |
|-----------|-----------|-------------------------------------------------------------------------------------------------------------|
| apiRoot   | string    | See clause 5.27.1.                                                                                          |
| sessionId | string    | Contains the unique identifier of the Individual MBS User Data Ingest Session resource assigned by the NEF. |

## 5.27.2.3.3 Resource Standard Methods

## 5.27.2.3.3.1 GET

This method allows an AF to retrieve an existing "Individual MBS User Data Ingest Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.27.2.3.3.1-1.

**Table 5.27.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.3.3.1-2 and the response data structures and response codes specified in table 5.27.2.3.3.1-3.

**Table 5.27.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.27.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngestSession                                                                                                | M | 1           | 200 OK                 | Successful case. The requested Individual MBS User Data Ingest Session resource is successfully returned.                                                                                                                      |
| n/a                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.27.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.27.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.27.2.3.3.2 PUT

This method enables an AF to request the update of an existing "Individual MBS User Data Ingest Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.27.2.3.3.2-1.



**Table 5.27.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.3.3.2-2 and the response data structures and response codes specified in table 5.27.2.3.3.2-3.

**Table 5.27.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type             | P | Cardinality | Description                                                                                                        |
|-----------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngSession | M | 1           | Contains the updated representation of the Individual MBS User Data Ingest Session resource that is to be updated. |

**Table 5.27.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngSession                                                                                                     | M | 1           | 200 OK                 | Successful case. The concerned Individual MBS User Data Ingest Session resource is successfully updated and a representation of the updated resource is returned in the response body.                                         |
| n/a                                                                                                                       |   |             | 204 No Content         | Successful case. The concerned Individual MBS User Data Ingest Session resource is successfully updated and no content is returned in the response body.                                                                       |
| n/a                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetailsMBS                                                                                                         | O | 0..1        | 400 Bad Request        | (NOTE 2)                                                                                                                                                                                                                       |
| ProblemDetailsMBS                                                                                                         | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                       |
| ProblemDetailsMBS                                                                                                         | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                       |
| NOTE 1: The mandatory HTTP error status code for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |
| NOTE 2: Failure cases are described in clause 5.27.7.                                                                     |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.27.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.27.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.27.2.3.3.3 PATCH

This method enables an AF to request the modification of an existing "Individual MBS User Data Ingest Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.27.2.3.3.3-1.

**Table 5.27.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.3.3.3-2 and the response data structures and response codes specified in table 5.27.2.3.3.3-3.

**Table 5.27.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type                  | P | Cardinality | Description                                                                                                  |
|----------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngSessionPatch | M | 1           | Contains the parameters to request the modification of the Individual MBS User Data Ingest Session resource. |

**Table 5.27.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngSession                                                                                                       | M | 1           | 200 OK                 | Successful case. The concerned Individual MBS User Data Ingest Session resource is successfully modified and a representation of the updated resource is returned in the response body.                                    |
| n/a                                                                                                                         |   |             | 204 No Content         | Successful response. The Individual MBS User Data Ingest Session resource is successfully modified and no content is returned in the response body.                                                                        |
| n/a                                                                                                                         |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                         |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetailsMBS                                                                                                           | O | 0..1        | 400 Bad Request        | (NOTE 2)                                                                                                                                                                                                                   |
| ProblemDetailsMBS                                                                                                           | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                   |
| ProblemDetailsMBS                                                                                                           | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                   |
| NOTE 1: The mandatory HTTP error status code for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                            |
| NOTE 2: Failure cases are described in clause 5.27.7.                                                                       |   |             |                        |                                                                                                                                                                                                                            |

**Table 5.27.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.27.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

#### 5.27.2.3.3.4 DELETE

This method enables an AF to request the deletion of an existing "Individual MBS User Data Ingest Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.27.2.3.3.4-1.

**Table 5.27.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.3.3.4-2 and the response data structures and response codes specified in table 5.27.2.3.3.4-3.

**Table 5.27.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.27.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                    |
|-----------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful response. The Individual MBS User Data Ingest Session resource is successfully deleted.                                                                                                                             |
|           |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
|           |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE 1: The mandatory HTTP error status code for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

**Table 5.27.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.27.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.27.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.27.2.4 Resource: MBS User Data Ingest Session Status Subscriptions

#### 5.27.2.4.1 Introduction

This resource represents the collection of MBS User Data Ingest Session Status Subscriptions managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

#### 5.27.2.4.2 Resource Definition

Resource URI: {apiRoot}/3gpp-mbs-ud-ingest/v1/status-subscriptions

This resource shall support the resource URI variables defined in table 5.27.2.4.2-1.

**Table 5.27.2.4.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.27.1. |

#### 5.27.2.4.3 Resource Standard Methods

##### 5.27.2.4.3.1 GET

This method allows an AF to retrieve all the active MBS User Data Ingest Session Status Subscriptions managed by the NEF.

This method shall support the URI query parameters specified in table 5.27.2.4.3.1-1.

**Table 5.27.2.4.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.4.3.1-2 and the response data structures and response codes specified in table 5.27.2.4.3.1-3.

**Table 5.27.2.4.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.27.2.4.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                      | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                      |
|--------------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(MBSUserDataIngStatSubsc) | M | 0..N        | 200 OK                 | Successful case. All the active MBS User Data Ingest Session Status Subscriptions managed by the NEF are returned.                                                                                                               |
| n/a                            |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

|                                                                                                                         |  |  |                              |                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                     |  |  | 308<br>Permanent<br>Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                              |                                                                                                                                                                                                                                         |

**Table 5.27.2.4.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.27.2.4.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**5.27.2.4.3.2 POST**

This method enables an AF to request the creation of a new MBS User Data Ingest Session Status Subscription at the NEF.

This method shall support the URI query parameters specified in table 5.27.2.4.3.2-1.

**Table 5.27.2.4.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.4.3.2-2 and the response data structures and response codes specified in table 5.27.2.4.3.2-3.

**Table 5.27.2.4.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type               | P | Cardinality | Description                                                                                                           |
|-------------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngStatSubsc | M | 1           | Contains the parameters to request the creation of a new MBS User Data Ingest Session Status Subscription at the NEF. |

**Table 5.27.2.4.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response Codes | Description                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngStatSubsc                                                                                                  | M | 1           | 201<br>Created | Successful case. A new MBS User Data Ingest Session Status Subscription is successfully created and a representation of the created Individual MBS User Data Ingest Session Status Subscription resource is returned.<br><br>An HTTP "Location" header that contains the URI of the created Individual MBS User Data Ingest Session Status Subscription resource is also included. |
| NOTE: The mandatory HTTP error status code for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                                                                                                                                                                                                                                                                    |

**Table 5.27.2.4.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                          |
|----------|-----------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-mbs-ud-ingest/v1/status-subscriptions/{subscriptionId} |

#### 5.27.2.4.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.27.2.5 Resource: Individual MBS User Data Ingest Session Status Subscription

#### 5.27.2.5.1 Introduction

This resource represents an Individual MBS User Data Ingest Session Status Subscription managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

#### 5.27.2.5.2 Resource Definition

Resource URI: {apiRoot}/3gpp-mbs-ud-ingest/v1/status-subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.27.2.5.2-1.

**Table 5.27.2.5.2-1: Resource URI variables for this resource**

| Name      | Data type | Definition                                                                                                                      |
|-----------|-----------|---------------------------------------------------------------------------------------------------------------------------------|
| apiRoot   | string    | See clause 5.27.1.                                                                                                              |
| sessionId | string    | Contains the unique identifier of the Individual MBS User Data Ingest Session Status Subscription resource assigned by the NEF. |

#### 5.27.2.5.3 Resource Standard Methods

##### 5.27.2.5.3.1 GET

This method allows an AF to retrieve an existing "Individual MBS User Data Ingest Session Status Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.27.2.5.3.1-1.

**Table 5.27.2.5.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.5.3.1-2 and the response data structures and response codes specified in table 5.27.2.5.3.1-3.

**Table 5.27.2.5.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.27.2.5.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response | Description |
|-----------|---|-------------|----------|-------------|
|-----------|---|-------------|----------|-------------|

|                                                                                                                         |   |   | codes                  |                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------|---|---|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngStatSubsc                                                                                                 | M | 1 | 200 OK                 | Successful case. The requested Individual MBS User Data Ingest Session Status Subscription resource is successfully returned.                                                                                              |
| n/a                                                                                                                     |   |   | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |   | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |   |                        |                                                                                                                                                                                                                            |

**Table 5.27.2.5.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.27.2.5.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.27.2.5.3.2 PUT

The PATCH method allows an AF to update an existing "Individual MBS User Data Ingest Session Status Subscription" resource managed by the NEF.

This method shall support the URI query parameters specified in table 5.27.2.5.3.2-1.

**Table 5.27.2.5.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.5.3.2-2 and the response data structures and response codes specified in table 5.27.2.5.3.2-3.

**Table 5.27.2.5.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type               | P | Cardinality | Description                                                                                                                                |
|-------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngStatSubsc | M | 1           | Contains the parameters to request the modification of an existing "Individual MBS User Data Ingest Session Status Subscription" resource. |

**Table 5.27.2.5.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type               | P | Cardinality | Response codes | Description                                                                                                                         |
|-------------------------|---|-------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngStatSubsc | M | 1           | 200 OK         | Successful case. The concerned "Individual MBS User Data Ingest Session Status Subscription" resource is successfully updated and a |

|                                                                                                                         |  |  |                        |                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                         |  |  |                        | representation of the updated resource is returned in the response body.                                                                                                                                                                |
| n/a                                                                                                                     |  |  | 204 No Content         | Successful case. The concerned "Individual MBS User Data Ingest Session Status Subscription" resource is successfully updated, and no content is returned in the response body.                                                         |
| n/a                                                                                                                     |  |  | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |  |  | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                         |

**Table 5.27.2.5.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.27.2.5.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

### 5.27.2.5.3.3 PATCH

The PATCH method allows an AF to modify an existing "Individual MBS User Data Ingest Session Status Subscription" resource managed by the NEF.

This method shall support the URI query parameters specified in table 5.27.2.5.3.3-1.

**Table 5.27.2.5.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.5.3.3-2 and the response data structures and response codes specified in table 5.27.2.5.3.3-3.

**Table 5.27.2.5.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type                       | P | Cardinality | Description                                                                                                                                |
|---------------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngestStatSubscPatch | M | 1           | Contains the parameters to request the modification of an existing "Individual MBS User Data Ingest Session Status Subscription" resource. |

**Table 5.27.2.5.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                  | P | Cardinality | Response codes | Description                                                                                              |
|----------------------------|---|-------------|----------------|----------------------------------------------------------------------------------------------------------|
| MBSUserDataIngestStatSubsc | M | 1           | 200 OK         | Successful case. The concerned "Individual MBS User Data Ingest Session Status Subscription" resource is |



|                                                                                                                           |  |  |                        |                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                           |  |  |                        | successfully modified, and a representation of the updated resource is returned in the response body.                                                                                                                                   |
| n/a                                                                                                                       |  |  | 204 No Content         | Successful case. The concerned "Individual MBS User Data Ingest Session Status Subscription" resource is successfully modified and no content is returned in the response body.                                                         |
| n/a                                                                                                                       |  |  | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                       |  |  | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                         |

**Table 5.27.2.5.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.27.2.5.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.27.2.5.3.4 DELETE

This method enables an AF to request the deletion of an existing Individual MBS User Data Ingest Session Status Subscription resource at the NEF.

This method shall support the URI query parameters specified in table 5.27.2.5.3.4-1.

**Table 5.27.2.5.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.27.2.5.3.4-2 and the response data structures and response codes specified in table 5.27.2.5.3.4-3.

**Table 5.27.2.5.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.27.2.5.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response Codes | Description                                                                                                            |
|-----------|---|-------------|----------------|------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content | Successful response. The Individual MBS User Data Ingest Session Status Subscription resource is successfully deleted. |

|                                                                                                                              |  |  |                        |                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                              |  |  | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
|                                                                                                                              |  |  | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE 1: The mandatory HTTP error status code for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |  |  |                        |                                                                                                                                                                                                                                |

**Table 5.27.2.5.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.27.2.5.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.27.2.5.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.27.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.27.4 Notifications

### 5.27.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.27.4.1-1: Notifications overview**

| Notification                                     | Callback URI | HTTP method or custom operation | Description (service operation)                                                                                           |
|--------------------------------------------------|--------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| MBS User Data Ingest Session Status Notification | {notifUri}   | POST                            | This operation enables the NEF to notify a previously subscribed AF on status changes of an MBS User Data Ingest Session. |

### 5.27.4.2 MBS User Data Ingest Session Status Change Notification

#### 5.27.4.2.1 Description

The MBS user data ingest session status change notification is used by the NEF to report one or several observed MBS user data ingest session status change events to a previously subscribed AF.

## 5.27.4.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 5.27.4.2.2-1.

**Table 5.27.4.2.2-1: Callback URI variables**

| Name     | Definition                                                                                                                                           |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| notifUri | Callback reference provided by the AF during the creation/update/modification of the corresponding MBS User Data Ingest Session Status Subscription. |

## 5.27.4.2.3 Operation Definition

## 5.27.4.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.27.4.2.3.1-1 and the response data structures and response codes specified in table 5.27.4.2.3.1-2.

**Table 5.27.4.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type                  | P | Cardinality | Description                                                                                                                 |
|----------------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------|
| MBSUserDataIngestStatNotif | M | 1           | Provides information about the observed MBS user data ingest session status change event notification by the NEF to the AF. |

**Table 5.27.4.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                       |   |             | 204 No Content         | The MBS User Data Ingest Session Status Change Notification is successfully received.                                                                                                                                                                                           |
| n/a                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                 |

**Table 5.27.4.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.27.4.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

5.27.4.2.3.2 Void

## 5.27.5 Data Model

### 5.27.5.1 General

This clause specifies the application data model supported by the MBSUserDataIngestSession API. Table 5.27.5.1-1 specifies the data types defined for the MBSUserDataIngestSession API.

**Table 5.27.5.1-1: MBSUserDataIngestSession specific Data Types**

| Data type | Clause defined | Description | Applicability |
|-----------|----------------|-------------|---------------|
|           |                |             |               |

Table 5.27.5.1-2 specifies data types re-used by the MBSUserDataIngestSession API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the MBSUserDataIngestSession API.

**Table 5.27.5.1-2: Re-used Data Types**

| Data type                    | Reference           | Comments                                                                                                                   | Applicability    |
|------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------|------------------|
| MBSUserDataIngSession        | 3GPP TS 29.580 [66] | Represents MBS User Data Ingest Session parameters.                                                                        |                  |
| MBSUserDataIngSessionPatch   | 3GPP TS 29.580 [66] | Represents the requested modifications to an MBS User Data Ingest Session resource representation.                         |                  |
| MBSUserDataIngStatNotif      | 3GPP TS 29.580 [66] | Represents an MBS User Data Ingest Session Status Notification.                                                            |                  |
| MBSUserDataIngStatSubsc      | 3GPP TS 29.580 [66] | Represents an MBS User Data Ingest Session Status Subscription.                                                            |                  |
| MBSUserDataIngStatSubscPatch | 3GPP TS 29.580 [66] | Represents the requested modifications to an MBS User Data Ingest Session Status Subscription.                             |                  |
| ProblemDetailsMBS            | 3GPP TS 29.580 [66] | Represents an extension to the ProblemDetails data structure with potentially additional error information related to MBS. | MBSErrorHandling |

### 5.27.5.2 Structured data types

#### 5.27.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

There are no structured data types defined for this API in this release of the specification.

### 5.27.5.3 Simple data types and enumerations

#### 5.27.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.27.5.3.2 Simple data types

The simple data types defined in table 5.27.5.3.2-1 shall be supported.

**Table 5.27.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.27.6 Used Features

The table below defines the features applicable to the MBSUserDataIngestSession API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.27.6-1: Features used by MBSUserDataIngestSession API**

| Feature number | Feature Name     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | Void             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2              | Void             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3              | 5MBS2            | <p>This feature indicates the support of the Rel-18 enhancements to the 5G Multicast/Broadcast services.</p> <p>The following functionalities are supported:</p> <ul style="list-style-type: none"> <li>- Support the provisioning of the Associated Session Identifier to enable 5MBS MOCN Network Sharing scenarios (e.g., MOCN with multiple broadcast MBS sessions transmitting the same content via different Core Networks).</li> <li>- Support NR RedCap UE Information provisioning during MBS Distribution Session creation/update.</li> <li>- Support the possibility for the active periods of an MBS User Data Ingest Session to be expressed in the form of a repetition rule.</li> </ul> |
| 4              | MBSErrorHandling | <p>Represents the support of the MBS related error handling procedures.</p> <p>The following functionalities are supported:</p> <ul style="list-style-type: none"> <li>- Support of the missing MBS Session related error handling procedures to enable end-to-end relaying of errors.</li> <li>- Support MBS Data Ingest Session specific error handling.</li> <li>- Support partial MBS Distribution Session creation/update failure management.</li> </ul>                                                                                                                                                                                                                                          |

## 5.27.7 Error handling

### 5.27.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.27.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the MBSUserDataIngestSession API.

### 5.27.7.3 Application Errors

The application errors defined for the MBSUserDataIngestSession API are listed in table 5.27.7.3-1.

**Table 5.27.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|-------------------|------------------|-------------|---------------|

|                                  |                 |                                                                                                                                                                      |                  |
|----------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| INVALID_MBS_SERVICE_INFO         | 400 Bad Request | Indicates that the provided MBS Service Information is invalid (e.g. invalid QoS reference), incorrect or insufficient to perform MBS policy authorization.          | MBSErrorHandling |
| MBS_SERVICE_AREA_NOT_SUPPORTED   | 403 Forbidden   | Indicates that the requested MBS Service Area is not supported by the 3GPP Core Network.                                                                             | MBSErrorHandling |
| MBS_SERVICE_INFO_NOT_AUTHORIZED  | 403 Forbidden   | Indicates the provided MBS Service Information is rejected.                                                                                                          | MBSErrorHandling |
| MBS_DIST_SESSION_ALREADY_CREATED | 403 Forbidden   | Indicates that the requested MBS Distribution Session has already been created.                                                                                      | MBSErrorHandling |
| OVERLAPPING_MBS_SERVICE_AREA     | 403 Forbidden   | Indicates that the provided MBS service area overlaps with the MBS service area of an existing MBS Distribution Session that shares the same MBS session Identifier. | MBSErrorHandling |
| UNKNOWN_MBS_SERVICE_AREA         | 404 Not Found   | Indicates that the requested MBS service area (e.g., identified by the Area Session ID) cannot be found.                                                             | MBSErrorHandling |

## 5.28 MSEventExposure API

### 5.28.1 Introduction

The Nnef\_MSEventExposure service shall use the MSEventExposure API.

The API URI of MSEventExposure API shall be:

**{apiRoot}/3gpp-ms-event-exposure/v1**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-ms-event-exposure".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.

All resource URIs in the clauses below are defined relative to the above API URI.

5.28.2 Resources

5.28.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.28.2.1-1 and the resources and HTTP methods used for the MSEventExposure API.

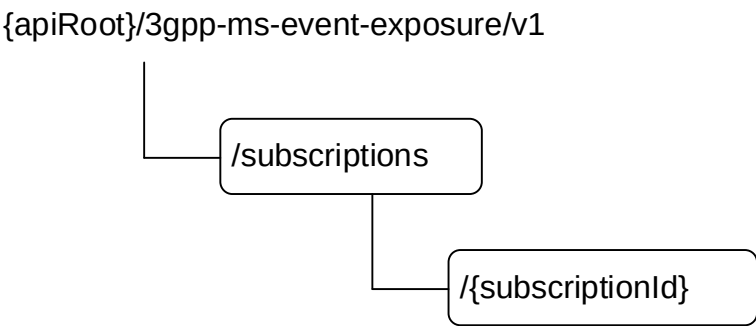


Figure 5.28.2.1-1: Resource URI structure of the MSEventExposure API

Table 5.28.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 5.28.2.1-1: Resources and methods overview

| Resource name                                          | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                                   |
|--------------------------------------------------------|--------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------|
| Media Streaming Event Exposure Subscriptions           | /subscriptions                             | GET                             | Reads all the existing Media Streaming Event Exposure Subscriptions.              |
|                                                        |                                            | POST                            | Request the creation of a Media Streaming Event Subscription.                     |
| Individual Media Streaming Event Exposure Subscription | /subscriptions/{subscriptionId}            | GET                             | Read an existing Individual Media Streaming Event Exposure Subscription resource. |
|                                                        |                                            | PUT                             | Update an existing Individual Media Streaming Event Exposure Subscription.        |
|                                                        |                                            | DELETE                          | Delete an existing Individual Media Streaming Event Exposure Subscription.        |

5.28.2.2 Resource: Media Streaming Event Exposure Subscriptions

5.28.2.2.1 Introduction

This resource represents the collection of Media Streaming Event Exposure Subscription resources managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

## 5.28.2.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-ms-event-exposure/v1/subscriptions

This resource shall support the resource URI variables defined in table 5.28.2.2.2-1.

**Table 5.28.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.28.1. |

## 5.28.2.2.3 Resource Standard Methods

## 5.28.2.2.3.1 GET

This method allows an AF to retrieve all the active Media Streaming Event Exposure Subscription resource at the NEF.

This method shall support the URI query parameters specified in table 5.28.2.2.3.1-1.

**Table 5.28.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.28.2.2.3.1-2 and the response data structures and response codes specified in table 5.28.2.2.3.1-3.

**Table 5.28.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.28.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(AfEventExposureSubsc)                                                                                             | M | 0..N        | 200 OK                 | Successful case. All the active Media Streaming Event Exposure Subscriptions managed by the NEF are returned.                                                                                                                       |
| n/a                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                     |

**Table 5.28.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |



**Table 5.28.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 5.28.2.2.3.2 POST

This method enables an AF to request the creation of a new Media Streaming Event Exposure Subscription at the NEF.

This method shall support the URI query parameters specified in table 5.28.2.2.3.2-1.

**Table 5.28.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.28.2.2.3.2-2 and the response data structures and response codes specified in table 5.28.2.2.3.2-3.

**Table 5.28.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type            | P | Cardinality | Description                                                                                                      |
|----------------------|---|-------------|------------------------------------------------------------------------------------------------------------------|
| AfEventExposureSubsc | M | 1           | Contains the parameters to request the creation of a new Media Streaming Event Exposure Subscription at the NEF. |

**Table 5.28.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                | P | Cardinality | Response Codes | Description                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AfEventExposureSubsc                                                                                                     | M | 1           | 201 Created    | Successful case. A new Media Streaming Event Exposure Subscription is successfully created and a representation of the created Individual Media Streaming Event Exposure Subscription resource is returned.<br><br>An HTTP "Location" header that contains the resource URI of the created Individual Media Streaming Event Exposure Subscription resource shall also be included. |
| NOTE: The mandatory HTTP error status code for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                                                                                                                                                                                                                                                                    |

**Table 5.28.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                       |
|----------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-ms-event-exposure/v1/subscriptions/{subscriptionId} |

#### 5.28.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.28.2.3 Resource: Individual Media Streaming Event Exposure Subscription

#### 5.28.2.3.1 Introduction

This resource represents an Individual Media Streaming Event Exposure Subscription managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

## 5.28.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-ms-event-exposure/v1/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.28.2.3.2-1.

**Table 5.28.2.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                                                                                                                 |
|----------------|-----------|----------------------------------------------------------------------------------------------------------------------------|
| apiRoot        | string    | See clause 5.28.1.                                                                                                         |
| subscriptionId | string    | Contains the unique identifier of the Individual Media Streaming Event Exposure Subscription resource assigned by the NEF. |

## 5.28.2.3.3 Resource Standard Methods

## 5.28.2.3.3.1 GET

This method allows an AF to retrieve an existing Individual Media Streaming Event Exposure Subscription resource at the NEF.

This method shall support the URI query parameters specified in table 5.28.2.3.3.1-1.

**Table 5.28.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.28.2.3.3.1-2 and the response data structures and response codes specified in table 5.28.2.3.3.1-3.

**Table 5.28.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.28.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AfEventExposureSubsc                                                                                                    | M | 1           | 200 OK                 | Successful case. The requested Individual Media Streaming Event Exposure Subscription resource is successfully returned.                                                                                                       |
| n/a                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.28.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

**Table 5.28.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**5.28.2.3.3.2 PUT**

This method enables an AF to request the update of an existing Individual Media Streaming Event Exposure Subscription resource at the NEF.

This method shall support the URI query parameters specified in table 5.28.2.3.3.2-1.

**Table 5.28.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.28.2.3.3.2-2 and the response data structures and response codes specified in table 5.28.2.3.3.2-3.

**Table 5.28.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type            | P | Cardinality | Description                                                                                                                       |
|----------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
| AfEventExposureSubsc | M | 1           | Contains the updated representation of the Individual Media Streaming Event Exposure Subscription resource that is to be updated. |

**Table 5.28.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AfEventExposureSubsc                                                                                                    | M | 1           | 200 OK                 | Successful case. The concerned Individual Media Streaming Event Exposure Subscription resource is successfully updated and a representation of the updated resource is returned in the response body.                          |
| n/a                                                                                                                     |   |             | 204 No Content         | Successful case. The concerned Individual Media Streaming Event Exposure Subscription resource is successfully updated and no content is returned in the response body.                                                        |
| n/a                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status code for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.28.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

**Table 5.28.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**5.28.2.3.3.3 DELETE**

This method enables an AF to request the deletion of an existing Individual Media Streaming Event Exposure resource at the NEF.

This method shall support the URI query parameters specified in table 5.28.2.3.3.3-1.

**Table 5.28.2.3.3.3-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.28.2.3.3.3-2 and the response data structures and response codes specified in table 5.28.2.3.3.3-3.

**Table 5.28.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.28.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                    |
|-----------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful response. The Individual Media Streaming Event Exposure resource is successfully deleted.                                                                                                                           |
|           |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
|           |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE: The mandatory HTTP error status code for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

**Table 5.28.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.28.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                   |
|----------|--------|---|---|-------------------------------------------------------------------|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-------------------------------------------------------------------|

#### 5.28.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.28.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.28.4 Notifications

### 5.28.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.28.4.1-1: Notifications overview**

| Notification                                | Callback URI | HTTP method or custom operation | Description (service operation)                                                                               |
|---------------------------------------------|--------------|---------------------------------|---------------------------------------------------------------------------------------------------------------|
| Media Streaming Event Exposure Notification | {notifUri}   | POST                            | This operation enables the NEF to notify a previously subscribed AF on the Media Streaming Exposure Event(s). |

### 5.28.4.2 Media Streaming Event Exposure Notification

#### 5.28.4.2.1 Description

The Media Streaming Event Exposure notification is used by the NEF to report one or several observed Media Streaming event(s) to a previously subscribed AF.

#### 5.28.4.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 5.28.4.2.2-1.

**Table 5.28.4.2.2-1: Callback URI variables**

| Name     | Definition                                                                                                                         |
|----------|------------------------------------------------------------------------------------------------------------------------------------|
| notifUri | Callback reference provided by the AF during the creation/update of the corresponding Media Streaming Event Exposure Subscription. |

#### 5.28.4.2.3 Operation Definition

##### 5.28.4.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.28.4.2.3.1-1 and the response data structures and response codes specified in table 5.28.4.2.3.1-2.

**Table 5.28.4.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type             | P | Cardinality | Description                                               |
|-----------------------|---|-------------|-----------------------------------------------------------|
| AfEventExposure Notif | M | 1           | Contains the Media Streaming Event Exposure Notification. |

**Table 5.28.4.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                       |   |             | 204 No Content         | The Media Streaming Event Notification is successfully received.                                                                                                                                                                                                                |
| N/A                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                 |

**Table 5.28.4.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.28.4.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

5.28.4.2.3.2            Void

## 5.28.5 Data Model

### 5.28.5.1 General

This clause specifies the application data model supported by the MSEventExposure API. Table 5.28.5.1-1 specifies the data types defined for the MSEventExposure API.

**Table 5.28.5.1-1: MSEventExposure specific Data Types**

| Data type | Clause defined | Description | Applicability |
|-----------|----------------|-------------|---------------|
|           |                |             |               |

Table 5.28.5.1-2 specifies data types re-used by the MSEventExposure API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the MSEventExposure API.

**Table 5.28.5.1-2: Re-used Data Types**

| Data type            | Reference           | Comments                                                                         | Applicability |
|----------------------|---------------------|----------------------------------------------------------------------------------|---------------|
| AfEventExposureNotif | 3GPP TS 29.517 [58] | Represents a Media Streaming event notification.                                 |               |
| AfEventExposureSubsc | 3GPP TS 29.517 [58] | Represents a Media Streaming event exposure subscription. Only applicable to the |               |

|  |  |                                                                                                         |  |
|--|--|---------------------------------------------------------------------------------------------------------|--|
|  |  | UE application events exposed via Data Collection AF as defined in clause 4.1.1 of 3GPP TS 29.517 [58]. |  |
|--|--|---------------------------------------------------------------------------------------------------------|--|

## 5.28.5.2 Structured data types

### 5.28.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

There are no structured data types defined for this API in this release of the specification.

## 5.28.5.3 Simple data types and enumerations

### 5.28.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.28.5.3.2 Simple data types

The simple data types defined in table 5.28.5.3.2-1 shall be supported.

**Table 5.28.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.28.6 Used Features

The table below defines the features applicable to the MSEventExposure API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.28.6-1: Features used by MSEventExposure API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.28.7 Error handling

### 5.28.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses shall apply.

### 5.28.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the MSEventExposure API.

### 5.28.7.3 Application Errors

The application errors defined for the MSEventExposure API are listed in table 5.28.7.3-1.

Table 5.28.7.3-1: Application errors

| Application Error | HTTP status code | Description |
|-------------------|------------------|-------------|
|                   |                  |             |

## 5.29 MBSGroupMsgDelivery API

### 5.29.1 Introduction

The Nnef\_MBSGroupMsgDelivery service shall use the MBSGroupMsgDelivery API.

The API URI of the MBSGroupMsgDelivery API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-mbs-group-msg".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above root URI.

### 5.29.2 Resources

#### 5.29.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.29.2.1-1 and HTTP methods used for the MBSGroupMsgDelivery API.

The structure of the resource URIs of the MBSGroupMsgDelivery API is shown in Figure 5.29.2.1-1.

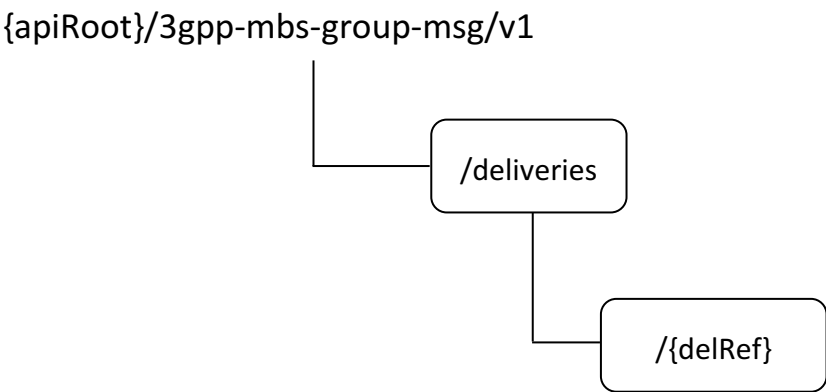


Figure 5.29.2.1-1: Resource URI structure of the MBSGroupMsgDelivery API

Table 5.29.2.1-1 provides an overview of the resources and applicable HTTP methods.



**Table 5.29.2.1-1: Resources and methods overview**

| Resource name                         | Resource URI<br>(relative path under<br>API URI) | HTTP method or<br>custom operation | Description<br>(service operation)                                             |
|---------------------------------------|--------------------------------------------------|------------------------------------|--------------------------------------------------------------------------------|
| MBS Group Message Deliveries          | /deliveries                                      | GET                                | Retrieve the existing MBS Group Message Deliveries.                            |
|                                       |                                                  | POST                               | Request the creation of a new MBS Group Message Delivery.                      |
| Individual MBS Group Message Delivery | /deliveries/{delRef}                             | GET                                | Retrieve a previously submitted MBS Group Message Delivery.                    |
|                                       |                                                  | PATCH                              | Request the modification of a previously submitted MBS Group Message Delivery. |
|                                       |                                                  | DELETE                             | Request the deletion of a previously submitted MBS Group Message Delivery.     |

## 5.29.2.2 Resource: MBS Group Message Deliveries

### 5.29.2.2.1 Introduction

This resource represents the collection of MBS Group Message Deliveries managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

### 5.29.2.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-mbs-group-msg/v1/deliveries**

This resource shall support the resource URI variables defined in table 5.29.2.2.2-1.

**Table 5.29.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.29.1. |

### 5.29.2.2.3 Resource Standard Methods

#### 5.29.2.2.3.1 GET

This method allows an AF to retrieve all the active MBS Group Message Deliveries managed by the NEF.

This method shall support the URI query parameters specified in table 5.29.2.2.3.1-1.

**Table 5.29.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.29.2.2.3.1-2 and the response data structures and response codes specified in table 5.29.2.2.3.1-3.

**Table 5.29.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.29.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(MbsGroupMsgDel)                                                                                                               | M | 0..N        | 200 OK                 | Successful case. All the active MBS Group Message Deliveries managed by the NEF shall be returned.<br><br>If there are no active MBS Group Message Delivery(ies) available at the NEF, an empty array shall be returned.              |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                       |

**Table 5.29.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.29.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

### 5.29.2.2.3.2 POST

This method enables an AF to request the creation of an MBS Group Message Delivery at the NEF.

This method shall support the URI query parameters specified in table 5.29.2.2.3.2-1.

**Table 5.29.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This operation shall support the request and response data structures and response codes specified in table 5.29.2.2.3.2-2 and table 5.29.2.2.3.2-3.

**Table 5.29.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type      | P | Cardinality | Description                                                     |
|----------------|---|-------------|-----------------------------------------------------------------|
| MbsGroupMsgDel | M | 1           | Represents the Group Message Delivery to be created at the NEF. |

**Table 5.29.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes | Description                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MbsGroupMsgDel                                                                                                                         | M | 1           | 201 Created    | Successful case: A representation of the created "Individual MBS Group Message Delivery" resource is returned in the response body.<br><br>An HTTP "Location" header that contains the URI of the created "Individual MBS Group Message Delivery" resource shall also be included. |
| ProblemDetails                                                                                                                         | O | 0..1        | 403 Forbidden  | (NOTE 2)                                                                                                                                                                                                                                                                           |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                                                                                    |
| NOTE 2: Failure cases are described in clause 5.29.7.                                                                                  |   |             |                |                                                                                                                                                                                                                                                                                    |

**Table 5.29.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                        |
|----------|-----------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-mbs-group-msg/v1/deliveries/{delRef} |

#### 5.29.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.29.2.3 Resource: Individual MBS Group Message Delivery

#### 5.29.2.3.1 Introduction

This resource represents an "Individual MBS Group Message Delivery" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

#### 5.29.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-mbs-group-msg/v1/deliveries/{delRef}

This resource shall support the resource URI variables defined in table 5.29.2.3.2-1.

**Table 5.29.2.3.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                                                                                           |
|---------|-----------|------------------------------------------------------------------------------------------------------|
| apiRoot | string    | See clause 5.29.1.                                                                                   |
| delRef  | string    | Contains the identifier of the "Individual MBS Group Message Delivery" resource assigned by the NEF. |

#### 5.29.2.3.3 Resource Standard Methods

##### 5.29.2.3.3.1 GET

This method allows an AF to retrieve an existing "Individual MBS Group Message Delivery" resource at the NEF.

This method shall support the URI query parameters specified in table 5.29.2.3.3.1-1.

**Table 5.29.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.29.2.3.3.1-2 and the response data structures and response codes specified in table 5.29.2.3.3.1-3.

**Table 5.29.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.29.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MbsGroupMsgDel                                                                                                                      | M | 1           | 200 OK                 | Successful case. The requested "Individual MBS Group Message Delivery" resource is successfully returned.                                                                                                                             |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                       |

**Table 5.29.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.29.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.29.2.3.3.2 PATCH

This method enables an AF to request the modification of an existing "Individual MBS Group Message Delivery" resource at the NEF.

This method shall support the URI query parameters specified in table 5.29.2.3.3.2-1.

**Table 5.29.2.3.3.2-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.29.2.3.3.2-2 and the response data structures and response codes specified in table 5.29.2.3.3.2-3.

**Table 5.29.2.3.3.2-2: Data structures supported by the PATCH Request Body on this resource**

| Data type            | P | Cardinality | Description                                                                                                  |
|----------------------|---|-------------|--------------------------------------------------------------------------------------------------------------|
| MbsGroupMsgDel Patch | M | 1           | Contains the parameters to request the modification of the "Individual MBS Group Message Delivery" resource. |

**Table 5.29.2.3.3.2-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MbsGroupMsgDel                                                                                                                          | M | 1           | 200 OK                 | Successful case. The concerned "Individual MBS Group Message Delivery" resource is successfully modified and a representation of the updated resource is returned in the response body.                                               |
| n/a                                                                                                                                     |   |             | 204 No Content         | Successful response. The "Individual MBS Group Message Delivery" resource is successfully modified and no content is returned in the response body.                                                                                   |
| n/a                                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                          | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                              |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                       |
| NOTE 2: Failure cases are described in clause 5.29.7.                                                                                   |   |             |                        |                                                                                                                                                                                                                                       |

**Table 5.29.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.29.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

### 5.29.2.3.3.3 DELETE

This method enables an AF to request the deletion of an existing "Individual MBS Group Message Delivery" resource at the NEF.

This method shall support the URI query parameters specified in table 5.29.2.3.3.3-1.

**Table 5.29.2.3.3.3-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.29.2.3.3.3-2 and the response data structures and response codes specified in table 5.29.2.3.3.3-3.

**Table 5.29.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.29.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful response. The "Individual MBS Group Message Delivery" resource is successfully deleted.                                                                                                                                    |
|                                                                                                                                        |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
|                                                                                                                                        |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                       |

**Table 5.29.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.29.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.29.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.29.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.29.4 Notifications

### 5.29.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.29.4.1-1: Notifications overview**

| Notification                            | Callback URI | HTTP method or custom operation | Description (service operation)                                                                      |
|-----------------------------------------|--------------|---------------------------------|------------------------------------------------------------------------------------------------------|
| MBS Group Message Delivery Notification | {notifUri}   | POST                            | Enables the NEF to notify a previously subscribed AF of the status of an MBS Group Message Delivery. |

### 5.29.4.2 MBS Group Message Delivery Notification

#### 5.29.4.2.1 Description

This notification is used by the NEF to report the status of an MBS Group Message Delivery to a previously subscribed AF.

#### 5.29.4.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 5.29.4.2.2-1.

**Table 5.29.4.2.2-1: Callback URI variables**

| Name     | Definition                                                          |
|----------|---------------------------------------------------------------------|
| notifUri | Represents the callback URI encoded as a string formatted as a URI. |

#### 5.29.4.2.3 Operation Definition

This method shall support the request data structures specified in table 5.29.4.2.3-1 and the response data structures and response codes specified in table 5.29.4.2.3-2.

**Table 5.29.4.2.3-1: Data structures supported by the POST Request Body on this resource**

| Data type                 | P | Cardinality | Description                                             |
|---------------------------|---|-------------|---------------------------------------------------------|
| MbsGroupMsgDelStatusNotif | M | 1           | Represents the MBS Group Message Delivery Notification. |

**Table 5.29.4.2.3-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                    |
|-----------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful case. The notification is successfully received and acknowledged.                                                                                                                                                                                                                   |
| n/a       |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

|                                                                                                                                      |  |  |                        |                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                  |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                                                                       |

**Table 5.29.4.2.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.29.4.2.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.29.5 Data Model

### 5.29.5.1 General

This clause specifies the application data model supported by the MBSGroupMsgDelivery API. Table 5.29.5.1-1 specifies the data types defined for the MBSGroupMsgDelivery API.

**Table 5.29.5.1-1: MBSGroupMsgDelivery API specific Data Types**

| Data type                 | Clause defined | Description                                                                                      | Applicability |
|---------------------------|----------------|--------------------------------------------------------------------------------------------------|---------------|
| MbsGroupMsgDel            | 5.29.5.2.3     | Represents an MBS Group Message Delivery.                                                        |               |
| MbsGroupMsgDelPatch       | 5.29.5.2.5     | Represents the parameters to request the modification of an existing MBS Group Message Delivery. |               |
| MbsGroupMsgDelStatusNotif | 5.29.5.2.6     | Represents an MBS Group Message Delivery Notification.                                           |               |
| MbsServArea               | 5.29.5.4.1     | Represents an MBS Service Area.                                                                  |               |

Table 5.29.5.1-2 specifies data types re-used by the MBSGroupMsgDelivery API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the MBSGroupMsgDelivery API.

**Table 5.29.5.1-2: MBSGroupMsgDelivery API re-used Data Types**

| Data type              | Reference          | Comments                                 | Applicability |
|------------------------|--------------------|------------------------------------------|---------------|
| Bytes                  | 3GPP TS 29.122 [4] | Represents a sequence of bytes.          |               |
| DateTime               | 3GPP TS 29.122 [4] | Represents a date and a time.            |               |
| ExternalGroupId        | 3GPP TS 29.122 [4] | Represents an external Group Identifier. |               |
| ExternalMbsServiceArea | 3GPP TS 29.571 [8] | Represents an external MBS service area. |               |
| MbsServiceArea         | 3GPP TS 29.571 [8] | Represents an MBS service area.          |               |
| NrRedCapUeInfo         | 3GPP TS 29.571 [8] | Represents NR RedCap UE Information.     |               |
| ProblemDetails         | 3GPP TS 29.571 [8] | Represents error related information.    |               |



|                        |                     |                                                                                                                  |  |
|------------------------|---------------------|------------------------------------------------------------------------------------------------------------------|--|
| SupportedFeatures      | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |  |
| Uri                    | 3GPP TS 29.122 [4]  | Represents a Uri.                                                                                                |  |
| UserServiceDescription | 3GPP TS 26.517 [71] | Represents MBS User Service Announcement information.                                                            |  |

## 5.29.5.2 Structured data types

### 5.29.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

### 5.29.5.2.2 Void

### 5.29.5.2.3 Type: MbsGroupMsgDel

**Table 5.29.5.2.3-1: Definition of type MbsGroupMsgDel**

| Attribute name   | Data type              | P | Cardinality | Description                                                                                                                                                                                                                                                          | Applicability |
|------------------|------------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId             | string                 | C | 0..1        | Contains the identifier of the AF that is sending the request.<br><br>This attribute shall be present only in MBS Group Message Delivery creation requests.                                                                                                          |               |
| extGroupId       | ExternalGroupId        | M | 1           | Contains the identifier of the targeted group of UEs.                                                                                                                                                                                                                |               |
| payload          | Bytes                  | M | 1           | Contains the payload of the requested MBS Group Message Delivery.                                                                                                                                                                                                    |               |
| mbsServArea      | MbsServArea            | M | 1           | Contains the targeted MBS Service Area.                                                                                                                                                                                                                              |               |
| startTime        | DateTime               | M | 1           | Contains the start time of the MBS Group Message Delivery.                                                                                                                                                                                                           |               |
| endTime          | DateTime               | M | 1           | Contains the end time of the MBS Group Message Delivery.                                                                                                                                                                                                             |               |
| notifUri         | Uri                    | M | 1           | Contains the notification URI via which the AF desires to receive notifications on the status of this MBS Group Message Delivery.                                                                                                                                    |               |
| delStatus        | boolean                | C | 0..1        | Indicates the status of this MBS Group Message Delivery.<br>- "true": Successful delivery.<br>- "false": Failed delivery.<br><br>This attribute shall be present only in MBS Group Message Delivery creation/modification responses.                                 |               |
| mbsUserServAnnmt | UserServiceDescription | C | 0..1        | Represents the MBS User Service Announcement information currently associated with the MBS group message delivery.<br><br>This attribute shall be present in the response to an MBS Group Message Delivery Creation request and may be present in the response to an |               |

|                     |                   |   |      |                                                                                                                                                            |  |
|---------------------|-------------------|---|------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                     |                   |   |      | MBS Group Message Delivery Modification request.                                                                                                           |  |
| servAreaWithout Mbs | MbsServArea       | O | 0..1 | Contains the service area without MBS capability.<br><br>This attribute may be present only in MBS Group Message Delivery creation/modification responses. |  |
| nrRedCapUeInfo      | NrRedCapUeInfo    | O | 0..1 | Contains the NR RedCap UE Information.                                                                                                                     |  |
| suppFeat            | SupportedFeatures | C | 0..1 | Indicates the list of supported features.<br><br>This attribute shall be present only when feature negotiation needs to take place.                        |  |

5.29.5.2.4 Void

5.29.5.2.5 Type: MbsGroupMsgDelPatch

**Table 5.29.5.2.5-1: Definition of type MbsGroupMsgDelPatch**

| Attribute name | Data type      | P | Cardinality | Description                                                                                                                               | Applicability |
|----------------|----------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| payload        | Bytes          | O | 0..1        | Contains the updated payload of the requested MBS Group Message Delivery.                                                                 |               |
| mbsServArea    | MbsServArea    | O | 0..1        | Contains the updated MBS Service Area.                                                                                                    |               |
| startTime      | DateTime       | O | 0..1        | Contains the updated start time of the MBS Group Message Delivery.                                                                        |               |
| endTime        | DateTime       | O | 0..1        | Contains the updated end time of the MBS Group Message Delivery.                                                                          |               |
| notifUri       | Uri            | O | 0..1        | Contains the updated notification URI via which the AF desires to receive notifications on the status of this MBS Group Message Delivery. |               |
| nrRedCapUeInfo | NrRedCapUeInfo | O | 0..1        | Contains the NR RedCap UE Information.                                                                                                    |               |

5.29.5.2.6 Type: MbsGroupMsgDelStatusNotif

**Table 5.29.5.2.6-1: Definition of type MbsGroupMsgDelStatusNotif**

| Attribute name | Data type | P | Cardinality | Description                                                                                                     | Applicability |
|----------------|-----------|---|-------------|-----------------------------------------------------------------------------------------------------------------|---------------|
| delStatus      | boolean   | M | 1           | Indicate the status of Group Message Delivery.<br>- "true": Successful delivery.<br>- "false": Failed delivery. |               |

### 5.29.5.3 Simple data types and enumerations

#### 5.29.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.29.5.3.2 Simple data types

The simple data types defined in Table 5.29.5.3.2-1 shall be supported.

**Table 5.29.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.29.5.4 Data types describing alternative data types or combinations of data types

#### 5.29.5.4.1 Type: MbsServArea

**Table 5.29.5.4.1-1: Definition of type MbsServArea as a list of mutually exclusive alternatives**

| Data type              | Cardinality | Description                                                                                                 | Applicability |
|------------------------|-------------|-------------------------------------------------------------------------------------------------------------|---------------|
| MbsServiceArea         | 0..1        | Represents the internal MBS Service Area (i.e., in the form of a list of cell ID(s) and/or list of TAI(s)). |               |
| ExternalMbsServiceArea | 0..1        | Represents the external MBS Service Area (i.e., in the form of geographical area(s) or civic address(es)).  |               |

## 5.29.6 Used Features

The optional features listed in table 5.29.6-1 are defined for the MBSGroupMsgDelivery API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.29.6-1: Features used by the MBSGroupMsgDelivery API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.29.7 Error handling

### 5.29.7.1 General

For the MBSGroupMsgDelivery API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the MBSGroupMsgDelivery API.

### 5.29.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the MBSGroupMsgDelivery API.

### 5.29.7.3 Application Errors

The application errors defined for the MBSGroupMsgDelivery API are listed in table 5.29.7.3-1.

Table 5.29.7.3-1: Application errors

| Application Error              | HTTP status code | Description                                                                                                                                          | Applicability |
|--------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| MBS_SERVICE_AREA_NOT_SUPPORTED | 403 Forbidden    | The MBS Group Message Delivery creation/update request is rejected because the requested MBS Service Area is not supported by the 3GPP Core Network. |               |

## 5.30 DNAMapping API

### 5.30.1 Introduction

The Nnef\_DNAMapping service shall use the DNAMapping API.

The API URI of the DNAMapping API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-dnai-mapping".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above root URI.

### 5.30.2 Resources

#### 5.30.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.30.2.1-1 and the resources and HTTP methods used for the DNAMapping API.

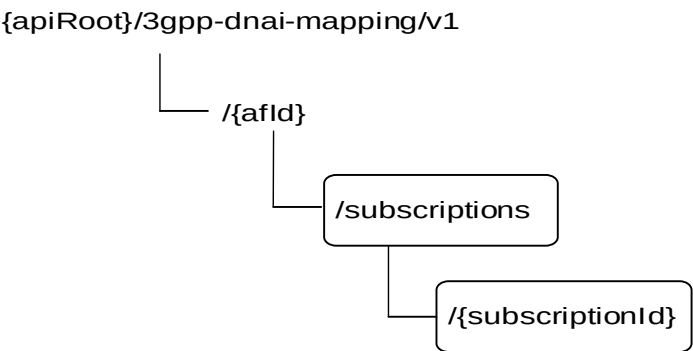


Figure 5.30.2.1-1: Resource URI structure of the DNAMapping API

Table 5.30.2.1-1 provides an overview of the resources and HTTP methods applicable for the DNAMapping API.

**Table 5.30.2.1-1: Resources and methods overview**

| Resource name                        | Resource URI                           | HTTP method | Description                                                    |
|--------------------------------------|----------------------------------------|-------------|----------------------------------------------------------------|
| DNAI Mapping Subscriptions           | /{afId}/subscriptions                  | GET         | Retrieve all the active DNAI Mapping Subscriptions at the NEF. |
|                                      |                                        | POST        | Create a new DNAI Mapping Subscription.                        |
| Individual DNAI Mapping Subscription | /{afId}/subscriptions/{subscriptionId} | GET         | Retrieve an existing DNAI Mapping Subscription.                |
|                                      |                                        | DELETE      | Delete an existing DNAI Mapping Subscription.                  |

## 5.30.2.2 Resource: DNAI Mapping Subscriptions

### 5.30.2.2.1 Introduction

This resource represents all the active DNAI Mapping Subscriptions managed by the NEF for a given AF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

### 5.30.2.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-dnai-mapping/<apiVersion>/{afId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.30.2.2.2-1.

**Table 5.30.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                           |
|---------|-----------|--------------------------------------|
| apiRoot | string    | See clause 5.30.1.                   |
| afId    | string    | Represents the identifier of the AF. |

### 5.30.2.2.3 Resource Standard Methods

#### 5.30.2.2.3.1 Void

#### 5.30.2.2.3.2 GET

The HTTP GET method allows to retrieve all the active DNAI Mapping Subscriptions managed by the NEF for a given AF.

This method shall support the URI query parameters specified in table 5.30.2.2.3.2-1.

**Table 5.30.2.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.30.2.2.3.2-2 and the response data structures and response codes specified in table 5.30.2.2.3.2-3.

**Table 5.30.2.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.30.2.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(DnaiMapSub)                                                                                                                   | M | 0..N        | 200 OK                 | Successful case. All the "Individual DNAI Mapping Subscription" resource(s) managed by the NEF are returned.<br><br>If there are no active "Individual DNAI Mapping Subscription" resources at the NEF, an empty array is returned.                   |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.30.2.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.30.2.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.30.2.2.3.3 POST

The HTTP POST method allows to create a new DNAI Mapping Subscription at the NEF for a given AF.

This method shall support the URI query parameters specified in table 5.30.2.2.3.3-1.

**Table 5.30.2.2.3.3-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.30.2.2.3.3-1 and the response data structures and response codes specified in table 5.30.2.2.3.3-2.

**Table 5.30.2.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type  | P | Cardinality | Description                                                                                    |
|------------|---|-------------|------------------------------------------------------------------------------------------------|
| DnaiMapSub | M | 1           | Contains the parameters to request the creation of a new DNAI Mapping Subscription at the NEF. |

**Table 5.30.2.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes | Description                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DnaiMapSub                                                                                                                           | M | 1           | 201<br>Created | Successful case. A representation of the created "Individual DNAI Mapping Subscription" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                           |

**Table 5.30.2.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                                   |
|----------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-dnai-mapping/<apiVersion>/{afld}/subscriptions/{subscriptionId} |

#### 5.30.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.30.2.3 Resource: Individual DNAI Mapping Subscription

#### 5.30.2.3.1 Introduction

This resource represents an "Individual DNAI Mapping Subscription" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

#### 5.30.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-dnai-mapping/<apiVersion>/{afld}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.30.2.3.2-1.

**Table 5.30.2.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                                                                        |
|----------------|-----------|-----------------------------------------------------------------------------------|
| apiRoot        | string    | See clause 5.30.1.                                                                |
| afld           | string    | Represents the identifier of the AF.                                              |
| subscriptionId | string    | Represents the identifier of the "Individual DNAI Mapping Subscription" resource. |

#### 5.30.2.3.3 Resource Standard Methods

##### 5.30.2.3.3.1 Void

##### 5.30.2.3.3.2 GET

The HTTP GET method allows to retrieve an existing "Individual DNAI Mapping Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.30.2.3.3.2-1.

**Table 5.30.2.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|     |  |  |  |  |
|-----|--|--|--|--|
| n/a |  |  |  |  |
|-----|--|--|--|--|

This method shall support the request data structures specified in table 5.30.2.3.3.2-2 and the response data structures and response codes specified in table 5.30.2.3.3.2-3.

**Table 5.30.2.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.30.2.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DnaiMapSub                                                                                                                          | M | 1           | 200 OK                 | Successful case. The requested "Individual DNAI Mapping Subscription" resource is successfully returned in the response body.                                                                                                                         |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.30.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.30.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.30.2.3.3.3 DELETE

The HTTP DELETE method allows to delete an existing "Individual DNAI Mapping Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.30.2.3.3.3-1.

**Table 5.30.2.3.3.3-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |



This method shall support the request data structures specified in table 5.30.2.3.3.3-2 and the response data structures and response codes specified in table 5.30.2.3.3.3-3.

**Table 5.30.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.30.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful case. The "Individual DNAI Mapping Subscription" resource is successfully deleted.                                                                                                                                                         |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.30.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.30.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.30.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.30.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.30.4 Notifications

### 5.30.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.30.4.1-1: Notifications overview**

| Notification                                 | Callback URI | HTTP method or custom operation | Description (service operation)                                                                              |
|----------------------------------------------|--------------|---------------------------------|--------------------------------------------------------------------------------------------------------------|
| DNAI Mapping Information Update Notification | {notifUri}   | POST                            | Enables the NEF to notify a previously subscribed AF on the updates of the DNAI-EAS address(es) information. |

## 5.30.4.2 DNAI Mapping Information Update Notification

### 5.30.4.2.1 Description

This notification is used by the NEF to report the updates of the DNAI Mapping information to a previously subscribed AF.

### 5.30.4.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 5.30.4.2.2-1.

**Table 5.30.4.2.2-1: Callback URI variables**

| Name     | Definition                                                          |
|----------|---------------------------------------------------------------------|
| notifUri | Represents the callback URI encoded as a string formatted as a URI. |

### 5.30.4.2.3 Operation Definition

#### 5.30.4.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.30.4.2.3.1-1 and the response data structures and response codes specified in table 5.30.4.2.3.1-2.

**Table 5.30.4.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type                 | P | Cardinality | Description                                                  |
|---------------------------|---|-------------|--------------------------------------------------------------|
| DnaiMapUpdateNotification | M | 1           | Represents the DNAI Mapping Information Update Notification. |

**Table 5.30.4.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                    |
|-----------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful case. The notification is successfully received and acknowledged.                                                                                                                                                                                                                   |
| n/a       |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a       |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.                                                                                  |

|                                                                                                                                      |  |  |  |                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------|
|                                                                                                                                      |  |  |  | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |  |                                                                           |

**Table 5.30.4.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.30.4.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

5.30.4.2.3.2                  Void

## 5.30.5 Data Model

### 5.30.5.1 General

This clause specifies the application data model supported by the DNAIMapping API. Table 5.30.5.1-1 specifies the data types defined for the DNAIMapping API.

**Table 5.30.5.1-1: DNAIMapping API specific Data Types**

| Data type          | Clause defined | Description                                                | Applicability |
|--------------------|----------------|------------------------------------------------------------|---------------|
| DnaiMapSub         | 5.30.5.2.2     | Represents a DNAI Mapping Subscription.                    |               |
| DnaiMapUpdateNotif | 5.30.5.2.3     | Represents a DNAI Mapping Information Update Notification. |               |

Table 5.30.5.1-2 specifies data types re-used by the DNAIMapping API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the DNAIMapping API.

**Table 5.30.5.1-2: DNAIMapping API re-used Data Types**

| Data type            | Reference           | Comments                                                                                                         | Applicability |
|----------------------|---------------------|------------------------------------------------------------------------------------------------------------------|---------------|
| DnaiEasInfo          | 3GPP TS 29.519 [23] | Represents EAS information for a DNAI.                                                                           |               |
| Dnn                  | 3GPP TS 29.571 [8]  | Represents a DNN.                                                                                                |               |
| Fqdn                 | 3GPP TS 29.571 [8]  | Represents an FQDN.                                                                                              |               |
| IpAddr               | 3GPP TS 29.571 [8]  | Represents an IP address.                                                                                        |               |
| ReportingInformation | 3GPP TS 29.523 [22] | Represents the event reporting requirements.                                                                     |               |
| Snssai               | 3GPP TS 29.571 [8]  | Represents an S-NSSAI.                                                                                           |               |
| SupportedFeatures    | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |               |
| Uri                  | 3GPP TS 29.122 [4]  | Represents a URI.                                                                                                |               |

## 5.30.5.2 Structured data types

### 5.30.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

### 5.30.5.2.2 Type: DnaiMapSub

**Table 5.30.5.2.2-1: Definition of type DnaiMapSub**

| Attribute name                                                                      | Data type                 | P | Cardinality | Description                                                                                                                                                                                                                                                                  | Applicability |
|-------------------------------------------------------------------------------------|---------------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| easIpAddrs                                                                          | array(IpAddr)             | C | 1..N        | Contains the IP address(es) of the EAS(s) in the Local part of the DN or the IP address range(s) (i.e., IPv4 subnetwork(s) and/or IPv6 prefix(es)) of the Local part of the DN where the EAS(s) is/are deployed.<br><br>(NOTE)                                               |               |
| fqdns                                                                               | array(Fqdn)               | C | 1..N        | Contains the FQDN(s) of the EAS(s) in the Local part of the DN where the EAS(s) is/are deployed.<br><br>(NOTE)                                                                                                                                                               |               |
| dnn                                                                                 | Dnn                       | O | 0..1        | Contains a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.                                                                                                                                              |               |
| snssai                                                                              | Snssai                    | O | 0..1        | Contains an S-NSSAI.                                                                                                                                                                                                                                                         |               |
| immReports                                                                          | array(DnaiMapUpdateNotif) | C | 1..N        | Contains the DNAI EAS mapping information.<br><br>This attribute shall be present only in subscription creation/update responses and only when immediate reporting was requested in the corresponding subscription creation/update request and the information is available. |               |
| eventReq                                                                            | ReportingInformation      | O | 0..1        | Contains the event reporting requirements.                                                                                                                                                                                                                                   |               |
| notifUri                                                                            | Uri                       | M | 1           | Contains the URI via which the DNAI Mapping Information Update notifications shall be delivered.                                                                                                                                                                             |               |
| notifCorrId                                                                         | string                    | M | 1           | Contains the notification correlation identifier.                                                                                                                                                                                                                            |               |
| supFeat                                                                             | SupportedFeatures         | C | 0..1        | Contains the list of supported features used as defined in clause 5.30.6.<br><br>This attribute shall be present only when feature negotiation needs to take place.                                                                                                          |               |
| NOTE: These attributes are mutually exclusive. Either one of them shall be present. |                           |   |             |                                                                                                                                                                                                                                                                              |               |

## 5.30.5.2.3 Type: DnaiMapUpdateNotif

**Table 5.30.5.2.3-1: Definition of type DnaiMapUpdateNotif**

| Attribute name | Data type          | P | Cardinality | Description                                                                                                                                                                            | Applicability |
|----------------|--------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| dnaiEasAddrMap | array(DnaiEasInfo) | C | 1..N        | Contains the mapping information between the DNAI(s) and the EAS address(es).<br><br>This attribute shall be present unless the notification is sent to notify deletion.               |               |
| mappingId      | string             | M | 1           | Identifies the mapping information provided in the "dnaiEasAddrMap" attribute.<br><br>For notifying deletion, this attribute shall be provided without the "dnaiEasAddrMap" attribute. |               |
| notifCorrId    | string             | M | 1           | Contains the notification correlation identifier.                                                                                                                                      |               |

## 5.30.5.2.4 Void

## 5.30.5.3 Simple data types and enumerations

## 5.30.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.30.5.3.2 Simple data types

The simple data types defined in table 5.30.5.3.2-1 shall be supported.

**Table 5.30.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.30.5.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

## 5.30.6 Used Features

The optional features listed in table 5.30.6-1 are defined for the DNAMapping API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.30.6-1: Features used by DNAMapping API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
| 1              | Void         |             |
| 2              | Void         |             |

## 5.30.7 Error handling

### 5.30.7.1 General

For the DNAMapping API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the DNAMapping API.

### 5.30.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the DNAMapping API.

### 5.30.7.3 Application Errors

The application errors defined for the DNAMapping API are listed in table 5.30.7.3-1.

**Table 5.30.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.31 PdtqPolicyNegotiation API

### 5.31.0 Introduction

The Nnef\_PdtqPolicyNegotiation service shall use the PdtqPolicyNegotiation API.

The API URI of PdtqPolicyNegotiation API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-pdtq-policy-negotiation".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.31.1 Resources

#### 5.31.1.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.29.2.1-1 and HTTP methods used for the PdtqPolicyNegotiation API.

The structure of the resource URIs of the PdtqPolicyNegotiation API is shown in Figure 5.31.1.1-1.

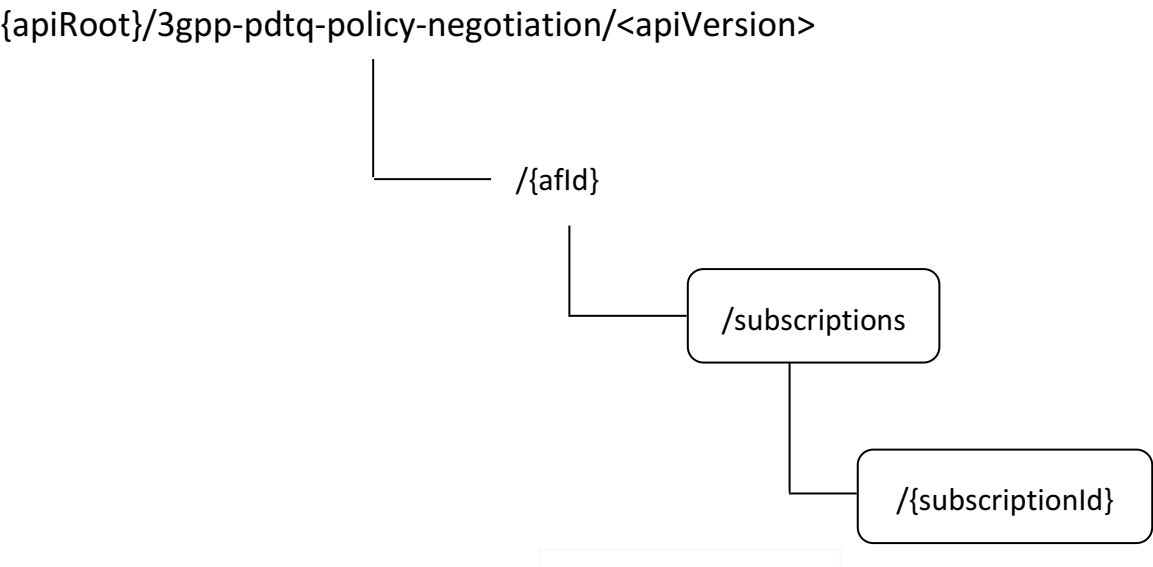


Figure 5.31.1.1-1: Resource URI structure of the PdtqPolicyNegotiation API

Table 5.31.1.1-1 provides an overview of the resources and applicable HTTP methods.

Table 5.31.1.1-1: Resources and methods overview

| Resource name                       | Resource URI                           | HTTP method or custom operation | Description                                                            |
|-------------------------------------|----------------------------------------|---------------------------------|------------------------------------------------------------------------|
| PDTQ Policy Subscriptions           | /{afId}/subscriptions                  | GET                             | Read all the active PDTQ Policy Subscription resources for a given AF. |
|                                     |                                        | POST                            | Create a new PDTQ Policy Subscription.                                 |
| Individual PDTQ Policy Subscription | /{afId}/subscriptions/{subscriptionId} | GET                             | Retrieve an existing "Individual PDTQ Policy Subscription" resource.   |
|                                     |                                        | PATCH                           | Modify an existing "Individual PDTQ Policy Subscription" resource.     |
|                                     |                                        | DELETE                          | Delete an existing "Individual PDTQ Policy Subscription" resource.     |

5.31.1.2 Resource: PDTQ Policy Subscriptions

5.31.1.2.1 Introduction

This resource represents all the active PDTQ Policy Subscriptions managed by the NEF for a given AF.  
This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

5.31.1.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-pdtq-policy-negotiation/<apiVersion>/{afId}/subscriptions

This resource shall support the resource URI variables defined in table 5.31.1.2.2-1.

Table 5.31.1.2.2-1: Resource URI variables for this resource

| Name    | Data type | Definition                           |
|---------|-----------|--------------------------------------|
| apiRoot | string    | See clause 5.31.0.                   |
| afId    | string    | Represents the identifier of the AF. |

## 5.31.1.2.3 Resource Standard Methods

## 5.31.1.2.3.1 Void

## 5.31.1.2.3.2 GET

The HTTP GET method allows to retrieve all the active PDTQ Policy Subscriptions managed by the NEF.

This method shall support the URI query parameters specified in table 5.31.1.2.3.2-1.

**Table 5.31.1.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.31.1.2.3.2-2 and the response data structures and response codes specified in table 5.31.1.2.3.2-3.

**Table 5.31.1.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.31.1.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(Pdtq)                                                                                                                         | M | 0..N        | 200 OK                 | Successful case. All the "Individual PDTQ Policy Subscription" resource(s) managed by the NEF are returned.<br><br>If there are no active "Individual PDTQ Policy Subscription" resources at the NEF, an empty array is returned.                     |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.31.1.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.31.1.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|



|          |        |   |   |                                                                                   |
|----------|--------|---|---|-----------------------------------------------------------------------------------|
| Location | string | M | 1 | Contains an alternative target URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-----------------------------------------------------------------------------------|

#### 5.31.1.2.3.3 POST

The HTTP POST method allows to create a new PDTQ Policy Subscription at the NEF.

This method shall support the URI query parameters specified in table 5.31.1.2.3.3-1.

**Table 5.31.1.2.3.3-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.31.1.2.3.3-2 and the response data structures and response codes specified in table 5.31.1.2.3.3-3.

**Table 5.31.1.2.3.3-2: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description                                                                                   |
|-----------|---|-------------|-----------------------------------------------------------------------------------------------|
| Pdtq      | M | 1           | Contains the parameters to request the creation of a new PDTQ Policy Subscription at the NEF. |

**Table 5.31.1.2.3.3-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes | Description                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pdtq                                                                                                                                 | M | 1           | 201 Created    | Successful case. A representation of the created "Individual PDTQ Policy Subscription" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                          |

**Table 5.31.1.2.3.3-4: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-pdtq-policy-negotiation/<apiVersion>/{afId}/subscriptions/{subscriptionId} |

#### 5.31.1.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.31.1.3 Resource: Individual PDTQ Policy Subscription

#### 5.31.1.3.1 Introduction

This resource represents an "Individual PDTQ Policy Subscription" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

#### 5.31.1.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-pdtq-policy-negotiation/<apiVersion>/{afId}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.31.1.3.2-1.

**Table 5.31.1.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                                                                       |
|----------------|-----------|----------------------------------------------------------------------------------|
| apiRoot        | string    | See clause 5.31.0.                                                               |
| afId           | string    | Represents the identifier of the AF.                                             |
| subscriptionId | string    | Represents the identifier of the "Individual PDTQ Policy Subscription" resource. |

### 5.31.1.3.3 Resource Standard Methods

#### 5.31.1.3.3.1 Void

#### 5.31.1.3.3.2 GET

The HTTP GET method allows to retrieve an existing "Individual PDTQ Policy Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.31.1.3.3.2-1.

**Table 5.31.1.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.31.1.3.3.2-2 and the response data structures and response codes specified in table 5.31.1.3.3.2-3.

**Table 5.31.1.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.31.1.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pdtq                                                                                                                                | M | 1           | 200 OK                 | Successful case. The requested "Individual PDTQ Policy Subscription" resource is successfully returned in the response body.                                                                                                                          |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.31.1.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.31.1.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.31.1.3.3.3 PATCH

The HTTP PATCH method allows to modify an existing "Individual PDTQ Policy Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.31.1.3.3.3-1.

**Table 5.31.1.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.31.1.3.3.3-2 and the response data structures and response codes specified in table 5.31.1.3.3.3-3.

**Table 5.31.1.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type | P | Cardinality | Description                                                                                   |
|-----------|---|-------------|-----------------------------------------------------------------------------------------------|
| PdtqPatch | M | 1           | Represents the requested modifications to the "Individual PDTQ Policy Subscription" resource. |

**Table 5.31.1.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                             | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pdtq                                                                                                                                  | M | 1           | 200 OK                 | Successful response. The "Individual PDTQ Policy Subscription " resource is successfully modified and a representation of the updated resource is returned in the response body.                                                                      |
| n/a                                                                                                                                   |   |             | 204 No Content         | Successful response. The "Individual PDTQ Policy Subscription" resource is successfully modified and no content is returned in the response body.                                                                                                     |
| n/a                                                                                                                                   |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                   |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.31.1.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.31.1.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.31.1.3.3.4 DELETE

The HTTP DELETE method allows to delete an existing "Individual PDTQ Policy Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.31.1.3.3.4.-1.

**Table 5.31.1.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.31.1.3.3.4-2 and the response data structures and response codes specified in table 5.31.1.3.3.4-3.

**Table 5.31.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.31.1.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-----------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful case. The "Individual PDTQ Policy Subscription" resource is successfully deleted.                                                                                                                                                          |
| n/a       |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a       |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply.

**Table 5.31.1.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.31.1.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.31.1.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.31.1A Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.31.2 Notifications

### 5.31.2.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.31.2.1-1: Notifications overview**

| Notification              | Callback URI | HTTP method or custom operation | Description (service operation)                                                |
|---------------------------|--------------|---------------------------------|--------------------------------------------------------------------------------|
| PDTQ Warning Notification | {notifUri}   | POST                            | Enables the NEF to notify a previously subscribed AF on PDTQ warning event(s). |

### 5.31.2.2 PDTQ Warning Notification

#### 5.31.2.2.1 Description

This notification is used by the NEF to notify a previously subscribed AF on PDTQ warning event(s), i.e., the changed conditions for a planned data transfer with QoS requirements (e.g., a network performance or DN performance in the area of interest reaches the criteria set by the operator).

#### 5.31.2.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 5.31.2.2.2-1.

**Table 5.31.2.2.2-1: Callback URI variables**

| Name     | Definition                                                          |
|----------|---------------------------------------------------------------------|
| notifUri | Represents the callback URI encoded as a string formatted as a URI. |

### 5.31.2.2.3 Operation Definition

#### 5.31.2.2.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.31.2.2.3.1-1 and the response data structures and response codes specified in table 5.31.2.2.3.1-2.

**Table 5.31.2.2.3.1-1: Data structures supported by the POST Request Body**

| Data type        | P | Cardinality | Description                               |
|------------------|---|-------------|-------------------------------------------|
| PdtqNotification | M | 1           | Represents the PDTQ Warning Notification. |

**Table 5.31.2.2.3.1-2: Data structures supported by the POST Response Body**

| Data type                                                                                                                            | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                  |             | 204 No Content         | Successful case. The notification is successfully received and acknowledged.                                                                                                                                                                                                                   |
| n/a                                                                                                                                  |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                  |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |             |                        |                                                                                                                                                                                                                                                                                                |

**Table 5.31.2.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.31.2.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.31.3 Data Model

### 5.31.3.1 General

This clause specifies the application data model supported by the PdtqPolicyNegotiation API. Table 5.31.3.1-1 specifies the data types defined for the PdtqPolicyNegotiation API.

**Table 5.31.3.1-1: PdtqPolicyNegotiation API specific Data Types**

| Data type        | Clause defined | Description                                                           | Applicability |
|------------------|----------------|-----------------------------------------------------------------------|---------------|
| Pdtq             | 5.31.3.3.2     | Represents a PDTQ Policy Subscription.                                |               |
| PdtqNotification | 5.31.3.3.4     | Represents a PDTQ Warning Notification.                               |               |
| PdtqPatch        | 5.31.3.3.3     | Represents the requested modifications to a PDTQ Policy Subscription. |               |

Table 5.31.3.1-2 specifies data types re-used by the PdtqPolicyNegotiation API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the PdtqPolicyNegotiation API.

**Table 5.31.3.1-2: PdtqPolicyNegotiation API re-used Data Types**

| Data type         | Reference           | Comments                                                                                                         |
|-------------------|---------------------|------------------------------------------------------------------------------------------------------------------|
| AltQosParamSet    | 3GPP TS 29.543 [68] | Represents the alternative QoS requirements expressed as a list of individual QoS parameters sets.               |
| ApplicationId     | 3GPP TS 29.571 [8]  | Represents the application identifier.                                                                           |
| LocationArea5G    | 3GPP TS 29.122 [4]  | Represents the user location area information.                                                                   |
| PdtqPolicy        | 3GPP TS 29.543 [68] | Represents a PDTQ policy.                                                                                        |
| PdtqReferenceId   | 3GPP TS 29.543 [68] | Represents a PDTQ Reference ID.                                                                                  |
| QosParameterSet   | 3GPP TS 29.543 [68] | Represents the QoS requirements expressed as one or more individual QoS parameters.                              |
| SupportedFeatures | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |
| TimeWindow        | 3GPP TS 29.122 [4]  | Represents a time window.                                                                                        |
| Uri               | 3GPP TS 29.122 [4]  | Represents a URI.                                                                                                |

### 5.31.3.2 Void

### 5.31.3.3 Structured data types

#### 5.31.3.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.31.3.3.2 Type: Pdtq

**Table 5.31.3.3.2-1: Definition of type Pdtq**

| Attribute name  | Data type             | P | Cardinality | Description                                                                                                                                                                                                                 | Applicability |
|-----------------|-----------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| altQosParamSets | array(AltQosParamSet) | O | 1..N        | Contains the alternative QoS requirements expressed as a list of individual QoS parameters sets in a prioritized order.<br><br>The lower the index of the array for a given entry, the higher the priority.<br><br>(NOTE 4) |               |
| altQosRefs      | array(string)         | O | 1..N        | Contains the alternative QoS requirements expressed as a list of QoS References in a prioritized order.<br><br>The lower the index of the array for a given entry, the higher the priority.<br><br>(NOTE 3)                 |               |
| appld           | ApplicationId         | O | 0..1        | Contains the identifier of the application.                                                                                                                                                                                 |               |
| aspld           | string                | M | 1           | Contains the identifier of the application service provider.                                                                                                                                                                |               |
| desTimeInts     | array(TimeWindow)     | M | 1..N        | Contains the time interval(s).                                                                                                                                                                                              |               |
| locationArea5G  | LocationArea5G        | O | 0..1        | Contains the area within which the AF request shall apply.                                                                                                                                                                  |               |

|                                                                                                                                                                                                                                                                                                                                                                                                             |                   |   |      |                                                                                                                                                                                                                                                                                      |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| notifUri                                                                                                                                                                                                                                                                                                                                                                                                    | Uri               | O | 0..1 | Contains the URI via which the PDTQ warning notifications should be delivered.                                                                                                                                                                                                       |  |
| numberOfUEs                                                                                                                                                                                                                                                                                                                                                                                                 | integer           | M | 1    | Contains the number of UEs.                                                                                                                                                                                                                                                          |  |
| pdtqPolicies                                                                                                                                                                                                                                                                                                                                                                                                | array(PdtqPolicy) | O | 1..N | Contains the PDTQ policies.                                                                                                                                                                                                                                                          |  |
| qosParamSet                                                                                                                                                                                                                                                                                                                                                                                                 | QosParameterSet   | C | 0..1 | Contains the requested QoS requirements expressed as one or more individual QoS parameters.<br><br>(NOTE 2)                                                                                                                                                                          |  |
| qosReference                                                                                                                                                                                                                                                                                                                                                                                                | string            | C | 0..1 | Contains the requested QoS requirements expressed as a QoS Reference.<br><br>(NOTE 2)                                                                                                                                                                                                |  |
| referenceId                                                                                                                                                                                                                                                                                                                                                                                                 | PdtqReferenceId   | O | 0..1 | Contains the identifier of the PDTQ policies of planned data transfer with QoS requirements for an AF.                                                                                                                                                                               |  |
| selectedPolicy                                                                                                                                                                                                                                                                                                                                                                                              | integer           | O | 0..1 | Contains the identity of the selected PDTQ policy.<br><br>This attribute shall not be present during resource creation, it may be provided only in a subsequent resource update.<br><br>(NOTE 5)                                                                                     |  |
| warnNotifEnabled                                                                                                                                                                                                                                                                                                                                                                                            | boolean           | O | 0..1 | Indicates whether the PDTQ warning notification is enabled or not.<br><br>- "true" indicates that the PDTQ warning notification is enabled.<br>- "false" indicates that the PDTQ warning notification is disabled.<br>- The default value is "false" when this attribute is omitted. |  |
| suppFeat                                                                                                                                                                                                                                                                                                                                                                                                    | SupportedFeatures | C | 0..1 | Contains the list of supported features among the ones defined in clause 5.31.4.<br><br>This attribute shall be present only when feature negotiation needs to take place.                                                                                                           |  |
| NOTE 1: Void.<br>NOTE 2: These attributes are mutually exclusive. Either one of them shall be present.<br>NOTE 3: This attribute may be present only if the "qosReference" attribute is present.<br>NOTE 4: This attribute may be present only if the "qosParamSet" attribute is present.<br>NOTE 5: When this attribute is present and set to the value "0", it indicates that no PDTQ policy is selected. |                   |   |      |                                                                                                                                                                                                                                                                                      |  |

### 5.31.3.3.3 Type: PdtqPatch

**Table 5.31.3.3.3-1: Definition of type PdtqPatch**

| Attribute name   | Data type | P | Cardinality | Description                                                                                                                                 | Applicability |
|------------------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| selectedPolicy   | integer   | O | 0..1        | Contains the identifier of the selected PDTQ policy.<br><br>(NOTE)                                                                          |               |
| warnNotifEnabled | boolean   | O | 0..1        | Indicates whether the PDTQ warning notification is enabled or not.<br><br>- "true" indicates that the PDTQ warning notification is enabled; |               |



|                                                                                                              |     |   |      |                                                                                        |  |
|--------------------------------------------------------------------------------------------------------------|-----|---|------|----------------------------------------------------------------------------------------|--|
|                                                                                                              |     |   |      | - "false" indicates that the PDTQ warning notification is not enabled.                 |  |
| notifUri                                                                                                     | Uri | O | 0..1 | Contains the updated URI via which the PDTQ warning notifications should be delivered. |  |
| NOTE: When this attribute is present and set to the value "0", it indicates that no PDTQ policy is selected. |     |   |      |                                                                                        |  |

#### 5.31.3.3.4 Type: PdtqNotification

**Table 5.31.3.3.4-1: Definition of type Notification**

| Attribute name | Data type         | P | Cardinality | Description                                                                                    | Applicability |
|----------------|-------------------|---|-------------|------------------------------------------------------------------------------------------------|---------------|
| pdtqRefId      | PdtqReferenceId   | M | 1           | Contains the identifier of the PDTQ policy to which the notification corresponds.              |               |
| candPolicies   | array(PdtqPolicy) | M | 1..N        | Contains a list of the candidate PDTQ policies from which the AF may select a new PDTQ policy. |               |

### 5.31.3.4 Simple data types and enumerations

#### 5.31.3.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.31.3.4.2 Simple data types

The simple data types defined in table 5.31.3.4.2-1 shall be supported.

**Table 5.31.3.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.31.3.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

## 5.31.4 Used Features

The optional features listed in table 5.31.4-1 are defined for the PdtqPolicyNegotiation API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.31.4-1: Features used by PdtqPolicyNegotiation API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.31.5 Error handling

### 5.31.5.1 General

For the PdtqPolicyNegotiation API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the PdtqPolicyNegotiation API.

### 5.31.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the PdtqPolicyNegotiation API.

### 5.31.5.3 Application Errors

The application errors defined for PdtqPolicyNegotiation API are listed in table 5.31.5.3-1.

**Table 5.31.5.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.32 MemberUESelectionAssistance API

### 5.32.1 Introduction

The Nnef\_MemberUESelectionAssistance service shall use the MemberUESelectionAssistance API.

The API URI of MemberUESelectionAssistance API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [2], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-musa".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.32.2 Resources

#### 5.32.2.1 Overview

This clause describes the structure for the Resource URIs as shown in Figure 5.32.2.1-1 and the resources and HTTP methods used for the MemberUESelectionAssistance API.

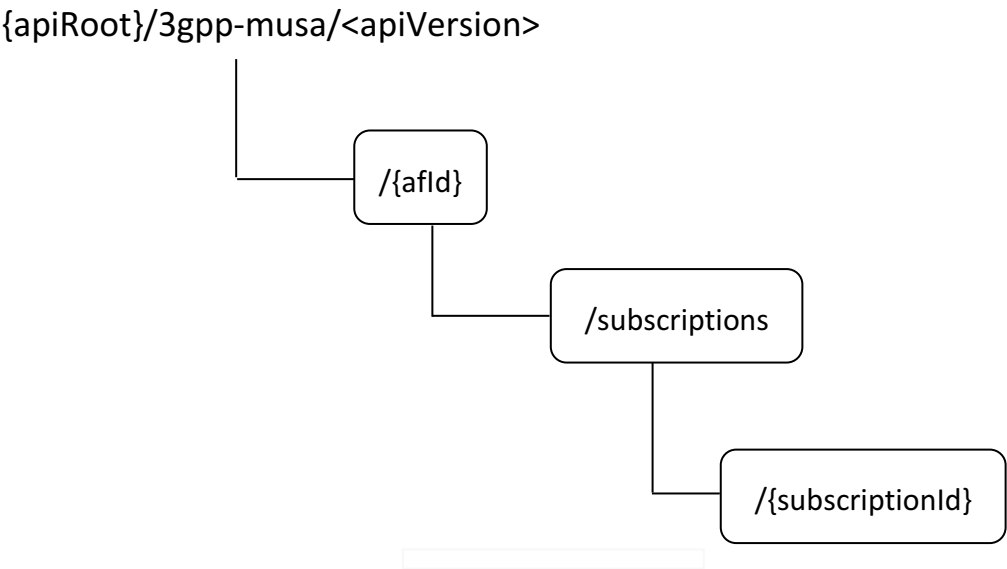


Figure 5.32.2.1-1: Resource URI structure of the MemberUESelectionAssistance API

Table 5.32.2.1-1 provides an overview of the resources and applicable HTTP methods applicable for the MemberUESelectionAssistance API.

Table 5.32.2.1-1: Resources and methods overview

| Resource name                                          | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                                         |
|--------------------------------------------------------|--------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------|
| Member UE Selection Assistance Subscriptions           | /{afld}/subscriptions                      | POST                            | Create a new Member UE Selection Assistance Subscription.                               |
|                                                        |                                            | GET                             | Retreive all the active Member UE Selection Assistance Subscription resources.          |
| Individual Member UE Selection Assistance Subscription | /{afld}/subscriptions/{subscriptionId}     | GET                             | Retreive an existing "Individual Member UE Selection Assistance Subscription" resource. |
|                                                        |                                            | PUT                             | Update an existing "Individual Member UE Selection Assistance Subscription" resource.   |
|                                                        |                                            | PATCH                           | Modify an existing "Individual Member UE Selection Assistance Subscription" resource.   |
|                                                        |                                            | DELETE                          | Delete an existing "Individual Member UE Selection Assistance Subscription" resource.   |

5.32.2.2 Resource: Member UE Selection Assistance Subscriptions

5.32.2.2.1 Introduction

This resource represents all the active Member UE Selection Assistance Subscriptions managed by the NEF for a given AF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

#### 5.32.2.2.2 Resource definition

Resource URL: **{apiRoot}/3gpp-musa/<apiVersion>/{afId}/subscriptions**

This resource shall support the resource URL variables defined in table 5.32.2.2.2-1.

**Table 5.32.2.2.2-1: Resource URL variables for this resource**

| Name    | Data type | Definition                           |
|---------|-----------|--------------------------------------|
| apiRoot | string    | See clause 5.32.1.                   |
| afId    | string    | Represents the identifier of the AF. |

#### 5.32.2.2.3 Resource Standard Methods

##### 5.32.2.2.3.1 POST

The HTTP POST method enables to request the creation of a new Member UE Selection Assistance Subscription at the NEF.

This method shall support the URI query parameters specified in table 5.32.2.2.3.1-1.

**Table 5.32.2.2.3.1-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.32.2.2.3.1-2 and the response data structures and response codes specified in table 5.32.2.2.3.1-3.

**Table 5.32.2.2.3.1-2: Data structures supported by the POST request body on this resource**

| Data type              | P | Cardinality | Description                                                                                                      |
|------------------------|---|-------------|------------------------------------------------------------------------------------------------------------------|
| MemUeSelectAssistSubsc | M | 1           | Contains the parameters to request the creation of a new Member UE Selection Assistance Subscription at the NEF. |

**Table 5.32.2.2.3.1-3: Data structures supported by the POST response body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes | Description                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MemUeSelectAssistSubsc                                                                                                               | M | 1           | 201 Created    | Successful case. A representation of the created "Individual Member UE Selection Assistance Subscription" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                                             |

**Table 5.32.2.2.3.1-4: Headers supported by the 201 response code on this resource**

| HTTP response header | Data type | P | Cardinality | Description                                                                                                                                  |
|----------------------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Location             | string    | M | 1           | The URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-musa/<apiVersion>/{afId}/subscriptions/{subscriptionId} |

## 5.32.2.2.3.2 GET

The HTTP GET method enables to retrieve all the active Member UE Selection Assistance Subscriptions managed by the NEF.

This method shall support the URI query parameters specified in table 5.32.2.2.3.2-1.

**Table 5.32.2.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.32.2.2.3.2-2 and the response data structures and response codes specified in table 5.32.2.2.3.2-3.

**Table 5.32.2.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.32.2.2.3.2-3-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(MemUeSelectAssistSubsc)                                                                                                       | M | 0..N        | 200 OK                 | Successful case. All the "Individual Member UE Selection Assistance Subscription" resource(s) managed by the NEF are returned.<br><br>If there are no active "Individual Member UE Selection Assistance Subscription" resources at the NEF, an empty array is returned. |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                   |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                   |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                                         |

**Table 5.32.2.2.3.2-3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.32.2.2.3.2-3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.32.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

#### 5.32.2.3 Resource: Individual Member UE Selection Assistance Subscription

##### 5.32.2.3.1 Introduction

This resource represents an "Individual Member UE Selection Assistance Subscription" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

##### 5.32.2.3.2 Resource Definition

Resource URL: **{apiRoot}/3gpp-musa/<apiVersion>/{afId}/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 5.32.2.3.2-1.

**Table 5.32.2.3.2-1: Resource URL variables for this resource**

| Name           | Data type | Definition                                                                                          |
|----------------|-----------|-----------------------------------------------------------------------------------------------------|
| apiRoot        | string    | See clause 5.32.1.                                                                                  |
| afId           | string    | Represents the identifier of the AF.                                                                |
| subscriptionId | string    | Represents the identifier of the "Individual Member UE Selection Assistance Subscription" resource. |

##### 5.32.2.3.3 Resource Standard Methods

###### 5.32.2.3.3.1 GET

The HTTP GET method enables to retrieve an existing "Individual Member UE Selection Assistance Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.32.2.3.3.1-1.

**Table 5.32.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.32.2.3.3.1-2 and the response data structures and response codes specified in table 5.32.2.3.3.1-3.

**Table 5.32.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.32.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type              | P | Cardinality | Response codes         | Description                                                                                                                                                      |
|------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MemUeSelectAssistSubsc | M | 1           | 200 OK                 | Successful case. The requested "Individual Member UE Selection Assistance Subscription" resource is returned in the response body.                               |
| n/a                    |   |             | 307 Temporary Redirect | Temporary redirection.<br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF. |

|                                                                                                                                     |  |  |                              |                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                     |  |  |                              | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                                                                                             |
| n/a                                                                                                                                 |  |  | 308<br>Permanent<br>Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                              |                                                                                                                                                                                                                                                       |

**Table 5.32.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.32.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.32.2.3.3.2 PUT**

The HTTP PUT method enables to request the update of an existing "Individual Member UE Selection Assistance Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.32.2.3.3.2-1.

**Table 5.32.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.32.2.3.3.2-2 and the response data structures and response codes specified in table 5.32.2.3.3.2-4.

**Table 5.32.2.3.3.2-2: Data structures supported by the PUT request body on this resource**

| Data type              | P | Cardinality | Description                                                                                            |
|------------------------|---|-------------|--------------------------------------------------------------------------------------------------------|
| MemUeSelectAssistSubsc | M | 1           | Contains the updated "Individual Member UE Selection Assistance Subscription" resource representation. |

**Table 5.32.2.3.3.2-3: Data structures supported by the PUT response body on this resource**

| Data type              | P | Cardinality | Response codes | Description                                                                                                                                                                                       |
|------------------------|---|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MemUeSelectAssistSubsc | M | 1           | 200 OK         | Successful response. The "Individual Member UE Selection Assistance Subscription" resource is successfully updated and a representation of the updated resource is returned in the response body. |
| n/a                    |   |             | 204 No Content | Successful response. The "Individual Member UE Selection Assistance Subscription" resource is successfully                                                                                        |

|                                                                                                                                     |  |  |                        |                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                     |  |  |                        | updated and no content is returned in the response body.                                                                                                                                                                                              |
| n/a                                                                                                                                 |  |  | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |  |  | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                       |

**Table 5.32.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.32.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.32.2.3.3.3 PATCH

This method enables to request the modification of an existing "Individual Member UE Selection Assistance Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.32.2.3.3.3-1.

**Table 5.32.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.32.2.3.3.3-2 and the response data structures and response codes specified in table 5.32.2.3.3.3-3.

**Table 5.32.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type                    | P | Cardinality | Description                                                                                                    |
|------------------------------|---|-------------|----------------------------------------------------------------------------------------------------------------|
| MemUeSelectAssistSubsc Patch | M | 1           | Contains the requested modifications to the "Individual Member UE Selection Assistance Subscription" resource. |

**Table 5.32.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
|-----------|---|-------------|----------------|-------------|



|                                                                                                                                       |   |   |                        |                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------|---|---|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MemUeSelectAssistSubsc                                                                                                                | M | 1 | 200 OK                 | Successful response. The "Individual Member UE Selection Assistance Subscription" resource is successfully modified and a representation of the updated resource is returned in the response body.                                                    |
| n/a                                                                                                                                   |   |   | 204 No Content         | Successful response. The "Individual Member UE Selection Assistance Subscription" resource is successfully modified and no content is returned in the response body.                                                                                  |
| n/a                                                                                                                                   |   |   | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                   |   |   | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |   |                        |                                                                                                                                                                                                                                                       |

**Table 5.32.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.32.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.32.2.3.3.4 DELETE

The HTTP DELETE method enables to request the deletion of an existing "Individual Member UE Selection Assistance Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.32.2.3.3.4-1.

**Table 5.32.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.32.2.3.3.4-2 and the response data structures and response codes specified in table 5.32.2.3.3.4-3.

**Table 5.32.2.3.3.4-2: Data structures supported by the DELETE request body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.32.2.3.3.4-3: Data structures supported by the DELETE response body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful response. The "Individual Member UE Selection Assistance Subscription" resource is successfully deleted.                                                                                                                                   |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.32.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.32.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.32.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.32.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.32.4 Notifications

### 5.32.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.32.4.1-1: Notifications overview**

| Notification                                | Callback URI | HTTP method or custom operation | Description (service operation)                                                        |
|---------------------------------------------|--------------|---------------------------------|----------------------------------------------------------------------------------------|
| Member UE Selection Assistance Notification | {notifUri}   | POST                            | Enable the NEF to notify a previously subscribed AF on Member UE Selection Assistance. |

## 5.32.4.2 Member UE Selection Assistance Notification

### 5.32.4.2.1 Description

The Member UE Selection Assistance Notification is used by the NEF to report Member UE Selection Assistance related event(s) to a previously subscribed AF.

### 5.32.4.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 5.32.4.2.2-1.

**Table 5.32.4.2.2-1: Callback URI variables**

| Name     | Definition                                                          |
|----------|---------------------------------------------------------------------|
| notifUri | Represents the callback URI encoded as a string formatted as a URI. |

### 5.32.4.2.3 Operation Definition

This method shall support the request data structures specified in table 5.32.4.2.3-1 and the response data structures and response codes specified in table 5.32.4.2.3-2.

**Table 5.32.4.2.3-1: Data structures supported by the POST Request Body on this resource**

| Data type                     | P | Cardinality | Description                                                 |
|-------------------------------|---|-------------|-------------------------------------------------------------|
| array(MemUeSel etAssistNotif) | M | 1..N        | Represents the Member UE Selection Assistance Notification. |

**Table 5.32.4.2.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                  |   |             | 204 No Content         | Successful case. The notification is successfully received and acknowledged.                                                                                                                                                                                                                   |
| n/a                                                                                                                                  |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                  |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                |

**Table 5.32.4.2.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.32.4.2.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.32.5 Data Model

### 5.32.5.1 General

This clause specifies the application data model supported by the MemberUESelectionAssistance API. Table 5.32.5.1-1 specifies the data types defined for the MemberUESelectionAssistance API.

**Table 5.32.5.1-1: MemberUESelectionAssistance API specific Data Types**

| Data type                   | Clause defined | Description                                                                                                 |
|-----------------------------|----------------|-------------------------------------------------------------------------------------------------------------|
| AccessRatTypeFilterCriteria | 5.32.5.2.5     | Represents the Access types and Rat types filtering criteria for Member UE selection.                       |
| CandUeInfo                  | 5.32.5.2.16    | Represents the candidate UE information.                                                                    |
| CandiUeListInfo             | 5.32.5.2.13    | Represents the lists of candidate UEs and recommended time window for performing the application operation. |
| DnnFilterCriteria           | 5.32.5.2.12    | Represents the DNN filtering criteria for Member UE selection.                                              |
| E2ETransTimeFilterCriteria  | 5.32.5.2.6     | Represents the End-to-end data volume transfer time filtering criteria for Member UE selection.             |
| FilterCriterionType         | 5.32.5.3.3     | Represents the filter criterion type.                                                                       |
| MemUeSeletAssistNotif       | 5.32.5.2.3     | Represents a Member UE Selection Assistance Notification.                                                   |
| MemUeSelectAssistSubsc      | 5.32.5.2.2     | Represents a Member UE Selection Assistance Subscription.                                                   |
| MemUeSelectAssistSubscPatch | 5.32.5.2.15    | Represents parameters to request the modification of a Member UE Selection Assistance Subscription.         |
| MemUeSeletReport            | 5.32.5.2.14    | Represents a Member UE selection report.                                                                    |
| UeDirectionFilterCriteria   | 5.32.5.2.9     | Represents the UE direction filtering criteria for Member UE selection.                                     |
| UeDistanceFilterCriteria    | 5.32.5.2.10    | Represents the UE distance filtering criteria for Member UE selection.                                      |
| UeHisLocFilterCriteria      | 5.32.5.2.8     | Represents the UE historical location filtering criteria for Member UE selection.                           |
| UeLocFilterCriteria         | 5.32.5.2.7     | Represents the UE location filtering criteria for Member UE selection.                                      |
| QoSFilterCriteria           | 5.32.5.2.4     | Represents the QoS filtering criteria for Member UE selection.                                              |
| ServiceExpFilterCriteria    | 5.32.5.2.11    | Represents the Service Experience filtering criteria for Member UE selection.                               |

Table 5.32.5.1-2 specifies data types re-used by the MemberUESelectionAssistance API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the MemberUESelectionAssistance API.

**Table 5.32.5.1-2: MemberUESelectionAssistance API re-used Data Types**

| Data type              | Reference           | Comments                                                             | Applicability |
|------------------------|---------------------|----------------------------------------------------------------------|---------------|
| AccessType             | 3GPP TS 29.571 [8]  | Represents the access type.                                          |               |
| AmfEventType           | 3GPP TS 29.518 [18] | Represents the events exposed by an AMF.                             |               |
| DataVolumeTransferTime | 3GPP TS 29.520 [27] | Represents the End-to-end data volume transfer time.                 |               |
| DateTime               | 3GPP TS 29.122 [4]  | Represents a date and a time.                                        |               |
| DurationSec            | 3GPP TS 29.122 [4]  | Represents the duration time in units of seconds.                    |               |
| DurationSecRm          | 3GPP TS 29.122 [4]  | Represents the time duration, same as the DurationSec data type, but |               |

|                       |                     |                                                                                                               |  |
|-----------------------|---------------------|---------------------------------------------------------------------------------------------------------------|--|
|                       |                     | with the OpenAPI "nullable: true" property.                                                                   |  |
| Direction             | 3GPP TS 29.520 [27] | Represents the UE direction.                                                                                  |  |
| Dnai                  | 3GPP TS 29.571 [8]  | Represents a user plane access to one or more DN(s).                                                          |  |
| Dnn                   | 3GPP TS 29.571 [8]  | Represents a DNN.                                                                                             |  |
| Gpsi                  | 3GPP TS 29.571 [8]  | Represents a GPSI.                                                                                            |  |
| GeoDistributionInfo   | 3GPP TS 29.520 [27] | Represents the geographical distribution of the UEs.                                                          |  |
| IpAddr                | 3GPP TS 29.571 [8]  | Represents an IP address.                                                                                     |  |
| LocationArea5G        | 3GPP TS 29.122 [4]  | Represents a user location area when the UE is attached to 5G.                                                |  |
| NwdafEvent            | 3GPP TS 29.520 [27] | Represents the events exposed by an NWDAF.                                                                    |  |
| RatType               | 3GPP TS 29.571 [8]  | Represents the RAT types.                                                                                     |  |
| ServiceExperienceType | 3GPP TS 29.520 [27] | Represents the type of Service Experience Analytics.                                                          |  |
| SmfEvent              | 3GPP TS 29.508 [26] | Represents the events exposed by an SMF.                                                                      |  |
| Snssai                | 3GPP TS 29.571 [8]  | Represents an S-NSSAI.                                                                                        |  |
| SupportedFeatures     | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features. |  |
| TimeWindow            | 3GPP TS 29.122 [4]  | Represents a time window.                                                                                     |  |
| UInteger              | 3GPP TS 29.571 [8]  | Represents an unsigned integer.                                                                               |  |
| Uri                   | 3GPP TS 29.122 [4]  | Represents a URI.                                                                                             |  |

### 5.32.5.2 Structured data types

#### 5.32.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.32.5.2.2 Type: MemUeSelectAssistSubsc

**Table 5.32.5.2.2-1: Definition of type MemUeSelectAssistSubsc**

| Attribute name | Data type                | P | Cardinality | Description                                                                                                                    | Applicability |
|----------------|--------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------|---------------|
| afld           | string                   | O | 0..1        | Contains the identifier of the AF.                                                                                             |               |
| tgtUelds       | array(Gpsi)              | C | 1..N        | Identifies the list of identifier(s) of the UE(s) for which Member UE Selection Assistance Reporting is requested.<br>(NOTE 2) |               |
| tgtUelps       | array(IpAddr)            | C | 1..N        | Contains the IP address(es) of the UE(s) for which Member UE Selection Assistance Reporting is requested.<br>(NOTE 2)          |               |
| notifUri       | Uri                      | M | 1           | Contains the URI via which Member UE Selection Assistance notifications shall be delivered.                                    |               |
| notifId        | string                   | M | 1           | Contains the Notification Correlation ID assigned by the AF.                                                                   |               |
| qosFilters     | array(QoSFilterCriteria) | C | 1..N        | Contains the QoS filtering criteria for Member UE selection.                                                                   |               |

|                                                                                   |                                    |   |      |                                                                                                                                                                     |  |
|-----------------------------------------------------------------------------------|------------------------------------|---|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                                                   |                                    |   |      | (NOTE 1)                                                                                                                                                            |  |
| accRatTypeFilters                                                                 | array(AccessRatTypeFilterCriteria) | C | 1..N | Contains The Access types and Rat types filtering criteria for Member UE selection.<br>(NOTE 1)                                                                     |  |
| e2eTransTimeFilters                                                               | array(E2ETransTimeFilterCriteria)  | C | 1..N | Contains the End-to-end data volume transfer time filtering criteria for Member UE selection.<br>(NOTE 1)                                                           |  |
| ueLocFilters                                                                      | array(UeLocFilterCriteria)         | C | 1..N | Contains the UE location filtering criteria for Member UE selection.<br>(NOTE 1)                                                                                    |  |
| ueHisLocFilters                                                                   | array(UeHisLocFilterCriteria)      | C | 1..N | Contains the UE historical location filtering criteria for Member UE selection.<br>(NOTE 1)                                                                         |  |
| ueDirFilters                                                                      | array(UeDirectionFilterCriteria)   | C | 1..N | Contains the UE direction filtering criteria for Member UE selection.<br>(NOTE 1)                                                                                   |  |
| ueDistanceFilters                                                                 | array(UeDistanceFilterCriteria)    | C | 1..N | Contains the UE distance filtering criteria for Member UE selection.<br>(NOTE 1)                                                                                    |  |
| serviceExpFilters                                                                 | array(ServiceExpFilterCriteria)    | C | 1..N | Contains the Service Experience filtering criteria for Member UE selection.<br>(NOTE 1)                                                                             |  |
| dnnFilters                                                                        | array(DnnFilterCriteria)           | C | 1..N | Contains the DNN filtering criteria for Member UE selection.<br>(NOTE 1)                                                                                            |  |
| memUpdatePeriod                                                                   | DurationSec                        | O | 0..1 | Contains the periodicity information for updating the member UEs.                                                                                                   |  |
| maxUeNum                                                                          | UInteger                           | O | 0..1 | Contains The maximum number of candidate UEs.                                                                                                                       |  |
| timeWin                                                                           | TimeWindow                         | O | 0..1 | Contains the start time and end time for selecting the candidate UEs.                                                                                               |  |
| expTime                                                                           | DateTime                           | O | 0..1 | Contains the subscription expiry time.                                                                                                                              |  |
| suppFeat                                                                          | SupportedFeatures                  | C | 0..1 | Contains the list of Supported features used as defined in clause 5.32.6.<br><br>This attribute shall be present only when feature negotiation needs to take place. |  |
| NOTE 1: At least one of these attributes shall be present.                        |                                    |   |      |                                                                                                                                                                     |  |
| NOTE 2: These attributes are mutually exclusive and one of them shall be present. |                                    |   |      |                                                                                                                                                                     |  |

## 5.32.5.2.3 Type: MemUeSeletAssistNotif

**Table 5.32.5.2.3-1: Definition of type MemUeSeletAssistNotif**

| Attribute name  | Data type               | P | Cardinality | Description                                                     | Applicability |
|-----------------|-------------------------|---|-------------|-----------------------------------------------------------------|---------------|
| notifId         | string                  | M | 1           | Contains the Notification Correlation ID.                       |               |
| candiUeInfos    | array(CandiUeListInfo)  | M | 1..N        | Contains the list of candidate UEs and the related information. |               |
| memUeSelectRpts | array(MemUeSeletReport) | O | 1..N        | Contains the Member UE Selection report(s).                     |               |

## 5.32.5.2.4 Type: QoSFilterCriteria

**Table 5.32.5.2.4-1: Definition of type QoSFilterCriteria**

| Attribute name | Data type | P | Cardinality | Description                                                                                                                                            | Applicability |
|----------------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| event          | SmfEvent  | O | 0..1        | Contains the SMF event which may be used to retrieve the QoS monitoring information.<br><br>The only applicable value for this attribute is "QOS_MON". |               |
| applId         | string    | O | 0..1        | Contains the identifier of the targeted application.                                                                                                   |               |
| dnn            | Dnn       | O | 0..1        | Contains the DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.                      |               |
| snssai         | Snssai    | O | 0..1        | Contains the network slice information.                                                                                                                |               |
| ulDelay        | UInteger  | O | 0..1        | Contains the uplink packet delay in units of milliseconds.                                                                                             |               |
| dlDelay        | UInteger  | O | 0..1        | Contains the downlink packet delay in units of milliseconds.                                                                                           |               |
| rtDelay        | UInteger  | O | 0..1        | Contains the round trip delay in units of milliseconds.                                                                                                |               |

## 5.32.5.2.5 Type: AccessRatTypeFilterCriteria

**Table 5.32.5.2.5-1: Definition of type AccessRatTypeFilterCriteria**

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                                                                              | Applicability |
|----------------|-------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| events         | array(SmfEvent)   | O | 1..N        | Contains the SMF event(s) which may be used to retrieve the Access Type and/or RAT Type of the selected UE.<br><br>The only applicable values within each array element of this attribute are "AC_TY_CH" or "RAT_TY_CH". |               |
| dnn            | Dnn               | O | 0..1        | Contains a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.                                                                                          |               |
| snssai         | Snssai            | O | 0..1        | Contains the network slice information.                                                                                                                                                                                  |               |
| accTypes       | array(AccessType) | O | 1..N        | Contains the Access Type of the selected UE.                                                                                                                                                                             |               |

|          |                |   |      |                                              |  |
|----------|----------------|---|------|----------------------------------------------|--|
| ratTypes | array(RatType) | O | 1..N | Contains the RAT Type(s) of the selected UE. |  |
|----------|----------------|---|------|----------------------------------------------|--|

#### 5.32.5.2.6 Type: E2ETransTimeFilterCriteria

**Table 5.32.5.2.6-1: Definition of type E2ETransTimeFilterCriteria**

| Attribute name   | Data type                  | P | Cardinality | Description                                                                                                                                                                        | Applicability |
|------------------|----------------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| event            | NwdafEvent                 | O | 0..1        | Contains the NWDAF event which may be used to retrieve the End-to-end data volume transfer time.<br><br>The only applicable value for this attribute is "E2E_DATA_VOL_TRANS_TIME". |               |
| appld            | string                     | O | 0..1        | Contains the identifier of the targeted application.                                                                                                                               |               |
| dnn              | Dnn                        | O | 0..1        | Contains the DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.                                                  |               |
| snssai           | Snssai                     | O | 0..1        | Contains the network slice information.                                                                                                                                            |               |
| dataVolTransTime | DataVolumeTransferTime     | O | 0..1        | Contains the E2E data volume transfer time and the data volume used to derive the transfer time.                                                                                   |               |
| geoDistrInfos    | array(GeoDistributionInfo) | O | 1..N        | Contains the request for geographical distribution of UEs.                                                                                                                         |               |
| locationArea     | LocationArea5G             | O | 0..1        | Contains the location area of the candidate UEs.                                                                                                                                   |               |
| numDataTrans     | UInteger                   | O | 0..1        | Contains the target number of data transmission repetitions.                                                                                                                       |               |
| timeInterval     | DurationSec                | O | 0..1        | Contains the target time interval (in units of seconds) between data transmissions.                                                                                                |               |

#### 5.32.5.2.7 Type: UeLocFilterCriteria

**Table 5.32.5.2.7-1: Definition of type UeLocFilterCriteria**

| Attribute name | Data type      | P | Cardinality | Description                                                                                                                                     | Applicability |
|----------------|----------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| event          | AmfEventType   | O | 0..1        | Contains the AMF event which may be used to retrieve the UE location.<br><br>The only applicable value for this attribute is "LOCATION_REPORT". |               |
| loc            | LocationArea5G | O | 0..1        | Contains the location area within which the selected UE is currently located.                                                                   |               |



## 5.32.5.2.8 Type: UeHisLocFilterCriteria

**Table 5.32.5.2.8-1: Definition of type UeHisLocFilterCriteria**

| Attribute name | Data type      | P | Cardinality | Description                                                                                                                                   | Applicability |
|----------------|----------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| event          | NwdafEvent     | O | 0..1        | Contains the NWDAF event which may be used to retrieve the UE Mobility.<br><br>The only applicable value for this attribute is "UE_MOBILITY". |               |
| loc            | LocationArea5G | O | 0..1        | Contains the historical location of the UEs.                                                                                                  |               |

## 5.32.5.2.9 Type: UeDirectionFilterCriteria

**Table 5.32.5.2.9-1: Definition of type UeDirectionFilterCriteria**

| Attribute name | Data type        | P | Cardinality | Description                                                                                                                                   | Applicability |
|----------------|------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| event          | NwdafEvent       | O | 0..1        | Contains the NWDAF event which may be used to retrieve the UE Mobility.<br><br>The only applicable value for this attribute is "UE_MOBILITY". |               |
| directions     | array(Direction) | O | 1..N        | Contains the moving directions of the UEs.                                                                                                    |               |

## 5.32.5.2.10 Type: UeDistanceFilterCriteria

**Table 5.32.5.2.10-1: Definition of type UeDistanceFilterCriteria**

| Attribute name | Data type  | P | Cardinality | Description                                                                                                                                                 | Applicability |
|----------------|------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| event          | NwdafEvent | O | 0..1        | Contains the NWDAF event which may be used to retrieve the Relative Proximity.<br><br>The only applicable value for this attribute is "RELATIVE_PROXIMITY". |               |
| distance       | UInteger   | O | 0..1        | Contains the minimum UE to UE separating distance of the selected UEs.                                                                                      |               |

## 5.32.5.2.11 Type: ServiceExpFilterCriteria

**Table 5.32.5.2.11-1: Definition of type ServiceExpFilterCriteria**

| Attribute name | Data type  | P | Cardinality | Description                                                                                                                                                 | Applicability |
|----------------|------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| event          | NwdafEvent | O | 0..1        | Contains the NWDAF event which may be used to retrieve the Service Experience.<br><br>The only applicable value for this attribute is "SERVICE_EXPERIENCE". |               |
| snssai         | Snssai     | O | 0..1        | Contains the network slice information.                                                                                                                     |               |

|                  |                              |   |      |                                                                                                                                   |  |
|------------------|------------------------------|---|------|-----------------------------------------------------------------------------------------------------------------------------------|--|
| dnn              | Dnn                          | O | 0..1 | Contains the DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. |  |
| appld            | string                       | O | 0..1 | Contains the identifier of the targeted application.                                                                              |  |
| dnai             | Dnai                         | O | 0..1 | Contains the DNAI indicating the user plane access to DN to which the subscription applies.                                       |  |
| loc              | LocationArea5G               | O | 0..1 | Contains the area of interest.                                                                                                    |  |
| contribWeightThr | UInteger                     | O | 0..1 | Contains the Service Experience Contribution weight reporting threshold.                                                          |  |
| expTypes         | array(ServiceExperienceType) | O | 1..N | Contains the Service Experience Type.                                                                                             |  |

## 5.32.5.2.12 Type: DnnFilterCriteria

Table 5.32.5.2.12-1: Definition of type DnnFilterCriteria

| Attribute name | Data type | P | Cardinality | Description                                                                                                                       | Applicability |
|----------------|-----------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------|
| event          | SmfEvent  | O | 0..1        | Contains the SMF event which may be used to retrieve the DNN.<br><br>The only applicable value for this attribute is "QFI_ALLOC". |               |
| dnn            | Dnn       | O | 0..1        | Contains the DNN of the selected UE for the PDU Session used by the application.                                                  |               |

## 5.32.5.2.13 Type: CandiUeListInfo

Table 5.32.5.2.13-1: Definition of type CandiUeListInfo

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                                                                                                                                                  | Applicability |
|----------------|-------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| candUeInfos    | array(CandUeInfo) | M | 1..N        | Contains the list of the identifier(s) of the candidate UE(s).                                                                                                                                                                                                                               |               |
| remdTimeWin    | TimeWindow        | O | 0..1        | Contains the recommended time window for performing the application operation.<br><br>It shall be a subset of the time window specified by "timeWin" attribute of the MemUeSelectAssistSubsc or MemUeSelectAssistSubscPatch data types representing the corresponding subscription resource. |               |

## 5.32.5.2.14 Type: MemUeSeletReport

Table 5.32.5.2.14-1: Definition of type MemUeSeletReport

| Attribute name | Data type           | P | Cardinality | Description                         | Applicability |
|----------------|---------------------|---|-------------|-------------------------------------|---------------|
| criterionType  | FilterCriterionType | M | 1           | Contains the filter criterion type. |               |

|                 |          |   |   |                                                                   |  |
|-----------------|----------|---|---|-------------------------------------------------------------------|--|
| numForCriterion | UInteger | M | 1 | Contains the number of UEs that do not meet the filter criterion. |  |
|-----------------|----------|---|---|-------------------------------------------------------------------|--|

#### 5.32.5.2.15 Type: MemUeSelectAssistSubscPatch

**Table 5.32.5.2.15-1: Definition of type MemUeSelectAssistSubscPatch**

| Attribute name      | Data type                          | P | Cardinality | Description                                                                                           | Applicability |
|---------------------|------------------------------------|---|-------------|-------------------------------------------------------------------------------------------------------|---------------|
| notifUri            | Uri                                | O | 0..1        | Contains the updated URI via which Member UE Selection Assistance notifications shall be delivered.   |               |
| notifId             | string                             | O | 0..1        | Contains the updated Notification Correlation ID assigned by the AF.                                  |               |
| qosFilters          | array(QoSFilterCriteria)           | O | 1..N        | Contains the updated QoS filtering criteria for Member UE selection.                                  |               |
| accRatTypeFilters   | array(AccessRatTypeFilterCriteria) | O | 1..N        | Contains the updated Access types and Rat types filtering criteria for Member UE selection.           |               |
| e2eTransTimeFilters | array(E2ETransTimeFilterCriteria)  | O | 1..N        | Contains the updated End-to-end data volume transfer time filtering criteria for Member UE selection. |               |
| ueLocFilters        | array(UeLocFilterCriteria)         | O | 1..N        | Contains the updated UE location filtering criteria for Member UE selection.                          |               |
| ueHisLocFilters     | array(UeHisLocFilterCriteria)      | O | 1..N        | Contains the updated UE historical location filtering criteria for Member UE selection.               |               |
| ueDirFilters        | array(UeDirectionFilterCriteria)   | O | 1..N        | Contains the updated UE direction filtering criteria for Member UE selection.                         |               |
| ueDistanceFilters   | array(UeDistanceFilterCriteria)    | O | 1..N        | Contains the updated UE distance filtering criteria for Member UE selection.                          |               |
| serviceExpFilters   | array(ServiceExpFilterCriteria)    | O | 1..N        | Contains the updated Service Experience filtering criteria for Member UE selection.                   |               |
| dnnFilters          | array(DnnFilterCriteria)           | O | 1..N        | Contains the updated DNN filtering criteria for Member UE selection.                                  |               |
| expTime             | DateTime                           | O | 0..1        | Contains the updated expiry time of the subscription.                                                 |               |
| memUpdatePeriod     | DurationSecRm                      | O | 0..1        | Contains the updated periodicity information for updating the member UEs.                             |               |
| maxUeNum            | UIntegerRm                         | O | 0..1        | Contains the updated maximum number of candidate UEs.                                                 |               |
| timeWin             | TimeWindow                         | O | 0..1        | Contains the updated the start time and end time for selecting the candidate UEs.                     |               |

#### 5.32.5.2.16 Type: CandUeInfo

**Table 5.32.5.2.16-1: Definition of type CandUeInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
|----------------|-----------|---|-------------|-------------|---------------|

|                                                                                     |                             |   |      |                                                                                               |  |
|-------------------------------------------------------------------------------------|-----------------------------|---|------|-----------------------------------------------------------------------------------------------|--|
| candUeld                                                                            | Gpsi                        | C | 0..1 | Contains the GPSI of a candidate UE.<br>(NOTE)                                                |  |
| candUelp                                                                            | IpAddr                      | C | 0..1 | Contains the IP address of a candidate UE.<br>(NOTE)                                          |  |
| qosFilter                                                                           | QoSFilterCriteria           | O | 0..1 | Contains the QoS filtering criteria for Member UE selection.                                  |  |
| accRatTypeFilter                                                                    | AccessRatTypeFilterCriteria | O | 0..1 | Contains the Access types and RAT types filtering criteria for Member UE selection.           |  |
| e2eTransTimeFilter                                                                  | E2ETransTimeFilterCriteria  | O | 0..1 | Contains the End-to-end data volume transfer time filtering criteria for Member UE selection. |  |
| ueLocFilter                                                                         | UeLocFilterCriteria         | O | 0..1 | Contains the UE location filtering criteria for Member UE selection.                          |  |
| ueHisLocFilter                                                                      | UeHisLocFilterCriteria      | O | 0..1 | Contains the UE historical location filtering criteria for Member UE selection.               |  |
| ueDirFilter                                                                         | UeDirectionFilterCriteria   | O | 0..1 | Contains the UE direction filtering criteria for Member UE selection.                         |  |
| ueDistanceFilter                                                                    | UeDistanceFilterCriteria    | O | 0..1 | Contains the UE distance filtering criteria for Member UE selection.                          |  |
| serviceExpFilter                                                                    | ServiceExpFilterCriteria    | O | 0..1 | Contains the Service Experience filtering criteria for Member UE selection.                   |  |
| dnnFilter                                                                           | DnnFilterCriteria           | O | 0..1 | Contains the DNN filtering criteria for Member UE selection.                                  |  |
| NOTE: Either the "candUeld" attribute or the "candUelp" attribute shall be present. |                             |   |      |                                                                                               |  |

### 5.32.5.3 Simple data types and enumerations

#### 5.32.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.32.5.3.2 Simple data types

The simple data types defined in table 5.32.5.3.2-1 shall be supported.

**Table 5.32.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

#### 5.32.5.3.3 Enumeration: FilterCriterionType

The enumeration FilterCriterionType represents the type of filter criterion event for which the AF requests to be notified. It shall comply with the provisions defined in table 5.32.5.3.3-1.

**Table 5.32.5.3.3-1: Enumeration FilterCriterionType**

| Enumeration value             | Description                                                                                    |
|-------------------------------|------------------------------------------------------------------------------------------------|
| QOS                           | Indicates that the type of filter criterion is QoS criterion.                                  |
| ACCESS_RAT_TYPE               | Indicates that the type of filter criterion is Access and Rat types criterion.                 |
| E2E_DATA_VOLUME_TRANSFER_TIME | Indicates that the type of filter criterion is End-to-end data volume transfer time criterion. |
| UE_LOCATION                   | Indicates that the type of filter criterion is UE location criterion.                          |
| UE_HISTORICAL_LOCATION        | Indicates that the type of filter criterion is UE historical location criterion.               |
| UE_DIRECTION                  | Indicates that the type of filter criterion is UE direction criterion.                         |
| UE_DISTANCE                   | Indicates that the type of filter criterion is UE distance criterion.                          |
| SERVICE_EXPERIENCE            | Indicates that the type of filter criterion is Service Experience criterion.                   |
| DNN                           | Indicates that the type of filter criterion is DNN criterion.                                  |

#### 5.32.5.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

#### 5.32.6 Used Features

The optional features listed in table 5.32.6-1 are defined for the MemberUESelectionAssistance API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.32.6-1: Features used by MemberUESelectionAssistance API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

#### 5.32.7 Error handling

##### 5.32.7.1 General

For the MemberUESelectionAssistance API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the MemberUESelectionAssistance API.

##### 5.32.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the MemberUESelectionAssistance API.

##### 5.32.7.3 Application Errors

The application errors defined for the MemberUESelectionAssistance API are listed in table 5.32.7.3-1.

**Table 5.32.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

# 5.33 GroupParametersProvisioning API

## 5.33.1 Introduction

The Nnef\_ParameterProvision service shall use the GroupParametersProvisioning API for:

- DNN and S-NSSAI specific Group Parameters provisioning.

The API URI of the GroupParametersProvisioning API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-grp-pp".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

## 5.33.2 Resources

### 5.33.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.33.2.1-1 and the resources and HTTP methods used for the GroupParametersProvisioning API.

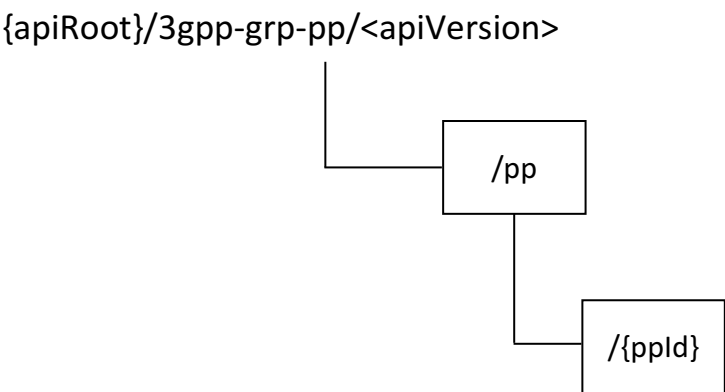


**Figure 5.33.2.1-1: Resource URI structure of the GroupParametersProvisioning API**

Table 5.33.2.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 5.33.2.1-1: Resources and methods overview**

| Resource name                  | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)          |
|--------------------------------|--------------------------------------------|---------------------------------|------------------------------------------|
| Group Parameters Provisionings | /pp                                        | GET                             | Retrieve all the active Group Parameters |

|                                          |            |        |                                                                                     |
|------------------------------------------|------------|--------|-------------------------------------------------------------------------------------|
| Individual Group Parameters Provisioning | /pp/{ppId} |        | Provisionings managed by the NEF.                                                   |
|                                          |            | POST   | Request the creation of a new Group Parameters Provisioning at the NEF.             |
|                                          |            | GET    | Retrieve an existing "Individual Group Parameters Provisioning" managed by the NEF. |
|                                          |            | PUT    | Update an existing "Individual Group Parameters Provisioning" managed by the NEF.   |
|                                          |            | DELETE | Delete an existing "Individual Group Parameters Provisioning" managed by the NEF.   |

### 5.33.2.2 Resource: Group Parameters Provisionings

#### 5.33.2.2.1 Introduction

This resource represents the collection of Group Parameters Provisionings managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [32]).

#### 5.33.2.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-grp-pp/<apiVersion>/pp

This resource shall support the resource URI variables defined in table 5.33.2.2.2-1.

**Table 5.33.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.33.1. |

#### 5.33.2.2.3 Resource Methods

##### 5.33.2.2.3.1 GET

This method enables an AF to request to retrieve all the active "Group Parameters Provisionings" resources managed by the NEF.

This method shall support the URI query parameters specified in table 5.33.2.2.3.1-1.

**Table 5.33.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.33.2.2.3.1-2 and the response data structures and response codes specified in table 5.33.2.2.3.1-3.

**Table 5.33.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.33.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(GrpPpData)                                                                                                                    | M | 0..N        | 200 OK                 | Successful case. All the "Individual Group Parameters Provisioning" resources managed by the NEF are returned.<br><br>If there are no existing "Individual Group Parameters Provisioning" resources managed at the NEF, an empty array is returned.   |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.33.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.33.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.33.2.2.3.2 POST

This method enables an AF to request the creation of a new Group Parameters Provisioning at the NEF.

This method shall support the URI query parameters specified in table 5.33.2.2.3.2-1.

**Table 5.33.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.33.2.2.3.2-2 and the response data structures and response codes specified in table 5.33.2.2.3.2-3.



**Table 5.33.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description                                                                                |
|-----------|---|-------------|--------------------------------------------------------------------------------------------|
| GrpPpData | M | 1           | Contains the representation of the Group Parameters Provisioning to be created at the NEF. |

**Table 5.33.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes | Description                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GrpPpData                                                                                                                            | M | 1           | 201 Created    | Successful case. A representation of the created "Individual Group Parameters Provisioning" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                               |

**Table 5.33.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                 |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-grp-pp/<apiVersion>/pp/{ppId} |

#### 5.33.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.33.2.3 Resource: Individual Group Parameters Provisioning

#### 5.33.2.3.1 Introduction

This resource represents an "Individual Group Parameters Provisioning" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [32]).

#### 5.33.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-grp-pp/<apiVersion>/pp/{ppId}

This resource shall support the resource URI variables defined in table 5.33.2.3.2-1.

**Table 5.33.2.3.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                                                                            |
|---------|-----------|---------------------------------------------------------------------------------------|
| apiRoot | string    | See clause 5.33.1.                                                                    |
| ppId    | string    | Represents the identifier of the "Individual Group Parameters Provisioning" resource. |

#### 5.33.2.3.3 Resource Methods

##### 5.33.2.3.3.1 GET

This method enables an AF to request to retrieve an existing "Individual Group Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.33.2.3.3.1-1.

**Table 5.33.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.33.2.3.3.1-2 and the response data structures and response codes specified in table 5.33.2.3.3.1-3.

**Table 5.33.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.33.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GrpPpData                                                                                                                           | M | 1           | 200 OK                 | Successful case. The requested "Individual Group Parameters Provisioning" resource is returned in the response body.                                                                                                                                  |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.33.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.33.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.33.2.3.3.2 PUT

This method enables an AF to request the update of an existing "Individual Group Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.33.2.3.3.2-1.

**Table 5.33.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.33.2.3.3.2-2 and the response data structures and response codes specified in table 5.33.2.3.3.2-3.

**Table 5.33.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type | P | Cardinality | Description                                                                                |
|-----------|---|-------------|--------------------------------------------------------------------------------------------|
| GrpPpData | M | 1           | Represents the updated "Individual Group Parameters Provisioning" resource representation. |

**Table 5.33.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GrpPpData                                                                                                                           | M | 1           | 200 OK                 | Successful response. The "Individual Group Parameters Provisioning" resource is successfully updated and a representation of the updated resource is returned in the response body.                                                                   |
| n/a                                                                                                                                 |   |             | 204 No Content         | Successful response. The "Individual Group Parameters Provisioning" resource is successfully updated and no content is returned in the response body.                                                                                                 |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.33.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.33.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.33.2.3.3.3 PATCH

This method enables an AF to request the modification of an existing "Individual Group Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.33.2.3.3.3-1.

**Table 5.33.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.33.2.3.3.3-2 and the response data structures and response codes specified in table 5.33.2.3.3.3-3.

**Table 5.33.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type      | P | Cardinality | Description                                                                                        |
|----------------|---|-------------|----------------------------------------------------------------------------------------------------|
| GrpPpDataPatch | M | 1           | Represents the requested modifications to the "Individual Group Parameters Provisioning" resource. |

**Table 5.33.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                             | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GrpPpData                                                                                                                             | M | 1           | 200 OK                 | Successful response. The "Individual Group Parameters Provisioning" resource is successfully modified and a representation of the updated resource is returned in the response body.                                                                  |
| n/a                                                                                                                                   |   |             | 204 No Content         | Successful response. The "Individual Group Parameters Provisioning" resource is successfully modified and no content is returned in the response body.                                                                                                |
| n/a                                                                                                                                   |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                   |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.33.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.33.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

## 5.33.2.3.3.4 DELETE

This method enables an AF to request the deletion of an existing "Individual Group Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.33.2.3.3.4-1.

**Table 5.33.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.33.2.3.3.4-2 and the response data structures and response codes specified in table 5.33.2.3.3.4-3.

**Table 5.33.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.33.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful case. The "Individual Group Parameters Provisioning" resource is successfully deleted.                                                                                                                                                     |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.33.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.33.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

## 5.33.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.33.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.33.4 Notifications

There are no notifications defined for this API in this release of the specification.

### 5.33.5 Data Model

#### 5.33.5.1 General

This clause specifies the application data model supported by the GroupParametersProvisioning API. Table 5.33.5.1-1 specifies the data types defined for the GroupParametersProvisioning API.

**Table 5.33.5.1-1: GroupParametersProvisioning API specific Data Types**

| Data type        | Clause defined | Description                                                                              | Applicability |
|------------------|----------------|------------------------------------------------------------------------------------------|---------------|
| AfReqDefaultQoS  | 5.33.5.2.5     | Represents the AF requested default QoS.                                                 |               |
| DnnSnssaiGrpData | 5.33.5.2.4     | Represents DNN and S-NSSAI specific Group Parameters data.                               |               |
| GrpPpData        | 5.33.5.2.2     | Represents Group Parameters Provisioning data.                                           |               |
| GrpPpDataPatch   | 5.33.5.2.3     | Represents the requested modification to an existing Group Parameters Provisioning data. |               |
| LadnServArea     | 5.33.5.2.6     | Represents an LADN Service Area.                                                         |               |

Table 5.33.5.1-2 specifies data types re-used by the GroupParametersProvisioning API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the GroupParametersProvisioning API.

**Table 5.33.5.1-2: GroupParametersProvisioning API re-used Data Types**

| Data type              | Reference           | Comments                                                                                                            | Applicability |
|------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------|---------------|
| 5Qi                    | 3GPP TS 29.571 [8]  | Represents a 5G QoS Identifier.                                                                                     |               |
| 5QIPriorityLevelRm     | 3GPP TS 29.571 [8]  | Represents the 5QI Priority Level.                                                                                  |               |
| Arp                    | 3GPP TS 29.571 [8]  | Represents an ARP.                                                                                                  |               |
| BitRate                | 3GPP TS 29.571 [8]  | Represents a bit rate.                                                                                              |               |
| BitRateRm              | 3GPP TS 29.571 [8]  | This data type is defined in the same way as the BitRate data type, but with the OpenAPI "nullable: true" property. |               |
| CivicAddress           | 3GPP TS 29.572 [34] | Represents a civic address.                                                                                         |               |
| Dnn                    | 3GPP TS 29.571 [8]  | Represents a DNN.                                                                                                   |               |
| ExternalGroupId        | 3GPP TS 29.122 [4]  | Represents the External Group Identifier for a user group.                                                          |               |
| GeographicArea         | 3GPP TS 29.572 [34] | Represents a geographical area.                                                                                     |               |
| MtcProviderInformation | 3GPP TS 29.571 [8]  | Represents the MTC provider information.                                                                            |               |
| Snssai                 | 3GPP TS 29.571 [8]  | Represents an S-NSSAI.                                                                                              |               |
| SupportedFeatures      | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.       |               |
| Tai                    | 3GPP TS 29.571 [8]  | Represents a Tracking Area Identifier.                                                                              |               |

#### 5.33.5.2 Structured data types

##### 5.33.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

## 5.33.5.2.2 Type: GrpPpData

Table 5.33.5.2.2-1: Definition of type GrpPpData

| Attribute name   | Data type              | P | Cardinality | Description                                                                                                                                                                                                  | Applicability |
|------------------|------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId             | string                 | M | 1           | Contains the identifier of the AF that is sending the request.                                                                                                                                               |               |
| mtcProviderId    | MtcProviderInformation | O | 0..1        | Contains the identifier of the MTC Service Provider and/or MTC Application.                                                                                                                                  |               |
| dnnSnssaiGrpData | DnnSnssaiGrpData       | C | 0..1        | Contains the DNN and S-NSSAI specific Group data that the AF requests to provision.<br><br>This attribute shall be present only when the AF requests to provision DNN and S-NSSAI specific Group parameters. |               |
| suppFeat         | SupportedFeatures      | C | 0..1        | Contains the list of supported features among the ones defined in clause 5.33.6.<br><br>This attribute shall be present only when feature negotiation needs to take place.                                   |               |

## 5.33.5.2.3 Type: GrpPpDataPatch

Table 5.33.5.2.3-1: Definition of type GrpPpDataPatch

| Attribute name   | Data type        | P | Cardinality | Description                                                                                 | Applicability |
|------------------|------------------|---|-------------|---------------------------------------------------------------------------------------------|---------------|
| dnnSnssaiGrpData | DnnSnssaiGrpData | O | 0..1        | Contains the updated DNN and S-NSSAI specific Group data that the AF requests to provision. |               |

## 5.33.5.2.4 Type: DnnSnssaiGrpData

Table 5.33.5.2.4-1: Definition of type DnnSnssaiGrpData

| Attribute name | Data type       | P | Cardinality | Description                                                                                                          | Applicability |
|----------------|-----------------|---|-------------|----------------------------------------------------------------------------------------------------------------------|---------------|
| extGroupId     | ExternalGroupId | M | 1           | Represents the external group identifier of the targeted group.                                                      |               |
| dnn            | Dnn             | M | 1           | Represents the concerned DNN.                                                                                        |               |
| snssai         | Snssai          | M | 1           | Represents the concerned S-NSSAI.                                                                                    |               |
| defQos         | AfReqDefaultQoS | C | 0..1        | Represents the AF-requested default QoS parameters to be applied to each UE within the targeted group.<br><br>(NOTE) |               |
| ladnServArea   | LadnServArea    | C | 0..1        | Represents the AF-requested LADN Service Area to be applied to each UE within the targeted group.<br><br>(NOTE)      |               |

NOTE: At least one of these attributes shall be present.

## 5.33.5.2.5 Type: AfReqDefaultQoS

Table 5.33.5.2.5-1: Definition of type AfReqDefaultQoS

| Attribute name | Data type | P | Cardinality | Description                                            | Applicability |
|----------------|-----------|---|-------------|--------------------------------------------------------|---------------|
| 5qi            | 5Qi       | M | 1           | Represents the AF requested default 5G QoS Identifier. |               |

|               |                        |   |      |                                                                        |  |
|---------------|------------------------|---|------|------------------------------------------------------------------------|--|
| arp           | Arp                    | M | 1    | Represents the AF requested default Allocation and Retention Priority. |  |
| priorityLevel | 5QIPriorityLevel<br>Rm | O | 0..1 | Represents the AF requested 5QI Priority Level.                        |  |

### 5.33.5.2.6 Type: LdnServArea

**Table 5.33.5.2.6-1: Definition of type LdnServArea**

| Attribute name                                                                      | Data type              | P | Cardinality | Description                                                                                      | Applicability |
|-------------------------------------------------------------------------------------|------------------------|---|-------------|--------------------------------------------------------------------------------------------------|---------------|
| geographicAreas                                                                     | array(Geographic Area) | C | 1..N        | Represents the LADN Service Area in the form of a list of geographic area(s).<br>(NOTE)          |               |
| civicAddresses                                                                      | array(CivicAddresses)  | C | 1..N        | Represents the LADN Service Area in the form of a list of civic address(es).<br>(NOTE)           |               |
| tais                                                                                | array(Tai)             | C | 1..N        | Represents the LADN Service Area in the form of a list of Tracking Area Identifier(s).<br>(NOTE) |               |
| NOTE: These attributes are mutually exclusive. Either one of them shall be present. |                        |   |             |                                                                                                  |               |

## 5.33.5.3 Simple data types and enumerations

### 5.33.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.33.5.3.2 Simple data types

The simple data types defined in table 5.33.5.3.2-1 shall be supported.

**Table 5.33.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.33.5.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

## 5.33.6 Used Features

The table below defines the features applicable to the GroupParametersProvisioning API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.33.6-1: Supported Features**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |



## 5.33.7 Error handling

### 5.33.7.1 General

For the GroupParametersProvisioning API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the GroupParametersProvisioning API.

### 5.33.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the GroupParametersProvisioning API.

### 5.33.7.3 Application Errors

The application errors defined for the GroupParametersProvisioning API are listed in table 5.33.7.3-1.

**Table 5.33.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.34 SliceParamProvision API

### 5.34.1 Introduction

The Nnef\_ParameterProvision service shall use the SliceParamProvision API for:

- Network Slice Parameters provisioning.

The API URI of the SliceParamProvision API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-slice-pp".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.34.2 Resources

#### 5.34.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.34.2.1-1 and the resources and HTTP methods used for the SliceParamProvision API.

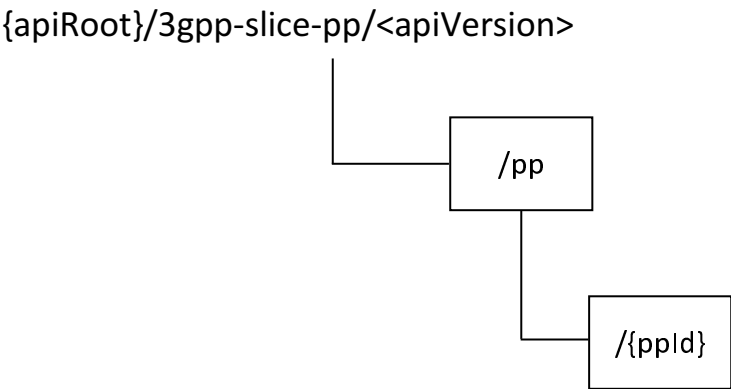


Figure 5.34.2.1-1: Resource URI structure of the SliceParamProvision API

Table 5.34.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 5.34.2.1-1: Resources and methods overview

| Resource name                            | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                                              |
|------------------------------------------|--------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------|
| Slice Parameters Provisionings           | /pp                                        | GET                             | Retrieve all the active Slice Parameters Provisionings managed by the NEF.                   |
|                                          |                                            | POST                            | Request the creation of a new Slice Parameters Provisioning at the NEF.                      |
| Individual Slice Parameters Provisioning | /pp/{ppId}                                 | GET                             | Retrieve an existing "Individual Slice Parameters Provisioning" resource managed by the NEF. |
|                                          |                                            | PUT                             | Update an existing "Individual Slice Parameters Provisioning" resource managed by the NEF.   |
|                                          |                                            | PATCH                           | Modify an existing "Individual Slice Parameters Provisioning" resource managed by the NEF.   |
|                                          |                                            | DELETE                          | Delete an existing "Individual Slice Parameters Provisioning" resource managed by the NEF.   |

5.34.2.2 Resource: Slice Parameters Provisionings

5.34.2.2.1 Introduction

This resource represents the collection of Slice Parameters Provisionings managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [32]).

5.34.2.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-slice-pp/<apiVersion>/pp

This resource shall support the resource URI variables defined in table 5.34.2.2.2-1.

**Table 5.34.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.34.1. |

### 5.34.2.2.3 Resource Methods

#### 5.34.2.2.3.1 GET

This method enables an AF to request to retrieve all the active Slice Parameters Provisionings managed by the NEF.

This method shall support the URI query parameters specified in table 5.34.2.2.3.1-1.

**Table 5.34.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.34.2.2.3.1-2 and the response data structures and response codes specified in table 5.34.2.2.3.1-3.

**Table 5.34.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.34.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(SlicePpData)                                                                                                                  | M | 0..N        | 200 OK                 | Successful case. All the "Individual Slice Parameters Provisioning" resource(s) managed by the NEF are returned.<br><br>If there are no active "Individual Slice Parameters Provisioning" resources at the NEF, an empty array is returned.           |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.34.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                                   |
|----------|--------|---|---|-----------------------------------------------------------------------------------|
| Location | string | M | 1 | Contains an alternative target URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-----------------------------------------------------------------------------------|

**Table 5.34.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.34.2.2.3.2 POST**

This method enables an AF to request the creation of a new Slice Parameters Provisioning at the NEF.

This method shall support the URI query parameters specified in table 5.34.2.2.3.2-1.

**Table 5.34.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.34.2.2.3.2-2 and the response data structures and response codes specified in table 5.34.2.2.3.2-3.

**Table 5.34.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type   | P | Cardinality | Description                                                                                |
|-------------|---|-------------|--------------------------------------------------------------------------------------------|
| SlicePpData | M | 1           | Contains the representation of the Slice Parameters Provisioning to be created at the NEF. |

**Table 5.34.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes | Description                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SlicePpData                                                                                                                          | M | 1           | 201 Created    | Successful case. A representation of the created "Individual Slice Parameters Provisioning" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                               |

**Table 5.34.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                   |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-slice-pp/<apiVersion>/pp/{ppId} |

**5.34.2.2.4 Resource Custom Operations**

There are no resource custom operations defined for this resource in this release of the specification.

### 5.34.2.3 Resource: Individual Slice Parameters Provisioning

#### 5.34.2.3.1 Introduction

This resource represents an "Individual Slice Parameters Provisioning" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [32]).

#### 5.34.2.3.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-slice-pp/<apiVersion>/pp/{ppId}**

This resource shall support the resource URI variables defined in table 5.34.2.3.2-1.

**Table 5.34.2.3.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                                                                            |
|---------|-----------|---------------------------------------------------------------------------------------|
| apiRoot | string    | See clause 5.34.1.                                                                    |
| ppId    | string    | Represents the identifier of the "Individual Slice Parameters Provisioning" resource. |

#### 5.34.2.3.3 Resource Methods

##### 5.34.2.3.3.1 GET

This method enables an AF to request to retrieve an existing "Individual Slice Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.34.2.3.3.1-1.

**Table 5.34.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.34.2.3.3.1-2 and the response data structures and response codes specified in table 5.34.2.3.3.1-3.

**Table 5.34.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.34.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SlicePpData | M | 1           | 200 OK                 | Successful case. The requested "Individual Slice Parameters Provisioning" resource is successfully returned in the response body.                                                                                                                     |
| n/a         |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a         |   |             | 308 Permanent Redirect | Permanent redirection.                                                                                                                                                                                                                                |

|                                                                                                                                     |  |  |  |                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                     |  |  |  | <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |  |                                                                                                                                                                                                                                |

**Table 5.34.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.34.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.34.2.3.3.2 PUT**

This method enables an AF to request the update of an existing "Individual Slice Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.34.2.3.3.2-1.

**Table 5.34.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.34.2.3.3.2-2 and the response data structures and response codes specified in table 5.34.2.3.3.2-3.

**Table 5.34.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type   | P | Cardinality | Description                                                                                |
|-------------|---|-------------|--------------------------------------------------------------------------------------------|
| SlicePpData | M | 1           | Represents the updated "Individual Slice Parameters Provisioning" resource representation. |

**Table 5.34.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type   | P | Cardinality | Response codes         | Description                                                                                                                                                                         |
|-------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SlicePpData | M | 1           | 200 OK                 | Successful response. The "Individual Slice Parameters Provisioning" resource is successfully updated and a representation of the updated resource is returned in the response body. |
| n/a         |   |             | 204 No Content         | Successful response. The "Individual Slice Parameters Provisioning" resource is successfully updated and no content is returned in the response body.                               |
| n/a         |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.                |

|                                                                                                                                     |  |  |                        |                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                     |  |  |                        | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                                                                                             |
| n/a                                                                                                                                 |  |  | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                       |

**Table 5.34.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.34.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**5.34.2.3.3.3 PATCH**

This method enables an AF to request the modification of an existing "Individual Slice Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.34.2.3.3.3-1.

**Table 5.34.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.34.2.3.3.3-2 and the response data structures and response codes specified in table 5.34.2.3.3.3-3.

**Table 5.34.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type        | P | Cardinality | Description                                                                                        |
|------------------|---|-------------|----------------------------------------------------------------------------------------------------|
| SlicePpDataPatch | M | 1           | Represents the requested modifications to the "Individual Slice Parameters Provisioning" resource. |

**Table 5.34.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type   | P | Cardinality | Response codes         | Description                                                                                                                                                                          |
|-------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SlicePpData | M | 1           | 200 OK                 | Successful response. The "Individual Slice Parameters Provisioning" resource is successfully modified and a representation of the updated resource is returned in the response body. |
| n/a         |   |             | 204 No Content         | Successful response. The "Individual Slice Parameters Provisioning" resource is successfully modified and no content is returned in the response body.                               |
| n/a         |   |             | 307 Temporary Redirect | Temporary redirection.                                                                                                                                                               |

|                                                                                                                                       |  |  |                        |                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                       |  |  |                        | <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p>                               |
| n/a                                                                                                                                   |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                              |

**Table 5.34.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.34.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**5.34.2.3.3.4 DELETE**

This method enables an AF to request the deletion of an existing "Individual Slice Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.34.2.3.3.4-1.

**Table 5.34.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.34.2.3.3.4-2 and the response data structures and response codes specified in table 5.34.2.3.3.4-3.

**Table 5.34.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.34.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                 |
|-----------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful case. The "Individual Slice Parameters Provisioning" resource is successfully deleted.                                                                           |
| n/a       |   |             | 307 Temporary Redirect | <p>Temporary redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> |



|                                                                                                                                        |  |  |                        |                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                        |  |  |                        | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                                                                                             |
| n/a                                                                                                                                    |  |  | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                       |

**Table 5.34.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.34.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.34.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.34.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.34.4 Notifications

There are no notifications defined for this API in this release of the specification.

### 5.34.5 Data Model

#### 5.34.5.1 General

This clause specifies the application data model supported by the SliceParamProvision API. Table 5.34.5.1-1 specifies the data types defined for the SliceParamProvision API.

**Table 5.34.5.1-1: SliceParamProvision API specific Data Types**

| Data type        | Clause defined | Description                                                                           | Applicability |
|------------------|----------------|---------------------------------------------------------------------------------------|---------------|
| SlicePpData      | 5.34.5.2.1     | Represents Slice Parameters Provisioning data.                                        |               |
| SlicePpDataPatch | 5.34.5.2.2     | Represents the requested modification to existing Slice Parameters Provisioning data. |               |

Table 5.34.5.1-2 specifies data types re-used by the SliceParamProvision API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SliceParamProvision API.

**Table 5.34.5.1-2: SliceParamProvision API re-used Data Types**

| Data type              | Reference          | Comments                                                                                                         | Applicability |
|------------------------|--------------------|------------------------------------------------------------------------------------------------------------------|---------------|
| MtcProviderInformation | 3GPP TS 29.571 [8] | Represents the MTC provider information.                                                                         |               |
| SliceUsageControlInfo  | 3GPP TS 29.571 [8] | Represents the Network Slice Usage Control information.                                                          |               |
| SupportedFeatures      | 3GPP TS 29.571 [8] | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |               |

## 5.34.5.2 Structured data types

### 5.34.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

### 5.34.5.2.2 Type: SlicePpData

**Table 5.34.5.2.2-1: Definition of type SlicePpData**

| Attribute name   | Data type                  | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Applicability |
|------------------|----------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId             | string                     | M | 1           | Represents the identifier of the AF that is sending the request.                                                                                                                                                                                                                                                                                                                                                                                                               |               |
| mtcProviderId    | MtcProviderInformation     | O | 0..1        | Contains the identifier of the MTC Service Provider and/or MTC Application.                                                                                                                                                                                                                                                                                                                                                                                                    |               |
| sliceUsgCtrlData | map(SliceUsageControlInfo) | C | 1..N        | Represents the Network Slice Usage Control information to be provisioned.<br><br>The key of the map shall be the AF-dedicated S-NSSAI (that is provided within the "snssai" attribute of the corresponding map value encoded via the SliceUsageControlInfo data structure) to which the provisioned Network Slice Usage Control information is related.<br><br>This attribute shall be present only when the AF requests to provision Network Slice Usage Control information. |               |
| suppFeat         | SupportedFeatures          | C | 0..1        | Represents the list of supported features among the ones defined in clause 5.34.6.<br><br>This attribute shall be present only when feature negotiation needs to take place.                                                                                                                                                                                                                                                                                                   |               |

### 5.34.5.2.3 Type: SlicePpDataPatch

**Table 5.34.5.2.3-1: Definition of type SlicePpDataPatch**

| Attribute name   | Data type                  | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                             | Applicability |
|------------------|----------------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| sliceUsgCtrlData | map(SliceUsageControlInfo) | O | 1..N        | Represents the Network Slice Usage Control information to be provisioned.<br><br>The key of the map shall be the AF-dedicated S-NSSAI (that is provided within the "snssai" attribute of the corresponding map value encoded via the SliceUsageControlInfo data structure) to which the provisioned Network Slice Usage Control information is related. |               |

### 5.34.5.3 Simple data types and enumerations

#### 5.34.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.34.5.3.2 Simple data types

The simple data types defined in table 5.34.5.3.2-1 shall be supported.

**Table 5.34.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.34.6 Used Features

The table below defines the features applicable to the SliceParamProvision API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.34.6-1: Supported Features**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

### 5.34.7 Error handling

#### 5.34.7.1 General

For the SliceParamProvision API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the SliceParamProvision API.

#### 5.34.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SliceParamProvision API.

#### 5.34.7.3 Application Errors

The application errors defined for the SliceParamProvision API are listed in table 5.34.7.3-1.

**Table 5.34.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.35 UeAddress API

### 5.35.1 Introduction

The Nnef\_UeAddress service shall use the UeAddress API.

The API URI of UeAddress API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- "apiRoot" is set as described in clause 5.2.4 in 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-ue-address".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

5.35.2 Resources

5.35.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.35.1.1-1 and the resources and HTTP methods used for the UeAddress API.

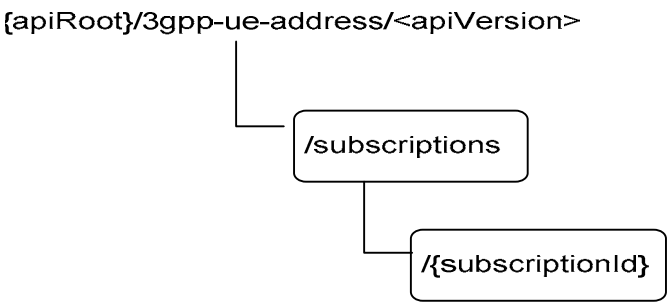


**Figure 5.35.2.1-1: Resource URI structure of the UeAddress API**

Table 5.35.2.1-1 provides an overview of the resources and HTTP methods applicable for the UeAddress API.

**Table 5.35.2.1-1: Resources and methods overview**

| Resource name                      | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                     |
|------------------------------------|--------------------------------------------|---------------------------------|---------------------------------------------------------------------|
| UE Address Subscriptions           | /subscriptions                             | GET                             | Retrieve all the UE Address Subscriptions.                          |
|                                    |                                            | POST                            | Create a new UE Address Subscription.                               |
| Individual UE Address Subscription | /subscriptions/{subscriptionId}            | GET                             | Retrieve an existing "Individual UE Address Subscription" resource. |
|                                    |                                            | DELETE                          | Delete an existing "Individual UE Address Subscription" resource.   |

## 5.35.2.2 Resource: UE Address Subscriptions

### 5.35.2.2.1 Introduction

This resource represents the collection of UE Address Subscriptions managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [32]).

### 5.35.2.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-ue-address/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in table 5.35.2.2.2-1.

**Table 5.35.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.35.1. |

### 5.35.2.2.3 Resource Standard Methods

#### 5.35.2.2.3.1 Void

#### 5.35.2.2.3.2 GET

The HTTP GET method enables an AF to request to retrieve all the active UE Address Subscriptions managed by the NEF.

This method shall support the URI query parameters specified in table 5.35.2.2.3.2-1.

**Table 5.35.2.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name      | Data type         | P | Cardinality | Description                                                                                                                                                                      |
|-----------|-------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| supp-feat | SupportedFeatures | O | 0..1        | Contains the list of supported features among the ones defined in clause 5.35.6.<br><br>This query parameter shall be present only when feature negotiation needs to take place. |

This method shall support the request data structures specified in table 5.35.2.2.3.2-2 and the response data structures and response codes specified in table 5.35.2.2.3.2-3.

**Table 5.35.2.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.35.2.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type          | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                             |
|--------------------|---|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(UeAddrSubsc) | M | 0..N        | 200 OK                 | Successful case. All the "Individual UE Address Subscription" resources managed by the NEF are returned.<br><br>If there are no existing "Individual UE Address Subscription" resources managed at the NEF, an empty array is returned. |
| n/a                |   |             | 307 Temporary Redirect | Temporary redirection.                                                                                                                                                                                                                  |

|                                                                                                                                            |  |  |                        |                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                            |  |  |                        | <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p>                               |
| n/a                                                                                                                                        |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| <p>NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply.</p> |  |  |                        |                                                                                                                                                                                                                                                              |

**Table 5.35.2.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.35.2.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.35.2.2.3.3 POST

The HTTP POST method enables an AF to request the creation of a new UE Address Subscription at the NEF.

This method shall support the URI query parameters specified in table 5.35.2.2.3.3-1.

**Table 5.35.2.2.3.3-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.35.2.2.3.3-2 and the response data structures and response codes specified in table 5.35.2.2.3.3-3.

**Table 5.35.2.2.3.3-2: Data structures supported by the POST Request Body on this resource**

| Data type   | P | Cardinality | Description                                                                          |
|-------------|---|-------------|--------------------------------------------------------------------------------------|
| UeAddrSubsc | M | 1           | Contains the representation of the UE Address Subscription to be created at the NEF. |

**Table 5.35.2.2.3.3-3: Data structures supported by the POST Response Body on this resource**

| Data type   | P | Cardinality | Response codes | Description                                                                                                                                                                                                                     |
|-------------|---|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UeAddrSubsc | M | 1           | 201 Created    | <p>Successful case. A representation of the created "Individual UE Address Subscription" resource is returned in the response body.</p> <p>The URI of the created resource shall be returned in the "Location" HTTP header.</p> |

NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply.

**Table 5.35.2.2.3.3-4: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                          |
|----------|-----------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-ue-address/<apiVersion>/subscriptions/{subscriptionId} |

#### 5.35.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.35.2.3 Resource: Individual UE Address Subscription

#### 5.35.2.3.1 Introduction

This resource represents a UE Address Subscription managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [32]).

#### 5.35.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-ue-address/<apiVersion>/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.35.2.3.2-1.

**Table 5.35.2.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                                                                      |
|----------------|-----------|---------------------------------------------------------------------------------|
| apiRoot        | string    | See clause 5.35.1.                                                              |
| subscriptionId | string    | Represents the identifier of the "Individual UE Address Subscription" resource. |

#### 5.35.2.3.3 Resource Standard Methods

##### 5.35.2.3.3.1 Void

##### 5.35.2.3.3.2 GET

The HTTP GET method enables an AF to request to retrieve an existing "Individual UE Address Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.35.2.3.3.2-1.

**Table 5.35.2.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|      |           |   |             |             |

This method shall support the request data structures specified in table 5.35.1.3.3.2-2 and the response data structures and response codes specified in table 5.35.1.3.3.2-3.

**Table 5.35.2.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
|-----------|---|-------------|-------------|

|     |  |  |  |
|-----|--|--|--|
| n/a |  |  |  |
|-----|--|--|--|

**Table 5.35.2.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UeAddrSubsc                                                                                                                         | M | 1           | 200 OK                 | Successful case. The requested "Individual UE Address Subscription" resource is returned in the response body.                                                                                                                                        |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.35.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.35.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.35.2.3.3.3 DELETE

The HTTP DELETE method enables an AF to request the deletion of an existing "Individual UE Address Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.35.2.3.3.3-1.

**Table 5.35.2.3.3.3-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.35.2.3.3.3-2 and the response data structures and response codes specified in table 5.35.2.3.3.3-3.

**Table 5.35.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |



Table 5. 35.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource

| Data type                                                                                                                              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful case. The "Individual UE Address Subscription" resource is successfully deleted.                                                                                                                                                           |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

Table 5.35.2.3.3.3-4: Headers supported by the 307 Response Code on this resource

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

Table 5.35.2.3.3.3-5: Headers supported by the 308 Response Code on this resource

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

5.35.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

5.35.3 Custom Operations without associated resources

5.35.3.1 Overview

The structure of the custom operation URIs of the UeAddress API is shown in Figure 5.35.3.1-1.

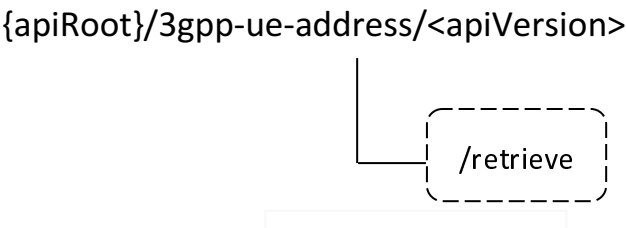


Figure 5.35.3.1-1: Custom operation URI structure of the UeAddress API

Table 5.35.3.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the UeAddress API.

**Table 5.35.3.1-1: Custom operations without associated resources**

| Custom operation name | Custom operation URI | Mapped HTTP method | Description                                                  |
|-----------------------|----------------------|--------------------|--------------------------------------------------------------|
| Retrieve              | /retrieve            | POST               | Enables an AF to request to retrieve UE Address information. |

The custom operations shall support the URI variables defined in table 5.35.3.1-2.

**Table 5.35.3.1-2: URI variables for this custom operation**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.35.1. |

### 5.35.3.2 Operation: Retrieve

#### 5.35.3.2.1 Description

The custom operation allows to retrieve UE Address information via the NEF.

#### 5.35.3.2.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.35.3.2.2-1 and table 5.35.3.2.2-2.

**Table 5.35.3.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type    | P | Cardinality | Description                                                            |
|--------------|---|-------------|------------------------------------------------------------------------|
| UeAddressReq | M | 1           | Contains the parameters to request to retrieve UE Address information. |

**Table 5.35.3.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UeAddressInfo                                                                                                                        | M | 1           | 200 OK                 | Successful case. The UE Address information request is successfully processed, and UE address information is returned in the response body.                                                                                                           |
| n/a                                                                                                                                  |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                  |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.35.3.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                                   |
|----------|--------|---|---|-----------------------------------------------------------------------------------|
| Location | string | M | 1 | Contains an alternative target URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-----------------------------------------------------------------------------------|

**Table 5.35.3.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

## 5.35.4 Notifications

### 5.35.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.35.4.1-1: Notifications overview**

| Notification            | Callback URI | HTTP method or custom operation | Description (service operation)                                                                  |
|-------------------------|--------------|---------------------------------|--------------------------------------------------------------------------------------------------|
| UE Address Notification | {notifUri}   | POST                            | Enables the NEF to notify a previously subscribed AF on UE address information related event(s). |

### 5.35.4.2 UE Address Notification

#### 5.35.4.2.1 Description

The UE Address Notification is used by the NEF to notify a previously subscribed AF on UE address information related event(s).

#### 5.35.4.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 5.35.4.2.2-1.

**Table 5.35.4.2.2-1: Callback URI variables**

| Name     | Definition                                                          |
|----------|---------------------------------------------------------------------|
| notifUri | Represents the callback URI encoded as a string formatted as a URI. |

#### 5.35.4.2.3 Standard Methods

##### 5.35.4.2.3.1 POST

This method shall support the request data structures specified in table 5.35.4.2.3.1-1 and the response data structures and response codes specified in table 5.35.4.2.3.1-2.

**Table 5.35.4.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type   | P | Cardinality | Description                             |
|-------------|---|-------------|-----------------------------------------|
| UeAddrNotif | M | 1           | Represents the UE Address Notification. |

**Table 5.35.4.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response | Description |
|-----------|---|-------------|----------|-------------|
|-----------|---|-------------|----------|-------------|

|                                                                                                                                      |  |  | codes                  |                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                  |  |  | 204 No Content         | Successful case. The UE Address Notification is successfully received and processed.                                                                                                                                                                                                           |
| n/a                                                                                                                                  |  |  | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                  |  |  | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                                                                |

**Table 5.35.4.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.35.4.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.35.5 Data Model

### 5.35.5.1 General

This clause specifies the application data model supported by the UeAddress API. Table 5.35.5.1-1 specifies the data types defined for the UeAddress API.

**Table 5.35.5.1-1: UeAddress service specific Data Types**

| Data type     | Clause defined | Description                                                  | Applicability |
|---------------|----------------|--------------------------------------------------------------|---------------|
| UeAddressInfo | 5.35.5.2.3     | Represents UE Address information.                           |               |
| UeAddressReq  | 5.35.5.2.2     | Represents the parameters to request UE Address information. |               |
| UeAddrInfo    | 5.35.5.2.5     | Represents the UE Public Address information.                |               |
| UeAddrNotif   | 5.35.5.2.6     | Represents the UE Address Notification.                      |               |
| UeAddrSubsc   | 5.35.5.2.4     | Represents the UE Address Subscription.                      |               |

Table 5.35.5.1-2 specifies data types re-used by the UeAddress API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the UeAddress API.

**Table 5.35.5.1-2: Re-used Data Types**

| Data type         | Reference           | Comments                                                                                                         |
|-------------------|---------------------|------------------------------------------------------------------------------------------------------------------|
| Gpsi              | 3GPP TS 29.571 [8]  | Represents a GPSI.                                                                                               |
| IpAddr            | 3GPP TS 29.571 [8]  | Represents UE IP address.                                                                                        |
| Ipv4Addr          | 3GPP TS 29.571 [8]  | Identifies an IPv4 address.                                                                                      |
| Ipv6Addr          | 3GPP TS 29.571 [8]  | Identifies an IPv6 address.                                                                                      |
| UeNatMappingInfo  | 3GPP TS 29.564 [61] | Represents UE NAT Mapping Information.                                                                           |
| SupportedFeatures | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |
| Uint16            | 3GPP TS 29.571 [8]  | Represents an unsigned 16-bit integer.                                                                           |
| Uri               | 3GPP TS 29.122 [4]  | Represents a URI.                                                                                                |

## 5.35.5.2 Structured data types

### 5.35.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

### 5.35.5.2.2 Type: UeAddressReq

**Table 5.35.5.2.2-1: Definition of type UeAddressReq**

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                         | Applicability |
|----------------|-------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId           | string            | M | 1           | Represents the identifier of the AF that is sending the request.                                                                                                    |               |
| gpsi           | Gpsi              | M | 1           | Contains the target GPSI for which UE address information is requested.                                                                                             |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Contains the list of supported features used as defined in clause 5.35.6.<br><br>This attribute shall be present only when feature negotiation needs to take place. |               |

### 5.35.5.2.3 Type: UeAddressInfo

**Table 5.35.5.2.3-1: Definition of type UeAddressInfo**

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                    | Applicability |
|----------------|-------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| ueIpAddrs      | array(IpAddr)     | M | 1..N        | Contains the UE Address(es) corresponding to the requested GPSI.                                                                                               |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Contains the list of supported features used as defined in clause 5.35.6.<br><br>This attribute shall be present when feature negotiation needs to take place. |               |

### 5.35.5.2.4 Type: UeAddrSubsc

**Table 5.35.5.2.4-1: Definition of type UeAddrSubsc**

| Attribute name | Data type | P | Cardinality | Description                                                                 | Applicability |
|----------------|-----------|---|-------------|-----------------------------------------------------------------------------|---------------|
| notifUri       | Uri       | M | 1           | Contains the URI for via which UE Address notifications shall be delivered. |               |
| notifId        | string    | M | 1           | Notification Correlation ID assigned by the AF.                             |               |

|                                                                                                                                                                                                                                                                               |                   |   |      |                                                                                                                                                                                                                                                        |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| afId                                                                                                                                                                                                                                                                          | string            | M | 1    | Represents the identifier of the AF that is sending the request.                                                                                                                                                                                       |  |
| ueAddrInfo                                                                                                                                                                                                                                                                    | UeAddrInfo        | C | 0..1 | Contains the UE private address information and IP address information of the remote end.<br><br>This attribute shall be present only if the UE public address information is subscribed.                                                              |  |
| immRepInd                                                                                                                                                                                                                                                                     | boolean           | C | 0..1 | Indicates whether immediate reporting is requested.<br><br>- "true": immediate reporting is requested;<br>- "false"(default): immediate reporting is not requested.<br>It shall be present and set to "true" if the "ueAddrInfo" attribute is present. |  |
| immReport                                                                                                                                                                                                                                                                     | UeNatMappingInfo  | C | 0..1 | Contains the UE Address report.<br><br>This attribute shall be present only in the response to a UE Address Subscription creation request and when the information is available.<br><br>(NOTE).                                                        |  |
| supFeat                                                                                                                                                                                                                                                                       | SupportedFeatures | C | 0..1 | Indicates the list of Supported features used as described in clause 5.35.6.<br><br>It shall be present if feature negotiation needs to take place.                                                                                                    |  |
| NOTE: The UPF may report a list of NATed public IP and port information for the same private UE IP address and the same remote IP address, for different destination port numbers, if no remote port number was received in the subscription within the ueAddrInfo attribute. |                   |   |      |                                                                                                                                                                                                                                                        |  |

## 5.35.5.2.5 Type: UeAddrInfo

Table 5.35.5.2.5-1: Definition of type UeAddrInfo

| Attribute name                                                                                   | Data type | P | Cardinality | Description                                                                                                                                | Applicability |
|--------------------------------------------------------------------------------------------------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| uePrivateIpAddr                                                                                  | IpAddr    | M | 1           | Contains the UE's private IP address.                                                                                                      |               |
| ipDomain                                                                                         | string    | O | 0..1        | Contains the IPv4 domain.<br><br>This attribute may be present only if an IPv4 address is provided within the "uePrivateIpAddr" attribute. |               |
| remoteIpv4Addr                                                                                   | Ipv4Addr  | C | 0..1        | Contains the IPv4 address of remote end for which the NAT mapping is requested.<br><br>(NOTE).                                             |               |
| remoteIpv6Addr                                                                                   | Ipv6Addr  | C | 0..1        | Contains the IPv6 address of remote end for which the NAT mapping is requested.<br><br>(NOTE)                                              |               |
| remotePortNumber                                                                                 | Uint16    | O | 0..1        | Contains the port number of the remote end for which the NAT mapping is requested.                                                         |               |
| NOTE: Either the "remoteIpv4Addr" attribute or the "remoteIpv6Addr" attribute shall be included. |           |   |             |                                                                                                                                            |               |

## 5.35.5.2.6 Type: UeAddrNotif

**Table 5.35.5.2.6-1: Definition of type UeAddrNotif**

| Attribute name                                                                                                                                                                                                                                | Data type        | P | Cardinality | Description                                                                                                                                                           | Applicability |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| notifId                                                                                                                                                                                                                                       | string           | M | 1           | Contains the identifier of the subscription to which the notification is related.                                                                                     |               |
| uePubAddrInfo                                                                                                                                                                                                                                 | UeNatMappingInfo | M | 1           | Contains the list of NATed public address and port information.<br><br>The NEF shall return an empty value when there is no UeNatMappingInfo available.<br><br>(NOTE) |               |
| NOTE: The UPF may return a list of NATed public IP and port information for the same private UE IP address and the same remote IP address, for different destination port numbers, if no remote port number was received in the subscription. |                  |   |             |                                                                                                                                                                       |               |

## 5.35.5.2.7 Void

## 5.35.5.3 Simple data types and enumerations

## 5.35.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.35.5.3.2 Simple data types

The simple data types defined in table 5.35.5.3.2-1 shall be supported.

**Table 5.35.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.35.5.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

## 5.35.6 Used Features

The optional features listed in table 5.35.6-1 are defined for the UeAddress API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.35.6-1: Features used by UeAddress API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.35.7 Error handling

### 5.35.7.1 General

For the UeAddress API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the UeAddress API.

### 5.35.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the UeAddress API.

### 5.35.7.3 Application Errors

The application errors defined for the UeAddress API are listed in table 5.35.7.3-1.

**Table 5.35.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.36 ECSAddress API

### 5.36.1 Introduction

The Nnef\_ECSAddress service shall use the ECSAddress API.

The API URI of ECSAddress API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-ecs-address".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.36.2 Resources

#### 5.36.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.36.2.1-1 and the resources and HTTP methods used for the ECSAddress API.



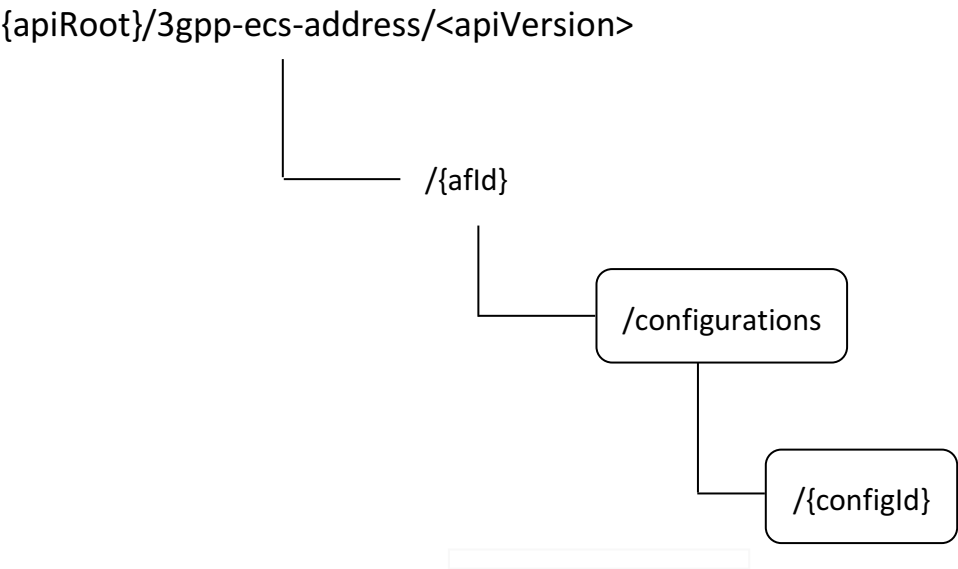


Figure 5.36.2.1-1: Resource URI structure of the northbound ECSAddress API

Table 5.36.2.1-1 provides an overview of the resources and HTTP methods applicable for the northbound ECSAddress API.

Table 5.36.2.1-1: Resources and methods overview

| Resource name                                        | Resource URI                      | HTTP method | Description                                                                           |
|------------------------------------------------------|-----------------------------------|-------------|---------------------------------------------------------------------------------------|
| ECS Address Configuration Information Sets           | /{afld}/configurations            | GET         | Retrieve all the active ECS Address Configuration Information Sets.                   |
|                                                      |                                   | POST        | Create a new ECS Address Configuration Information Set.                               |
| Individual ECS Address Configuration Information Set | /{afld}/configurations/{configId} | GET         | Retrieve an existing "Individual ECS Address Configuration Information Set" resource. |
|                                                      |                                   | PUT         | Update an existing "Individual ECS Address Configuration Information Set" resource.   |
|                                                      |                                   | PATCH       | Modify an existing "Individual ECS Address Configuration Information Set" resource.   |
|                                                      |                                   | DELETE      | Delete an existing "Individual ECS Address Configuration Information Set" resource.   |

5.36.2.2 Resource: ECS Address Configuration Information Sets

5.36.2.2.1 Introduction

This resource represents all the active ECS Address Configuration Information Sets managed by the NEF for a given AF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

5.36.2.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-ecs-address/<apiVersion>/{afld}/configurations**

This resource shall support the resource URI variables defined in table 5.36.2.2.2-1.

**Table 5.36.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                           |
|---------|-----------|--------------------------------------|
| apiRoot | string    | See clause 5.36.1.                   |
| afId    | string    | Represents the identifier of the AF. |

### 5.36.2.2.3 Resource Standard Methods

#### 5.36.2.2.3.1 Void

#### 5.36.2.2.3.2 GET

The HTTP GET method allows to retrieve all the active ECS Address Configuration Information Sets at the NEF for a given AF.

This method shall support the URI query parameters specified in table 5.36.2.2.3.2-1.

**Table 5.36.2.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.36.2.2.3.2-2, the response data structures and response codes specified in table 5.36.2.2.3.2-3, and the location headers specified in table 5.36.2.2.3.2-4 and table 5.36.2.2.3.2-5.

**Table 5.36.2.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.36.2.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(EcsAddrInfo)                                                                                                                  | M | 0..N        | 200 OK                 | Successful case. All the active "Individual ECS Address Configuration Information Set" resource(s) are returned.<br><br>If there are no active "Individual ECS Address Configuration Information Set" resources at the NEF, an empty array is returned. |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].   |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].   |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                         |

**Table 5.36.2.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.36.2.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.36.2.2.3.3 POST

The HTTP POST method allows to create a new ECS Address Configuration Information Set at the NEF for a given AF.

This method shall support the URI query parameters specified in table 5.36.2.2.3.3-1.

**Table 5.36.2.2.3.3-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.36.2.2.3.3-1, the response data structures and response codes specified in table 5.36.2.2.3.3-2, and the Location Headers specified in table 5.36.2.2.3.3-3.

**Table 5.36.2.2.3.3-1: Data structures supported by the POST Request Body on this resource**

| Data type   | P | Cardinality | Description                                                                                      |
|-------------|---|-------------|--------------------------------------------------------------------------------------------------|
| EcsAddrInfo | M | 1           | Contains the parameters to request the creation of an ECS Address Configuration Information Set. |

**Table 5.36.2.2.3.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes | Description                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EcsAddrInfo                                                                                                                          | M | 1           | 201 Created    | Successful case. A representation of the created "Individual ECS Address Configuration Information Set" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                                            |

**Table 5.36.2.2.3.3-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                             |
|----------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-ecs-address/<apiVersion>/{afId}/configurations/{configId} |

### 5.36.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.36.2.3 Resource: Individual ECS Address Configuration Information Set

#### 5.36.2.3.1 Introduction

This resource represents an "Individual ECS Address Configuration Information Set" resource managed by the NEF.

#### 5.36.2.3.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-ecs-address/<apiVersion>/{afId}/configurations/{configId}**

This resource shall support the resource URI variables defined in table 5.36.2.3.2-1.

**Table 5.36.2.3.2-1: Resource URI variables for this resource**

| Name     | Data type | Definition                                                                                        |
|----------|-----------|---------------------------------------------------------------------------------------------------|
| apiRoot  | string    | See clause 5.36.1.                                                                                |
| afId     | string    | Represents the identifier of the AF.                                                              |
| configId | string    | Represents the identifier of the "Individual ECS Address Configuration Information Set" resource. |

#### 5.36.2.3.3 Resource Standard Methods

##### 5.36.2.3.3.1 Void

##### 5.36.2.3.3.2 GET

The HTTP GET method allows to retrieve an existing "Individual ECS Address Configuration Information Set" resource at the NEF.

This method shall support the URI query parameters specified in table 5.36.2.3.3.2-1.

**Table 5.36.2.3.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.36.2.3.3.2-2 and the response data structures and response codes specified in table 5.36.2.3.3.2-3.

**Table 5.36.2.3.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.36.2.3.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type   | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EcsAddrInfo | M | 1           | 200 OK                 | Successful case. The requested "Individual ECS Address Configuration Information Set" resource is successfully returned in the response body.                                                                                                         |
| n/a         |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

|                                                                                                                                     |  |  |                        |                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                 |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                              |

**Table 5.36.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.36.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.36.2.3.3.3 PUT

The HTTP PUT method allows to update an existing "Individual ECS Address Configuration Information Set" resource at the NEF.

This method shall support the URI query parameters specified in table 5.36.2.3.3.3-1.

**Table 5.36.2.3.3.3-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.36.2.3.3.3-2 and the response data structures and response codes specified in table 5.36.2.3.3.3-3.

**Table 5.36.2.3.3.3-2: Data structures supported by the PUT Request Body on this resource**

| Data type   | P | Cardinality | Description                                                                                                 |
|-------------|---|-------------|-------------------------------------------------------------------------------------------------------------|
| EcsAddrInfo | M | 1           | Contains the updated representation of the "Individual ECS Address Configuration Information Set" resource. |

**Table 5.36.2.3.3.3-3: Data structures supported by the PUT Response Body on this resource**

| Data type   | P | Cardinality | Response codes         | Description                                                                                                                                                                                 |
|-------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EcsAddrInfo | M | 1           | 200 OK                 | Successful case. The "Individual ECS Address Configuration Information Set" resource is successfully updated and a representation of the updated resource is returned in the response body. |
| n/a         |   |             | 204 No Content         | Successful case. The "Individual ECS Address Configuration Information Set" resource is successfully updated and no content is returned in the response body.                               |
| n/a         |   |             | 307 Temporary Redirect | <p>Temporary redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p>                 |

|                                                                                                                                     |  |  |                        |                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                     |  |  |                        | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].                                                                                                                                                                             |
| n/a                                                                                                                                 |  |  | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                       |

**Table 5.36.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.36.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.36.2.3.3.3A PATCH**

This method enables to request the modification of an existing "Individual ECS Address Configuration Information Set" resource at the NEF.

This method shall support the URI query parameters specified in table 5.36.2.3.3.3A-1.

**Table 5.36.2.3.3.3A-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.36.2.3.3.3A-2 and the response data structures and response codes specified in table 5.36.2.3.3.3A-3.

**Table 5.36.2.3.3.3A-2: Data structures supported by the PATCH Request Body on this resource**

| Data type        | P | Cardinality | Description                                                                                                  |
|------------------|---|-------------|--------------------------------------------------------------------------------------------------------------|
| EcsAddrInfoPatch | M | 1           | Contains the requested modifications to the "Individual ECS Address Configuration Information Set" resource. |

**Table 5.36.2.3.3.3A-3: Data structures supported by the PATCH Response Body on this resource**

| Data type   | P | Cardinality | Response codes | Description                                                                                                                                                                                      |
|-------------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EcsAddrInfo | M | 1           | 200 OK         | Successful response. The "Individual ECS Address Configuration Information Set" resource is successfully modified and a representation of the updated resource is returned in the response body. |
| n/a         |   |             | 204 No Content | Successful response. The "Individual ECS Address Configuration Information Set" resource is successfully modified and no content is returned in the response body.                               |

|                                                                                                                                       |  |  |                        |                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                   |  |  | 307 Temporary Redirect | <p>Temporary redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| n/a                                                                                                                                   |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                              |

**Table 5.36.2.3.3.3A-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.36.2.3.3.3A-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.36.2.3.3.4 DELETE

The HTTP DELETE method allows to delete an existing "Individual ECS Address Configuration Information Set" resource at the NEF.

This method shall support the URI query parameters specified in table 5.36.2.3.3.4-1.

**Table 5.36.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.36.2.3.3.4-2 and the response data structures and response codes specified in table 5.36.2.3.3.4-3.

**Table 5.36.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.36.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                   |
|-----------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------|
| N/A       |   |             | 204 No Content         | Successful case. The "Individual ECS Address Configuration Information Set" resource is successfully deleted. |
| N/A       |   |             | 307 Temporary Redirect | Temporary redirection.                                                                                        |

|                                                                                                                                        |  |  |                        |                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                        |  |  |                        | <div>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</div> <div>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</div>                                   |
| N/A                                                                                                                                    |  |  | 308 Permanent Redirect | <div>Permanent redirection.</div> <div>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</div> <div>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</div> |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                                          |

Table 5.36.2.3.3.4-4: Headers supported by the 307 Response Code on this resource

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

Table 5.36.2.3.3.4-5: Headers supported by the 308 Response Code on this resource

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

5.36.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

5.36.3 Custom Operations without associated resources

5.36.3.1 Overview

The structure of the custom operation URIs of the ECSAddress API is shown in Figure 5.36.3.1-1.

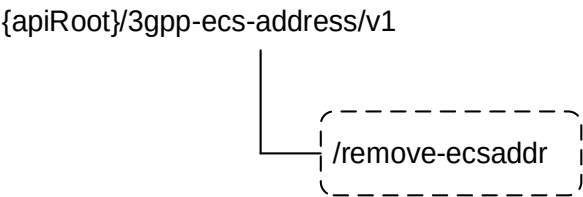


Figure 5.36.3.1-1: Custom operation URI structure of the ECSAddress API

Table 5.36.3.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the ECSAddress API.

Table 5.36.3.1-1: Custom operations without associated resources

| Custom operation name | Custom operation URI | Mapped HTTP method | Description                                                                                           |
|-----------------------|----------------------|--------------------|-------------------------------------------------------------------------------------------------------|
| RemoveEcsAddr         | /remove-ecsaddr      | POST               | Enables to request the NEF to delete ECS Address Configuration information based on given attributes. |



The custom operations shall support the URI variables defined in table 5.36.3.1-2.

**Table 5.36.3.1-2: URI variables for this custom operation**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.36.1. |

### 5.36.3.2 Operation: RemoveEcsAddr

#### 5.36.3.2.1 Description

The custom operation enables to delete ECS Address Configuration information based on given attributes.

#### 5.36.3.2.2 Operation Definition

This operation shall support the request data structures shown in Table 5.36.3.2.2-1 and the response data structures and error codes specified in Table 5.36.3.2.2-2.

**Table 5.36.3.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type             | P | Cardinality | Description                                                                                                |
|-----------------------|---|-------------|------------------------------------------------------------------------------------------------------------|
| EcsAddrDeleteCriteria | M | 1           | Contains the information about the criteria to be used for ECS Address Configuration information deletion. |

**Table 5.36.3.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                  |   |             | 204 No Content         | Successful case. The request to remove ECS Address Configuration information based on given criteria is successfully received and processed.                                                                                                          |
| n/a                                                                                                                                  |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                  |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.36.3.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.36.3.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

## 5.36.4 Notifications

There are no notifications defined for this API in this release of the specification.

## 5.36.5 Data Model

### 5.36.5.1 General

This clause specifies the application data model supported by the ECSAddress API. Table 5.36.5.1-1 specifies the data types defined for the ECSAddress API.

**Table 5.36.5.1-1: ECSAddress API specific Data Types**

| Data type             | Clause defined | Description                                                                         | Applicability |
|-----------------------|----------------|-------------------------------------------------------------------------------------|---------------|
| EcsAddrDeleteCriteria | 5.36.5.3.3     | Contains criteria for deleting ECS Address Configuration information.               |               |
| EcsAddrInfo           | 5.36.5.3.2     | Represents an ECS Address Configuration Information.                                |               |
| EcsAddrInfoPatch      | 5.36.5.3.4     | Represents the requested modifications to an ECS Address Configuration Information. |               |

Table 5.36.5.1-2 specifies data types re-used by the ECSAddress API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the ECSAddress API.

**Table 5.36.5.1-2: ECSAddress API re-used Data Types**

| Data type         | Reference           | Comments                                                                                                         | Applicability |
|-------------------|---------------------|------------------------------------------------------------------------------------------------------------------|---------------|
| Dnn               | 3GPP TS 29.571 [8]  | Represents a DNN.                                                                                                |               |
| EcsAuthMethod     | 3GPP TS 29.503 [17] | Represents the ECS Authentication Methods.                                                                       |               |
| EcsServerAddr     | 3GPP TS 29.571 [8]  | Represents the Edge Configuration Server (ECS) address configuration information.                                |               |
| Link              | 3GPP TS 29.122 [4]  | Represents a link.                                                                                               |               |
| Snssai            | 3GPP TS 29.571 [8]  | Represents an S-NSSAI.                                                                                           |               |
| SupportedFeatures | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |               |
| SupportedPlmn     | 3GPP TS 29.503 [17] | ID of the PLMN supported by the ECS along with the list of ECSPs associated with the PLMN.                       |               |
| TargetUeid        | 5.6.3.3.7           | Represents the target UE(s) information.                                                                         |               |

### 5.36.5.2 Void

### 5.36.5.3 Structured data types

#### 5.36.5.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

## 5.36.5.3.2 Type: EcsAddrInfo

Table 5.36.5.3.2-1: Definition of type EcsAddrInfo

| Attribute name      | Data type            | P | Cardinality | Description                                                                                                                                                         | Applicability |
|---------------------|----------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| self                | Link                 | C | 0..1        | Identifies the individual resource.<br><br>This attribute shall be present in the HTTP GET response when retrieving all the resources for an AF.                    |               |
| ecsServerAddr       | EcsServerAddr        | M | 1           | Contains the ECS address(es).                                                                                                                                       |               |
| spatialValidityCond | SpatialValidityCond  | O | 0..1        | Contains the spatial validity conditions.                                                                                                                           |               |
| dnn                 | Dnn                  | O | 0..1        | Contains an HPLMN DNN.                                                                                                                                              |               |
| snssai              | Snssai               | O | 0..1        | Contains an HPLMN S-NSSAI.                                                                                                                                          |               |
| ecsAuthMethods      | array(EcsAuthMethod) | O | 1..N        | Contains the Supported ECS Authentication Method(s).                                                                                                                |               |
| supportedPlmns      | array(SupportedPlmn) | O | 1..N        | The List of PLMNs and associated ECSPs for which EDN configuration information can be provided by the ECS.                                                          |               |
| suppFeat            | SupportedFeatures    | C | 0..1        | Contains the list of supported features used as defined in clause 5.36.6.<br><br>This attribute shall be present only when feature negotiation needs to take place. |               |

## 5.36.5.3.3 Type: EcsAddrDeleteCriteria

Table 5.36.5.3.3-1: Definition of type EcsAddrDeleteCriteria

| Attribute name                                             | Data type         | P | Cardinality | Description                                                                                                                                                                          | Applicability |
|------------------------------------------------------------|-------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| aflds                                                      | array(string)     | C | 1..N        | Contains the targeted identifier(s) of the AF(s).<br><br>(NOTE 1)                                                                                                                    |               |
| dnn                                                        | Dnn               | C | 0..1        | Contains the DNN to be used as deletion criterion.<br><br>(NOTE 1)                                                                                                                   |               |
| snssai                                                     | Snssai            | C | 0..1        | Contains the S-NSSAI to be used as deletion criterion.<br><br>(NOTE 1)                                                                                                               |               |
| ecsAddrInfo                                                | EcsAddrInfo       | C | 0..1        | Contains the ECS Address Configuration information to be used as deletion criterion. Only entries that are exact matches of this attribute shall be deleted.<br><br>(NOTE 1, NOTE 2) |               |
| suppFeat                                                   | SupportedFeatures | C | 0..1        | Contains the list of supported features used as defined in clause 5.36.6.<br><br>This attribute shall be present only when feature negotiation needs to take place.                  |               |
| NOTE 1: At least one of these attributes shall be present. |                   |   |             |                                                                                                                                                                                      |               |

NOTE 2: The "self" and "suppFeat" attributes of the "ecsAddrInfo" attribute (encoded using the EcsAddrInfo data type) shall not be provided and shall not be considered when finding the matching entries.

#### 5.36.5.3.4 Type: EcsAddrInfoPatch

**Table 5.36.5.3.4-1: Definition of type EcsAddrInfoPatch**

| Attribute name      | Data type            | P | Cardinality | Description                                                                                                         | Applicability |
|---------------------|----------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------|---------------|
| ecsServerAddr       | EcsServerAddr        | O | 0..1        | Represents the updated ECS address(es) information.                                                                 |               |
| ecsAuthMethods      | array(EcsAuthMethod) | O | 1..N        | Contains the Supported ECS Authentication Method(s).                                                                |               |
| supportedPlmns      | array(SupportedPlmn) | O | 1..N        | Contains the List of PLMNs and associated ECSPs for which EDN configuration information can be provided by the ECS. |               |
| spatialValidityCond | SpatialValidityCond  | O | 0..1        | Contains the updated spatial validity conditions.                                                                   |               |

### 5.36.5.4 Simple data types and enumerations

#### 5.36.5.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.36.5.4.2 Simple data types

The simple data types defined in table 5.36.5.4.2-1 shall be supported.

**Table 5.36.5.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.36.5.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

## 5.36.6 Used Features

The optional features listed in table 5.36.6-1 are defined for the ECSAddress API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.36.6-1: Features used by ECSAddress API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.36.7 Error handling

### 5.36.7.1 General

For the ECSAddress API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the ECSAddress API.

### 5.36.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the ECSAddress API.

### 5.36.7.3 Application Errors

The application errors defined for ECSAddress API are listed in table 5.36.7.3-1.

**Table 5.36.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.37 RSLPPIParametersProvisioning API

### 5.37.1 Introduction

The Nnef\_ParameterProvision service shall use the RSLPPIParametersProvisioning API for:

- RSLPPI Parameters provisioning.

The API URI of the RSLPPIParametersProvisioning API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-rslppi-pp".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.37.2 Resources

#### 5.37.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.37.2.1-1 and the resources and HTTP methods used for the RSLPPIParametersProvisioning API.

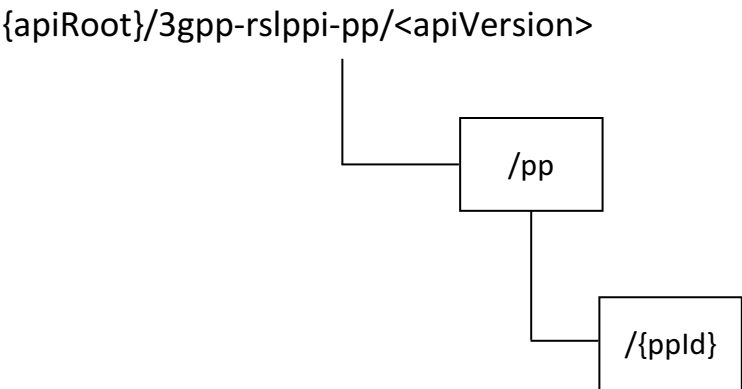


Figure 5.37.2.1-1: Resource URI structure of the RSLPPIParametersProvisioning API

Table 5.37.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 5.37.2.1-1: Resources and methods overview

| Resource name                             | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                                      |
|-------------------------------------------|--------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------|
| RSLPPI Parameters Provisionings           | /pp                                        | GET                             | Retrieve all the active RSLPPI Parameters Provisionings managed by the NEF.          |
|                                           |                                            | POST                            | Request the creation of a new RSLPPI Parameters Provisioning at the NEF.             |
| Individual RSLPPI Parameters Provisioning | /pp/{ppId}                                 | GET                             | Retrieve an existing "Individual RSLPPI Parameters Provisioning" managed by the NEF. |
|                                           |                                            | PUT                             | Update an existing "Individual RSLPPI Parameters Provisioning" managed by the NEF.   |
|                                           |                                            | PATCH                           | Modify an existing "Individual RSLPPI Parameters Provisioning" managed by the NEF.   |
|                                           |                                            | DELETE                          | Delete an existing "Individual RSLPPI Parameters Provisioning" managed by the NEF.   |

5.37.2.2 Resource: RSLPPI Parameters Provisionings

5.37.2.2.1 Introduction

This resource represents the collection of RSLPPI Parameters Provisionings managed by the NEF.  
This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [32]).

5.37.2.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-rslppi-pp/<apiVersion>/pp

This resource shall support the resource URI variables defined in table 5.37.2.2.2-1.

**Table 5.37.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.37.1. |

### 5.37.2.2.3 Resource Methods

#### 5.37.2.2.3.1 GET

This method enables an AF to request to retrieve all the active RSLPPI Parameters Provisionings managed by the NEF.

This method shall support the URI query parameters specified in table 5.37.2.2.3.1-1.

**Table 5.37.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.37.2.2.3.1-2 and the response data structures and response codes specified in table 5.37.2.2.3.1-3.

**Table 5.37.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.37.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(RslppiPpData)                                                                                                                 | M | 0..N        | 200 OK                 | Successful case. All the "Individual RSLPPI Parameters Provisioning" resources managed by the NEF are returned.<br><br>If there are no existing "Individual RSLPPI Parameters Provisioning" resources managed at the NEF, an empty array is returned. |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.37.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.37.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.37.2.2.3.2 POST

This method enables an AF to request the creation of a new RSLPPI Parameters Provisioning at the NEF.

This method shall support the URI query parameters specified in table 5.37.2.2.3.2-1.

**Table 5.37.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.37.2.2.3.2-2 and the response data structures and response codes specified in table 5.37.2.2.3.2-3.

**Table 5.37.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type    | P | Cardinality | Description                                                                                 |
|--------------|---|-------------|---------------------------------------------------------------------------------------------|
| RslppiPpData | M | 1           | Contains the representation of the RSLPPI Parameters Provisioning to be created at the NEF. |

**Table 5.37.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                      | P | Cardinality | Response codes | Description                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RslppiPpData                                                                                                                   | M | 1           | 201 Created    | Successful case. A representation of the created "Individual RSLPPI Parameters Provisioning" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                |                                                                                                                                                                                                                                |

**Table 5.37.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                    |
|----------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-rslppi-pp/<apiVersion>/pp/{ppId} |

#### 5.37.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.37.2.3 Resource: Individual RSLPPI Parameters Provisioning

#### 5.37.2.3.1 Introduction

This resource represents an "Individual RSLPPI Parameters Provisioning" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [32]).



## 5.37.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-rslppi-pp/<apiVersion>/pp/{ppId}

This resource shall support the resource URI variables defined in table 5.37.2.3.2-1.

**Table 5.37.2.3.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                                                                             |
|---------|-----------|----------------------------------------------------------------------------------------|
| apiRoot | string    | See clause 5.37.1.                                                                     |
| ppId    | string    | Represents the identifier of the "Individual RSLPPI Parameters Provisioning" resource. |

## 5.37.2.3.3 Resource Methods

## 5.37.2.3.3.1 GET

This method enables an AF to request to retrieve an existing "Individual RSLPPI Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.37.2.3.3.1-1.

**Table 5.37.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.37.2.3.3.1-2 and the response data structures and response codes specified in table 5.37.2.3.3.1-3.

**Table 5.37.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.37.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RslppiPpData                                                                                                                        | M | 1           | 200 OK                 | Successful case. The requested "Individual RSLPPI Parameters Provisioning" resource is returned in the response body.                                                                                                                                 |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.37.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.37.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.37.2.3.3.2 PUT

This method enables an AF to request the update of an existing "Individual RSLPPI Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.37.2.3.3.2-1.

**Table 5.37.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.37.2.3.3.2-2 and the response data structures and response codes specified in table 5.37.2.3.3.2-3.

**Table 5.37.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type    | P | Cardinality | Description                                                                                 |
|--------------|---|-------------|---------------------------------------------------------------------------------------------|
| RslppiPpData | M | 1           | Represents the updated "Individual RSLPPI Parameters Provisioning" resource representation. |

**Table 5.37.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type    | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|--------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RslppiPpData | M | 1           | 200 OK                 | Successful response. The "Individual RSLPPI Parameters Provisioning" resource is successfully updated and a representation of the updated resource is returned in the response body.                                                                  |
| n/a          |   |             | 204 No Content         | Successful response. The "Individual RSLPPI Parameters Provisioning" resource is successfully updated and no content is returned in the response body.                                                                                                |
| n/a          |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a          |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply.

**Table 5.37.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.37.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

### 5.37.2.3.3.3 PATCH

This method enables an AF to request the modification of an existing "Individual RSLPPI Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.37.2.3.3.3-1.

**Table 5.37.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.37.2.3.3.3-2 and the response data structures and response codes specified in table 5.37.2.3.3.3-3.

**Table 5.37.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type         | P | Cardinality | Description                                                                                         |
|-------------------|---|-------------|-----------------------------------------------------------------------------------------------------|
| RslppiPpDataPatch | M | 1           | Represents the requested modifications to the "Individual RSLPPI Parameters Provisioning" resource. |

**Table 5.37.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type    | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|--------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RslppiPpData | M | 1           | 200 OK                 | Successful response. The "Individual RSLPPI Parameters Provisioning" resource is successfully modified and a representation of the updated resource is returned in the response body.                                                                 |
| n/a          |   |             | 204 No Content         | Successful response. The "Individual RSLPPI Parameters Provisioning" resource is successfully modified and no content is returned in the response body.                                                                                               |
| n/a          |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a          |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.                                                                                  |

|                                                                                                                                       |  |  |  |                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------|
|                                                                                                                                       |  |  |  | Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |  |                                                                           |

**Table 5.37.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.37.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**5.37.2.3.3.4 DELETE**

This method enables an AF to request the deletion of an existing "Individual RSLPPI Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.37.2.3.3.4-1.

**Table 5.37.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.37.2.3.3.4-2 and the response data structures and response codes specified in table 5.37.2.3.3.4-3.

**Table 5.37.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.37.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-----------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful case. The "Individual RSLPPI Parameters Provisioning" resource is successfully deleted.                                                                                                                                                    |
| n/a       |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a       |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply.

**Table 5.37.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.37.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.37.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.37.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.37.4 Notifications

There are no notifications defined for this API in this release of the specification.

### 5.37.5 Data Model

#### 5.37.5.1 General

This clause specifies the application data model supported by the RSLPPIParametersProvisioning API. Table 5.37.5.1-1 specifies the data types defined for the RSLPPIParametersProvisioning API.

**Table 5.37.5.1-1: RSLPPIParametersProvisioning API specific Data Types**

| Data type         | Clause defined | Description                                                                               | Applicability |
|-------------------|----------------|-------------------------------------------------------------------------------------------|---------------|
| RslppiData        | 5.37.5.2.2     | Represents RSLPPI parameters data.                                                        |               |
| RslppiPpData      | 5.37.5.2.3     | Represents RSLPPI Parameters Provisioning data.                                           |               |
| RslppiPpDataPatch | 5.37.5.2.4     | Represents the requested modification to an existing RSLPPI Parameters Provisioning data. |               |

Table 5.37.5.1-2 specifies data types re-used by the RSLPPIParametersProvisioning API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the RSLPPIParametersProvisioning API.

**Table 5.37.5.1-2: RSLPPIParametersProvisioning API re-used Data Types**

| Data type         | Reference           | Comments                                                                                                      | Applicability |
|-------------------|---------------------|---------------------------------------------------------------------------------------------------------------|---------------|
| ExternalGroupId   | 3GPP TS 29.122 [4]  | Represents the External Group Identifier for a user group.                                                    |               |
| Gpsi              | 3GPP TS 29.571 [8]  | Represents a GPSI.                                                                                            |               |
| Rslppi            | 3GPP TS 29.503 [17] | Represents the RSLPPI information.                                                                            |               |
| SupportedFeatures | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features. |               |

## 5.37.5.2 Structured data types

### 5.37.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

### 5.37.5.2.2 Type: RslppiData

**Table 5.37.5.2.2-1: Definition of type RslppiData**

| Attribute name                                                                      | Data type       | P | Cardinality | Description                                                               | Applicability |
|-------------------------------------------------------------------------------------|-----------------|---|-------------|---------------------------------------------------------------------------|---------------|
| extGroupld                                                                          | ExternalGroupld | C | 0..1        | Represents the external group identifier of the targeted group.<br>(NOTE) |               |
| gpsi                                                                                | Gpsi            | C | 0..1        | Represents the GPSI of the targeted UE.<br>(NOTE)                         |               |
| rslppi                                                                              | Rslppi          | M | 1           | Contains the RSLPPI parameters.                                           |               |
| NOTE: These attributes are mutually exclusive. Either one of them shall be present. |                 |   |             |                                                                           |               |

### 5.37.5.2.3 Type: RslppiPpData

**Table 5.37.5.2.3-1: Definition of type RslppiPpData**

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                                | Applicability |
|----------------|-------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afld           | string            | M | 1           | Contains the identifier of the AF that is sending the request.                                                                                                             |               |
| rslppiData     | RslppiData        | C | 0..1        | Contains the RSLPPI data that the AF requests to provision.<br><br>This attribute shall be present only when the AF requests to provision RSLPPI parameters.               |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Contains the list of supported features among the ones defined in clause 5.37.6.<br><br>This attribute shall be present when only feature negotiation needs to take place. |               |
|                |                   |   |             |                                                                                                                                                                            |               |

### 5.37.5.2.4 Type: RslppiPpDataPatch

**Table 5.37.5.2.4-1: Definition of type RslppiPpDataPatch**

| Attribute name | Data type  | P | Cardinality | Description                                                          | Applicability |
|----------------|------------|---|-------------|----------------------------------------------------------------------|---------------|
| rslppiData     | RslppiData | O | 0..1        | Contains the modified RSLPPI data that the AF requests to provision. |               |

## 5.37.5.3 Simple data types and enumerations

### 5.37.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.37.5.3.2 Simple data types

The simple data types defined in table 5.37.5.3.2-1 shall be supported.

**Table 5.37.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.37.5.4 Data types describing alternative data types or combinations of data types

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.37.6 Used Features

The table below defines the features applicable to the RSLPPIParametersProvisioning API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.37.6-1: Supported Features**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.37.7 Error handling

### 5.37.7.1 General

For the RSLPPIParametersProvisioning API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the RSLPPIParametersProvisioning API.

### 5.37.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the RSLPPIParametersProvisioning API.

### 5.37.7.3 Application Errors

The application errors defined for the RSLPPIParametersProvisioning API are listed in table 5.37.7.3-1.

**Table 5.37.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.38 AddressingParamProvision API

### 5.38.1 Introduction

The Nnef\_ParameterProvision service shall use the AddressingParamProvision API for:

- Static IP Address Parameters provisioning.

The API URI of the AddressingParamProvision API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-addr-pp".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

5.38.2 Resources

5.38.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.38.2.1-1 and the resources and HTTP methods used for the AddressingParamProvision API.

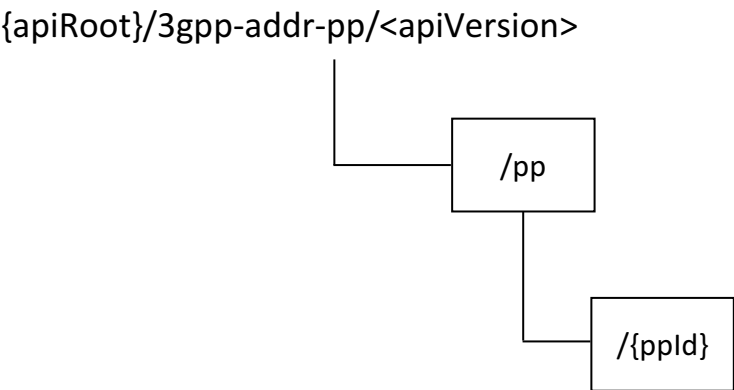


**Figure 5.38.2.1-1: Resource URI structure of the AddressingParamProvision API**

Table 5.38.2.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 5.38.2.1-1: Resources and methods overview**

| Resource name                                 | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                                          |
|-----------------------------------------------|--------------------------------------------|---------------------------------|------------------------------------------------------------------------------------------|
| Addressing Parameters Provisionings           | /pp                                        | GET                             | Retrieve all the active Addressing Parameters Provisionings managed by the NEF.          |
|                                               |                                            | POST                            | Request the creation of a new Addressing Parameters Provisioning at the NEF.             |
| Individual Addressing Parameters Provisioning | /pp/{ppId}                                 | GET                             | Retrieve an existing "Individual Addressing Parameters Provisioning" managed by the NEF. |



|  |  |        |                                                                                        |
|--|--|--------|----------------------------------------------------------------------------------------|
|  |  | PUT    | Update an existing "Individual Addressing Parameters Provisioning" managed by the NEF. |
|  |  | PATCH  | Modify an existing "Individual Addressing Parameters Provisioning" managed by the NEF. |
|  |  | DELETE | Delete an existing "Individual Addressing Parameters Provisioning" managed by the NEF. |

## 5.38.2.2 Resource: Addressing Parameters Provisionings

### 5.38.2.2.1 Introduction

This resource represents the collection of Addressing Parameters Provisionings managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [32]).

### 5.38.2.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-addr-pp/<apiVersion>/pp**

This resource shall support the resource URI variables defined in table 5.38.2.2.2-1.

**Table 5.38.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.38.1. |

### 5.38.2.2.3 Resource Standard Methods

#### 5.38.2.2.3.1 GET

This method enables an AF to request to retrieve all the active Addressing Parameters Provisionings managed by the NEF.

This method shall support the URI query parameters specified in table 5.38.2.2.3.1-1.

**Table 5.38.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.38.2.2.3.1-2 and the response data structures and response codes specified in table 5.38.2.2.3.1-3.

**Table 5.38.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.38.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
|-----------|---|-------------|----------------|-------------|

|                                                                                                                                     |   |      |                        |                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------|---|------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(AddrPpData)                                                                                                                   | M | 0..N | 200 OK                 | Successful case. All the "Individual Addressing Parameters Provisioning" resource(s) managed by the NEF are returned.<br><br>If there are no existing "Individual Addressing Parameters Provisioning" resources managed at the NEF, an empty array is returned. |
| n/a                                                                                                                                 |   |      | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].           |
| n/a                                                                                                                                 |   |      | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].           |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |      |                        |                                                                                                                                                                                                                                                                 |

**Table 5.38.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.38.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.38.2.2.3.2 POST**

This method enables an AF to request the creation of a new Addressing Parameters Provisioning at the NEF.

This method shall support the URI query parameters specified in table 5.38.2.2.3.2-1.

**Table 5.38.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.38.2.2.3.2-2 and the response data structures and response codes specified in table 5.38.2.2.3.2-3.

**Table 5.38.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type  | P | Cardinality | Description                                                                                     |
|------------|---|-------------|-------------------------------------------------------------------------------------------------|
| AddrPpData | M | 1           | Contains the representation of the Addressing Parameters Provisioning to be created at the NEF. |

**Table 5.38.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes | Description                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AddrPpData                                                                                                                             | M | 1           | 201 Created    | Successful case. A representation of the created "Individual Addressing Parameters Provisioning" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| ProblemDetails                                                                                                                         | O | 0..1        | 403 Forbidden  | (NOTE 2)                                                                                                                                                                                                                           |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                                    |
| NOTE 2: Failure causes are described in clause 5.38.7.                                                                                 |   |             |                |                                                                                                                                                                                                                                    |

**Table 5.38.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                  |
|----------|-----------|---|-------------|------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-addr-pp/<apiVersion>/pp/{ppId} |

#### 5.38.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.38.2.3 Resource: Individual Addressing Parameters Provisioning

#### 5.38.2.3.1 Introduction

This resource represents an "Individual Addressing Parameters Provisioning" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [32]).

#### 5.38.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-addr-pp/<apiVersion>/pp/{ppId}

This resource shall support the resource URI variables defined in table 5.38.2.3.2-1.

**Table 5.38.2.3.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                                                                                 |
|---------|-----------|--------------------------------------------------------------------------------------------|
| apiRoot | string    | See clause 5.38.1.                                                                         |
| ppId    | string    | Represents the identifier of the "Individual Addressing Parameters Provisioning" resource. |

#### 5.38.2.3.3 Resource Standard Methods

##### 5.38.2.3.3.1 GET

This method enables an AF to request to retrieve an existing "Individual Addressing Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.38.2.3.3.1-1.

**Table 5.38.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.38.2.3.3.1-2 and the response data structures and response codes specified in table 5.38.2.3.3.1-3.

**Table 5.38.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.38.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AddrPpData                                                                                                                          | M | 1           | 200 OK                 | Successful case. The requested "Individual Addressing Parameters Provisioning" resource is returned in the response body.                                                                                                                             |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.38.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.38.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.38.2.3.3.2 PUT

This method enables an AF to request the update of an existing "Individual Addressing Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.38.2.3.3.2-1.

**Table 5.38.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.38.2.3.3.2-2 and the response data structures and response codes specified in table 5.38.2.3.3.2-3.

**Table 5.38.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type  | P | Cardinality | Description                                                                                     |
|------------|---|-------------|-------------------------------------------------------------------------------------------------|
| AddrPpData | M | 1           | Represents the updated "Individual Addressing Parameters Provisioning" resource representation. |

**Table 5.38.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                             | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AddrPpData                                                                                                                            | M | 1           | 200 OK                 | Successful response. The "Individual Addressing Parameters Provisioning" resource is successfully updated and a representation of the updated resource is returned in the response body.                                                              |
| n/a                                                                                                                                   |   |             | 204 No Content         | Successful response. The "Individual Addressing Parameters Provisioning" resource is successfully updated and no content is returned in the response body.                                                                                            |
| n/a                                                                                                                                   |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                   |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                        | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                                              |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |
| NOTE 2: Failure causes are described in clause 5.38.7.                                                                                |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.38.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.38.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.38.2.3.3.3 PATCH

This method enables an AF to request the modification of an existing "Individual Addressing Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.38.2.3.3.3-1.

**Table 5.38.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.38.2.3.3.3-2 and the response data structures and response codes specified in table 5.38.2.3.3.3-3.

**Table 5.38.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type       | P | Cardinality | Description                                                                                             |
|-----------------|---|-------------|---------------------------------------------------------------------------------------------------------|
| AddrPpDataPatch | M | 1           | Represents the requested modifications to the "Individual Addressing Parameters Provisioning" resource. |

**Table 5.38.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                               | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AddrPpData                                                                                                                              | M | 1           | 200 OK                 | Successful response. The "Individual Addressing Parameters Provisioning" resource is successfully modified and a representation of the updated resource is returned in the response body.                                                             |
| n/a                                                                                                                                     |   |             | 204 No Content         | Successful response. The "Individual Addressing Parameters Provisioning" resource is successfully modified and no content is returned in the response body.                                                                                           |
| n/a                                                                                                                                     |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                     |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                          | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                                              |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |
| NOTE 2: Failure causes are described in clause 5.38.7.                                                                                  |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.38.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.38.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

## 5.38.2.3.3.4 DELETE

This method enables an AF to request the deletion of an existing "Individual Addressing Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.38.2.3.3.4-1.

**Table 5.38.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.38.2.3.3.4-2 and the response data structures and response codes specified in table 5.38.2.3.3.4-3.

**Table 5.38.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.38.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful case. The "Individual Addressing Parameters Provisioning" resource is successfully deleted.                                                                                                                                                |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.38.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.38.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

## 5.38.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.38.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.38.4 Notifications

There are no notifications defined for this API in this release of the specification.

### 5.38.5 Data Model

#### 5.38.5.1 General

This clause specifies the application data model supported by the AddressingParamProvision API. Table 5.38.5.1-1 specifies the data types defined for the AddressingParamProvision API.

**Table 5.38.5.1-1: AddressingParamProvision API specific Data Types**

| Data type          | Clause defined | Description                                                                              | Applicability |
|--------------------|----------------|------------------------------------------------------------------------------------------|---------------|
| AddrPpData         | 5.38.5.2.2     | Represents the Addressing Parameters data.                                               |               |
| StaticIpAddrParams | 5.38.5.2.3     | Represents Static IP Address Parameters data.                                            |               |
| AddrPpDataPatch    | 5.38.5.2.4     | Represents the requested modification to an existing Addressing Parameters Provisioning. |               |

Table 5.38.5.1-2 specifies data types re-used by the AddressingParamProvision API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the AddressingParamProvision API.

**Table 5.38.5.1-2: AddressingParamProvision API re-used Data Types**

| Data type         | Reference          | Comments                                                                                                      | Applicability |
|-------------------|--------------------|---------------------------------------------------------------------------------------------------------------|---------------|
| Dnn               | 3GPP TS 29.571 [8] | Represents a DNN.                                                                                             |               |
| Gpsi              | 3GPP TS 29.571 [8] | Represents a GPSI.                                                                                            |               |
| IpAddr            | 3GPP TS 29.571 [8] | Represents an IP address (IPv4, or IPv6, or IPv6 prefix).                                                     |               |
| ProblemDetails    | 3GPP TS 29.571 [8] | Represents error related information.                                                                         |               |
| Snsai             | 3GPP TS 29.571 [8] | Represents an S-NSSAI.                                                                                        |               |
| SupportedFeatures | 3GPP TS 29.571 [8] | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features. |               |

#### 5.38.5.2 Structured data types

##### 5.38.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

##### 5.38.5.2.2 Type: AddrPpData

**Table 5.38.5.2.2-1: Definition of type AddrPpData**

| Attribute name     | Data type                 | P | Cardinality | Description                                                                          | Applicability |
|--------------------|---------------------------|---|-------------|--------------------------------------------------------------------------------------|---------------|
| afId               | string                    | M | 1           | Contains the identifier of the AF that is sending the request.                       |               |
| staticIpaddrParams | array(StaticIpAddrParams) | C | 1..N        | Contains the Static IP Addressing Parameters data that the AF requests to provision. |               |



|          |                   |   |      |                                                                                                                                                                            |  |
|----------|-------------------|---|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|          |                   |   |      | This attribute shall be present only when the AF requests to provision static IP addressing parameters.                                                                    |  |
| suppFeat | SupportedFeatures | C | 0..1 | Contains the list of supported features among the ones defined in clause 5.38.6.<br><br>This attribute shall be present only when feature negotiation needs to take place. |  |

### 5.38.5.2.3 Type: StaticIpAddrParams

**Table 5.38.5.2.3-1: Definition of type StaticIpAddrParams**

| Attribute name    | Data type     | P | Cardinality | Description                                                                                                 | Applicability |
|-------------------|---------------|---|-------------|-------------------------------------------------------------------------------------------------------------|---------------|
| dnn               | Dnn           | M | 1           | Contains the DNN to which the provisioned static IP addressing parameters data is related.                  |               |
| snssai            | Snssai        | M | 1           | Contains the S-NSSAI to which the provisioned static IP addressing parameters data is related.              |               |
| gpsi              | Gpsi          | O | 0..1        | Contains the identifier of the UE to which the provisioned static IP addressing parameters data is related. |               |
| staticIpAddresses | array(IpAddr) | M | 1..N        | Contains the provisioned static IP address(es) of the UE.                                                   |               |

### 5.38.5.2.4 Type: AddrPpDataPatch

**Table 5.38.5.2.4-1: Definition of type AddrPpDataPatch**

| Attribute name                                                                                                                         | Data type                 | P | Cardinality | Description                                                                                         | Applicability |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---|-------------|-----------------------------------------------------------------------------------------------------|---------------|
| staticIpAddrParams                                                                                                                     | array(StaticIpAddrParams) | O | 1..N        | Contains the modified Static IP address parameters that the AF requests to provision.<br><br>(NOTE) |               |
| NOTE: The "dnn", "snssai" and "gpsi" attributes within each array element of the "staticIpAddrParams" attribute shall not be modified. |                           |   |             |                                                                                                     |               |

## 5.38.5.3 Simple data types and enumerations

### 5.38.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.38.5.3.2 Simple data types

The simple data types defined in table 5.38.5.3.2-1 shall be supported.

**Table 5.38.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.38.5.4 Data types describing alternative data types or combinations of data types

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.38.5.5 Binary data

### 5.38.5.5.1 Binary Data Types

**Table 5.38.5.5.1-1: Binary Data Types**

| Name | Clause defined | Content type |
|------|----------------|--------------|
|      |                |              |

## 5.38.6 Used Features

The optional features in table 5.38.6-1 are defined for the AddressingParamProvision API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.38.6-1: Supported Features**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.38.7 Error handling

### 5.38.7.1 General

For the AddressingParamProvision API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the AddressingParamProvision API.

### 5.38.7.2 Protocol Errors

No specific procedures for the AddressingParamProvision API are specified.

### 5.38.7.3 Application Errors

The application errors defined for the AddressingParamProvision API are listed in table 5.38.7.3-1.

**Table 5.38.7.3-1: Application errors**

| Application Error    | HTTP status code | Description                                                                                                                                                                                                                                             | Applicability |
|----------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| OUT_OF_ALLOWED_RANGE | 403 Forbidden    | Indicates that the Static IP Addressing Parameters Provisioning request is rejected because the provided static IP addressing parameters provisioning data is not within the IP address/prefix range allowed for the target DNN and S-NSSAI for the AF. |               |

## 5.39 UAVFlightAssistance API

### 5.39.1 Introduction

The UAVFlightAssistance service shall use the UAVFlightAssistance API.

The API URI of UAVFlightAssistance API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [2], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-uav-fa".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

5.39.2 Resources

5.39.2.1 Overview

This clause describes the structure for the Resource URIs as shown in Figure 5.39.2.1-1 and the resources and HTTP methods used for the UAVFlightAssistance API.

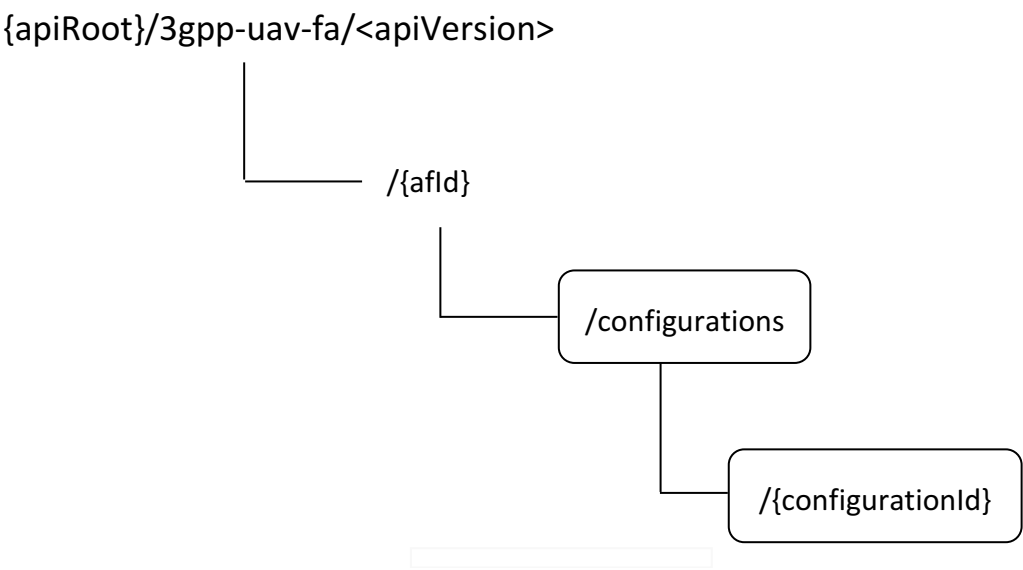


**Figure 5.39.2.1-1: Resource URI structure of the UAVFlightAssistance API**

Table 5.39.2.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 5.39.2.1-1: Resources and methods overview**

| Resource name                        | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                                    |
|--------------------------------------|--------------------------------------------|---------------------------------|------------------------------------------------------------------------------------|
| UAV Flight Assistance Configurations | /{afld}/configurations                     | GET                             | Retrieve all the active UAV Flight Assistance Configuration(s) managed by the NEF. |
|                                      |                                            | POST                            | Create a new UAV Flight Assistance Configuration.                                  |

|                                                |                                         |        |                                                                                 |
|------------------------------------------------|-----------------------------------------|--------|---------------------------------------------------------------------------------|
| Individual UAV Flight Assistance Configuration | {afld}/configurations/{configurationId} | GET    | Retrieve an existing "Individual UAV Flight Assistance Configuration" resource. |
|                                                |                                         | PUT    | Update an existing "Individual UAV Flight Assistance Configuration" resource.   |
|                                                |                                         | PATCH  | Modify an existing "Individual UAV Flight Assistance Configuration" resource.   |
|                                                |                                         | DELETE | Delete an existing "Individual UAV Flight Assistance Configuration" resource.   |

### 5.39.2.2 Resource: UAV Flight Assistance Configurations

#### 5.39.2.2.1 Introduction

This resource represents the collection of UAV Flight Assistance Configurations managed by the NEF for a given AF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [32]).

#### 5.39.2.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-uav-fa/<apiVersion>/{afld}/configurations**

This resource shall support the resource URI variables defined in table 5.39.2.2.2-1.

**Table 5.39.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                           |
|---------|-----------|--------------------------------------|
| apiRoot | string    | See clause 5.39.1.                   |
| afld    | string    | Represents the identifier of the AF. |

#### 5.39.2.2.3 Resource Standard Methods

##### 5.39.2.2.3.0 GET

This method enables an AF to request to retrieve all the active "UAV Flight Assistance Configurations" resources managed by the NEF.

This method shall support the URI query parameters specified in table 5.39.2.2.3.0-1.

**Table 5.39.2.2.3.0-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.39.2.2.3.0-2 and the response data structures and response codes specified in table 5.39.2.2.3.0-3.

**Table 5.39.2.2.3.0-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.39.2.2.3.0-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
|-----------|---|-------------|----------------|-------------|

|                                                                                                                                     |   |      |                        |                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------|---|------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(UavFlightAssistance)                                                                                                          | M | 0..N | 200 OK                 | Successful case. All the "Individual UAV Flight Assistance Configuration" resource(s) managed by the NEF are returned.<br><br>If there are no existing "Individual UAV Flight Assistance Configuration" resources managed at the NEF, an empty array is returned. |
| n/a                                                                                                                                 |   |      | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].             |
| n/a                                                                                                                                 |   |      | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].             |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |      |                        |                                                                                                                                                                                                                                                                   |

**Table 5.39.2.2.3.0-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.39.2.2.3.0-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.39.2.2.3.1 POST**

This method enables an AF to request the creation of a new UAV Flight Assistance Configuration at the NEF.

This method shall support the URI query parameters specified in table 5.39.2.2.3.1-1.

**Table 5.39.2.2.3.1-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.39.2.2.3.1-2 and the response data structures and response codes specified in table 5.39.2.2.3.1-3.

**Table 5.39.2.2.3.1-2: Data structures supported by the POST request body on this resource**

| Data type           | P | Cardinality | Description                                                                                  |
|---------------------|---|-------------|----------------------------------------------------------------------------------------------|
| UavFlightAssistance | M | 1           | Contains the representation of UAV Flight Assistance Configuration to be created at the NEF. |

**Table 5.39.2.2.3.1-3: Data structures supported by the POST response body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes | Description                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UavFlightAssistance                                                                                                                  | M | 1           | 201 Created    | Successful case. A representation of the created "Individual UAV Flight Assistance Configuration" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                                     |

**Table 5.39.2.2.3.1-4: Headers supported by the 201 response code on this resource**

| HTTP response header | Data type | P | Cardinality | Description                                                                                                                                               |
|----------------------|-----------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location             | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-uav-fa/<apiVersion>/{afId}/configurations/{configurationId} |

#### 5.39.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.39.2.3 Resource: Individual UAV Flight Assistance Configuration

#### 5.39.2.3.1 Introduction

This resource represents an "Individual UAV Flight Assistance Configuration" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [32]).

#### 5.39.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-uav-fa/<apiVersion>/{afId}/configurations/{configurationId}

This resource shall support the resource URI variables defined in table 5.39.2.3.2-1.

**Table 5.39.2.3.2-1: Resource URI variables for this resource**

| Name            | Data type | Definition                                                                              |
|-----------------|-----------|-----------------------------------------------------------------------------------------|
| apiRoot         | string    | See clause 5.39.1 of 3GPP TS 29.122 [4].                                                |
| afId            | string    | Represents the identifier of the AF.                                                    |
| configurationId | string    | Represents identifier of the "Individual UAV Flight Assistance Configuration" resource. |

#### 5.39.2.3.3 Resource Standard Methods

##### 5.39.2.3.3.0 GET

This method enables an AF to request to retrieve an existing "Individual UAV Flight Assistance Configuration" resource at the NEF.

This method shall support the URI query parameters specified in table 5.39.2.3.3.0-1.

**Table 5.39.2.3.3.0-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.39.2.3.3.0-2 and the response data structures and response codes specified in table 5.39.2.3.3.0-3.

**Table 5.39.2.3.3.0-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.39.2.3.3.0-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UavFlightAssistance                                                                                                                 | M | 1           | 200 OK                 | Successful case. The requested "Individual UAV Flight Assistance Configuration" resource is returned in the response body.                                                                                                                            |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.39.2.3.3.0-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.39.2.3.3.0-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.39.2.3.3.1 PUT

This method enables an AF to update an existing "Individual UAV Flight Assistance Configuration" resource at the NEF.

This method shall support the URI query parameters specified in table 5.39.2.3.3.1-1.

**Table 5.39.2.3.3.1-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.39.2.3.3.1-2 and the response data structures and response codes specified in table 5.39.2.3.3.1-3.

**Table 5.39.2.3.3.1-2: Data structures supported by the PUT request body on this resource**

| Data type           | P | Cardinality | Description                                                                                      |
|---------------------|---|-------------|--------------------------------------------------------------------------------------------------|
| UavFlightAssistance | M | 1           | Represents the updated "Individual UAV Flight Assistance Configuration" resource representation. |

**Table 5.39.2.3.3.1-3: Data structures supported by the PUT response body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UavFlightAssistance                                                                                                                 | M | 1           | 200 OK                 | Successful case. The "Individual UAV Flight Assistance Configuration" resource is successfully updated and a representation of the updated resource is returned in the response body.                                                                 |
| n/a                                                                                                                                 |   |             | 204 No Content         | Successful case. The "Individual UAV Flight Assistance Configuration" resource is successfully updated and no content is to be returned in the response body.                                                                                         |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.39.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.39.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.39.2.3.3.1A PATCH

This method enables an AF to request the modification of an existing "Individual UAV Flight Assistance Configuration" resource at the NEF.

This method shall support the URI query parameters specified in table 5.39.2.3.3.1A-1.

**Table 5.39.2.3.3.1A-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |



This method shall support the request data structures specified in table 5.39.2.3.3.1A-2 and the response data structures and response codes specified in table 5.39.2.3.3.1A-3.

**Table 5.39.2.3.3.1A-2: Data structures supported by the PATCH Request Body on this resource**

| Data type                | P | Cardinality | Description                                                                                              |
|--------------------------|---|-------------|----------------------------------------------------------------------------------------------------------|
| UavFlightAssistancePatch | M | 1           | Represents the requested modifications to the "Individual UAV Flight Assistance Configuration" resource. |

**Table 5.39.2.3.3.1A-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                             | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UavFlightAssistance                                                                                                                   | M | 1           | 200 OK                 | Successful response. The "Individual UAV Flight Assistance Configuration" resource is successfully modified and a representation of the updated resource is returned in the response body.                                                            |
| n/a                                                                                                                                   |   |             | 204 No Content         | Successful response. The "Individual UAV Flight Assistance Configuration" resource is successfully modified and no content is returned in the response body.                                                                                          |
| n/a                                                                                                                                   |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                   |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.39.2.3.3.1A-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.39.2.3.3.1A-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.39.2.3.3.2 DELETE

This method enables an AF to request the deletion of an existing "Individual UAV Flight Assistance Configuration" resource at the NEF.

This method shall support the URI query parameters specified in table 5.39.2.3.3.2-1.

**Table 5.39.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|     |  |  |  |  |
|-----|--|--|--|--|
| n/a |  |  |  |  |
|-----|--|--|--|--|

This method shall support the request data structures specified in table 5.39.2.3.3.2-2 and the response data structures and response codes specified in table 5.39.2.3.3.2-3.

**Table 5.39.2.3.3.2-2: Data structures supported by the DELETE request body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.39.2.3.3.2-3: Data structures supported by the DELETE response body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful case. The "Individual UAV Flight Assistance Configuration" resource is successfully deleted.                                                                                                                                               |
|                                                                                                                                        |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
|                                                                                                                                        |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.39.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.39.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.39.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.39.3 Custom Operations without associated resources

#### 5.39.3.1 Overview

The structure of the custom operation URIs of the UAVFlightAssistance API is shown in Figure 5.39.3.1-1.

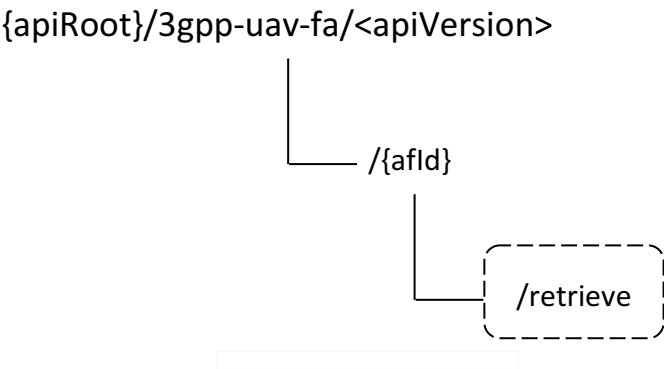


**Figure 5.39.3.1-1: Custom operation URI structure of the UAVFlightAssistance API**

Table 5.39.3.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the UAVFlightAssistance API.

**Table 5.39.3.1-1: Custom operations without associated resources**

| Custom operation name | Custom operation URI | Mapped HTTP method | Description                                 |
|-----------------------|----------------------|--------------------|---------------------------------------------|
| Retrieve              | /afld/retrieve       | POST               | Request to retrieve UAV Flight information. |

The custom operations shall support the URI variables defined in table 5.39.3.1-2.

**Table 5.39.3.1-2: URI variables for this custom operation**

| Name    | Data type | Definition                           |
|---------|-----------|--------------------------------------|
| apiRoot | string    | See clause 5.39.1.                   |
| afld    | string    | Represents the identifier of the AF. |

5.39.3.2      Operation: Retrieve

5.39.3.2.1      Description

The custom operation allows to retrieve UAV Flight information from the NEF.

5.39.3.2.2      Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.39.3.2.2-1 and table 5.39.3.2.2-2.

**Table 5.39.3.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type        | P | Cardinality | Description                                                            |
|------------------|---|-------------|------------------------------------------------------------------------|
| UAVFlightInfoReq | M | 1           | Contains the parameters to request to retrieve UAV Flight information. |

**Table 5.39.3.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type         | P | Cardinality | Response codes         | Description                                                                                                                                                         |
|-------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UAVFlightInfoResp | M | 1           | 200 OK                 | Successful case. The UAV Flight information retrieval request is successfully processed, and the requested UAV Flight information is returned in the response body. |
| n/a               |   |             | 307 Temporary Redirect | Temporary redirection.                                                                                                                                              |

|                                                                                                                                             |  |  |                        |                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                             |  |  |                        | <p>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p>                               |
| n/a                                                                                                                                         |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| <p>NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply.</p> |  |  |                        |                                                                                                                                                                                                                                              |

**Table 5.39.3.2.2-3: Headers supported by the 307 Response Code on this custom operation**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI located in an alternative NEF. |

**Table 5.39.3.2.2-4: Headers supported by the 308 Response Code on this custom operation**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI located in an alternative NEF. |

## 5.39.4 Notifications

### 5.39.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.39.4.1-1: Notifications overview**

| Notification                       | Callback URI | HTTP method or custom operation | Description (service operation)                                                                 |
|------------------------------------|--------------|---------------------------------|-------------------------------------------------------------------------------------------------|
| UAV Flight Assistance Notification | {notifUri}   | POST                            | Enables the NEF to notify a previously subscribed AF on UAV Flight Assistance related event(s). |

### 5.39.4.2 UAV Flight Assistance Notification

#### 5.39.4.2.1 Description

The UAV Flight Assistance Notification is used by the NEF to report UAV Flight Assistance related event(s) to a previously subscribed AF.

#### 5.39.4.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 5.39.4.2.2-1.

**Table 5.39.4.2.2-1: Callback URI variables**

| Name     | Definition                                                          |
|----------|---------------------------------------------------------------------|
| notifUri | Represents the callback URI encoded as a string formatted as a URI. |

## 5.39.4.2.3 Operation Definition

This method shall support the request data structures specified in table 5.39.4.2.3-1 and the response data structures and response codes specified in table 5.39.4.2.3-2.

**Table 5.39.4.2.3-1: Data structures supported by the POST Request Body on this resource**

| Data type            | P | Cardinality | Description                                        |
|----------------------|---|-------------|----------------------------------------------------|
| UAVFlightAssistNotif | M | 1           | Represents the UAV Flight Assistance Notification. |

**Table 5.39.4.2.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UAVFlightAssistNotifResp                                                                                                             | M | 1           | 200 OK                 | Successful case. The notification is successfully received and acknowledged, and notification related information is returned in the response body.                                                                                                                                            |
| n/a                                                                                                                                  |   |             | 204 No Content         | Successful case. The notification is successfully received and acknowledged.                                                                                                                                                                                                                   |
| n/a                                                                                                                                  |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                  |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                |

**Table 5.39.4.2.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.39.4.2.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.39.5 Data Model

### 5.39.5.1 General

This clause specifies the application data model supported by the UAVFlightAssistance API. Table 5.39.5.1-1 specifies the data types defined for the UAVFlightAssistance API.

**Table 5.39.5.1-1: UAVFlightAssistance API specific Data Types**

| Data type                | Clause defined | Description                                                                      | Applicability |
|--------------------------|----------------|----------------------------------------------------------------------------------|---------------|
| AltitudeReport           | 5.39.5.2.9     | Represents the UAV's altitude report.                                            |               |
| AltitudeRepEvent         | 5.39.5.3.5     | Represents the UAV's altitude reporting event.                                   |               |
| AltitudeRepReqs          | 5.39.5.2.8     | Represents the UAV's altitude reporting requirements.                            |               |
| AltThresholds            | 5.39.5.2.10    | Represents the UAV's altitude thresholds.                                        |               |
| CandidateFlightPathInfo  | 5.39.5.2.13    | Represents the candidate flight path information.                                |               |
| FlightPath               | 5.39.5.2.3     | Represents a flight path.                                                        |               |
| FlightPathSegInfo        | 5.39.5.2.4     | Represents a flight path segment.                                                |               |
| MonitoringMode           | 5.39.5.3.6     | Represents the UAV Flight Assistance monitoring mode.                            |               |
| RangSIUavData            | 5.39.5.2.11    | Represents the Ranging/Sidelink UAV data.                                        |               |
| RequestPurpose           | 5.39.5.3.4     | Represents the purpose of the request.                                           |               |
| RetrievePurpose          | 5.39.5.3.7     | Represents the purpose of the retrieved UAV Flight information.                  |               |
| UavFlightAssistance      | 5.39.5.2.2     | Represents the UAV Flight Assistance Configuration.                              |               |
| UavFlightAssistancePatch | 5.39.5.2.7     | Represents the requested modifications to a UAV Flight Assistance Configuration. |               |
| UAVFlightAssistNotif     | 5.39.5.2.5     | Represents the UAV Flight Assistance Notification.                               |               |
| UAVFlightAssistNotifResp | 5.39.5.2.6     | Represents the response to a UAV Flight Assistance Notification.                 |               |
| UAVFlightInfoReq         | 5.39.5.2.12    | Represents the UAV Flight information retrieval request.                         |               |
| UAVFlightInfoResp        | 5.39.5.2.14    | Represents the UAV Flight information retrieval response.                        |               |
| UavStatus                | 5.39.5.3.3     | Represents the status of the UAV.                                                |               |

Table 5.39.5.1-2 specifies data types re-used by the UAVFlightAssistance API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the UAVFlightAssistance API.

**Table 5.39.5.1-2: Re-used Data Types**

| Data type                 | Reference           | Comments                                                                                                      | Applicability |
|---------------------------|---------------------|---------------------------------------------------------------------------------------------------------------|---------------|
| Altitude                  | 3GPP TS 29.572 [34] | Represents an altitude.                                                                                       |               |
| AnalyticsEventFilter      | 5.6.3.3.13          | Represents analytics event filter information.                                                                |               |
| DateTime                  | 3GPP TS 29.122 [4]  | Represents a date and a time.                                                                                 |               |
| DurationSec               | 3GPP TS 29.122 [4]  | Represents a time duration expressed in seconds.                                                              |               |
| Float                     | 3GPP TS 29.571 [8]  | Represents a float.                                                                                           |               |
| Gpsi                      | 3GPP TS 29.571 [8]  | Represents a GPSI.                                                                                            |               |
| LinearDistance            | 3GPP TS 29.572 [34] | Represents a linear distance.                                                                                 |               |
| LocationArea5G            | 3GPP TS 29.122 [4]  | Represents location area information.                                                                         |               |
| QoSSustainabilityExposure | 5.6.3.3.18          | Represents a QoS sustainability information.                                                                  |               |
| SupportedFeatures         | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features. |               |
| TimeWindow                | 3GPP TS 29.122 [4]  | Represents a time window.                                                                                     |               |
| UInteger                  | 3GPP TS 29.571 [8]  | Represents an unsigned integer.                                                                               |               |
| Uri                       | 3GPP TS 29.122 [4]  | Represents a URI.                                                                                             |               |

## 5.39.5.2 Structured data types

### 5.39.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

### 5.39.5.2.2 Type: UavFlightAssistance

**Table 5.39.5.2.2-1: Definition of type UavFlightAssistance**

| Attribute name | Data type             | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                              | Applicability |
|----------------|-----------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| uavId          | Gpsi                  | M | 1           | Identifies the UAV.                                                                                                                                                                                                                                                                                                                                      |               |
| reqPurpose     | RequestPurpose        | M | 1           | Contains the purpose of the request.                                                                                                                                                                                                                                                                                                                     |               |
| monitorMode    | MonitoringMode        | C | 0..1        | Contains the monitoring mode.<br><br>This attribute shall be present only when the "reqPurpose" attribute value is set to "IN_FLIGHT_MONITORING".                                                                                                                                                                                                        |               |
| notifUri       | Uri                   | M | 1           | Contains the URI via which UAV Flight Assistance notifications shall be delivered.                                                                                                                                                                                                                                                                       |               |
| enviromingUavs | array(Gpsi)           | O | 1..N        | Contains the identifier(s) of the enviroming UAV(s) to be monitored on whether they are present in the same area as the target UAV.<br><br>This attribute may be present only when the "monitorMode" attribute is present and set to "FLIGHT_ENVIRONMENT".                                                                                               |               |
| preSetDistance | LinearDistance        | O | 0..1        | Contains the preset distance value to be used to monitor the other UAV(s) distance to the target UAV, i.e., monitor whether the the other UAV(s) distance to the target UAV is smaller than this preset distance value.<br><br>This attribute may be present only when the "monitorMode" attribute is present and set to "RANGING_SIDELINK_POSITION".    |               |
| qosSustReq     | AnalyticsEventFilter  | O | 0..1        | Contains the QoS sustainability analytics related requirements (only the attributes applicable for the "QoS_Sustainability" feature defined in Table 5.6.4-1 may be present within the AnalyticsEventFilter data type).<br><br>This attribute may be present only when the "monitorMode" attribute is present and set to "QOS_SUSTAINABILITY_ANALYTICS". |               |
| flightPath     | FlightPath            | O | 0..1        | Contains the flight path.                                                                                                                                                                                                                                                                                                                                |               |
| altitudeRep    | array(AltitudeReport) | O | 1..N        | Contains the UAV's altitude report(s).                                                                                                                                                                                                                                                                                                                   |               |

|                 |                   |   |      |                                                                                                                                                                                                                                                                                                                                                                                   |  |
|-----------------|-------------------|---|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                 |                   |   |      | This attribute may be present only in a UAV Flight Assistance Configuration Update request.                                                                                                                                                                                                                                                                                       |  |
| altitudeRepReqs | AltitudeRepReqs   | O | 0..1 | Indicates the altitude reporting requirements.<br><br>This attribute shall not be present in a UAV Flight Assistance Configuration Creation request.                                                                                                                                                                                                                              |  |
| stopAltRepInd   | boolean           | O | 0..1 | Indicates whether to stop the altitude reporting for the UAV UE.<br><br>- "true" indicates to stop the altitude reporting for the UAV UE.<br><br>When present, this attribute shall be set to "true". The presence of this attribute set to the value "false" is forbidden.<br><br>This attribute shall not be present in a UAV Flight Assistance Configuration Creation request. |  |
| suppFeat        | SupportedFeatures | C | 0..1 | Contains the list of supported features among the ones defined in clause 5.39.6.<br><br>This attribute shall be present only when feature negotiation is required.                                                                                                                                                                                                                |  |

### 5.39.5.2.3 Type: FlightPath

**Table 5.39.5.2.3-1: Definition of type FlightPath**

| Attribute name | Data type                | P | Cardinality | Description                                   | Applicability |
|----------------|--------------------------|---|-------------|-----------------------------------------------|---------------|
| pathSegInfo    | array(FlightPathSegInfo) | M | 1..N        | Contains the flight path segment information. |               |

### 5.39.5.2.4 Type: FlightPathSegInfo

**Table 5.39.5.2.4-1: Definition of type FlightPathSegInfo**

| Attribute name  | Data type             | P | Cardinality | Description                                                                                                                                                               | Applicability |
|-----------------|-----------------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| flightSeg       | LocationArea5G        | M | 1           | Contains the location of the UAV's flight path segment.                                                                                                                   |               |
| ussId           | string                | M | 1           | Contains the identifier of the USS serving the flight path segment location area.                                                                                         |               |
| candBdCrsPoints | array(LocationArea5G) | O | 1..N        | Contains the candidate border-crossing point(s).                                                                                                                          |               |
| uavSpeed        | Float                 | O | 0..1        | Contains the speed of the UAV at the flight path segment, expressed in units of meters per second.                                                                        |               |
| altitude        | Altitude              | O | 0..1        | Contains the altitude of the UAV's flight at the flight path segment.<br><br>The altitude value within this attribute shall take precedence over any altitude information |               |



|                                                |             |   |      |                                                                                                                            |  |
|------------------------------------------------|-------------|---|------|----------------------------------------------------------------------------------------------------------------------------|--|
|                                                |             |   |      | provided within the "flightSeg" attribute.                                                                                 |  |
| timeSchedule                                   | TimeWindow  | O | 0..1 | Contains the time schedule for crossing the flight path segment located as defined in the "flightSeg" attribute.<br>(NOTE) |  |
| timeDuration                                   | DurationSec | O | 0..1 | Contains the time duration spent at the flight path segment located as defined in the "flightSeg" attribute.<br>(NOTE)     |  |
| NOTE: These attributes are mutually exclusive. |             |   |      |                                                                                                                            |  |

## 5.39.5.2.5 Type: UAVFlightAssistNotif

Table 5.39.5.2.5-1: Definition of type UAVFlightAssistNotif

| Attribute name | Data type      | P | Cardinality | Description                                                                                                                                                                                                                                                                                         | Applicability |
|----------------|----------------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| subscriptionId | string         | M | 1           | Contains the identifier of the subscription to which the notification is related.                                                                                                                                                                                                                   |               |
| uavStatus      | UavStatus      | M | 1           | Contains the status of the UAV.                                                                                                                                                                                                                                                                     |               |
| bdCrsPoint     | LocationArea5G | O | 0..1        | Contains the location of the border-crossing point.                                                                                                                                                                                                                                                 |               |
| altitude       | Altitude       | O | 0..1        | Contains the altitude of the border-crossing point.<br><br>This attribute may be present only when the "bdCrsPoint" attribute is present.<br><br>The altitude value within this attribute shall take precedence over any altitude information provided within the "bdCrsPoint" attribute.<br>(NOTE) |               |
| altitudeRptInd | boolean        | O | 0..1        | Indicates whether the UAV's altitude reporting failed or not.<br><br>- "true" indicates that the UAV's altitude reporting failed.<br><br>When this attribute is present, it shall be set to "true". The presence of this attribute with the value "false" shall be prohibited.<br>(NOTE)            |               |
| uavLocation    | LocationArea5G | O | 0..1        | Contains the location information of the UAV.<br><br>This attribute may be present only when the request purpose is "IN_FLIGHT_MONITORING" and the monitoring mode is "UAV_LOCATION".                                                                                                               |               |
| uavTrajectInd  | boolean        | O | 0..1        | Indicates whether the UAV is following the assigned path/trajectory.                                                                                                                                                                                                                                |               |

|                                                |                                  |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|------------------------------------------------|----------------------------------|---|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                |                                  |   |      | <ul style="list-style-type: none"> <li>- "true" indicates that the UAV is following the assigned path/trajectory.</li> <li>- "false" indicates that UAV is not following the assigned path/trajectory.</li> <li>- The default value is "false" when this attribute is omitted.</li> </ul> <p>This attribute may be present only when the request purpose is "IN_FLIGHT_MONITORING" and the monitoring mode is "FLIGHT_TRAJECTORY".</p> |  |
| uavPresList                                    | array(Gpsi)                      | O | 1..N | <p>Contains the environing UAV(s) that are present in the same geographic area as the target UAV.</p> <p>This attribute may be present only when the request purpose is "IN_FLIGHT_MONITORING" and the monitoring mode is "UAV_ENVIRONMENT".</p>                                                                                                                                                                                       |  |
| rangSIUavData                                  | array(RangSIUavData)             | O | 1..N | <p>Contains the Ranging/Sidelink related UAV(s) information.</p> <p>This attribute may be present only when the request purpose is "IN_FLIGHT_MONITORING" and the monitoring mode is "RANGING_SIDELINK_POSITION".</p>                                                                                                                                                                                                                  |  |
| qosSustainInfoData                             | array(QosSustainabilityExposure) | O | 1..N | <p>Contains the QoS sustainability information.</p> <p>This attribute may be present only when the request purpose is "IN_FLIGHT_MONITORING" and the monitoring mode is "QOS_SUSTAINABILITY_ANALYTICS".</p>                                                                                                                                                                                                                            |  |
| altitudeRepReqs                                | AltitudeRepReqs                  | O | 0..1 | Indicates the UAV's altitude reporting requirements.                                                                                                                                                                                                                                                                                                                                                                                   |  |
| NOTE: These attributes are mutually exclusive. |                                  |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |

## 5.39.5.2.6 Type: UAVFlightAssistNotifResp

Table 5.39.5.2.6-1: Definition of type UAVFlightAssistNotifResp

| Attribute name | Data type | P | Cardinality | Description                                                                                                                                                                                                                               | Applicability |
|----------------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| ussChgInd      | boolean   | M | 1           | <p>Indicates whether the USS changeover was completed successfully.</p> <ul style="list-style-type: none"> <li>- "true" indicates that USS changeover was successful;</li> <li>- "false" indicates that USS changeover failed.</li> </ul> |               |

## 5.39.5.2.7 Type: UavFlightAssistancePatch

Table 5.39.5.2.7-1: Definition of type UavFlightAssistancePatch

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
|----------------|-----------|---|-------------|-------------|---------------|

|                 |                       |   |      |                                                                                                                                                                                                                                                                             |  |
|-----------------|-----------------------|---|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| notifUri        | Uri                   | O | 0..1 | Contains the updated URI via which UAV Flight Assistance notifications shall be delivered.                                                                                                                                                                                  |  |
| flightPath      | FlightPath            | O | 0..1 | Contains the updated flight path.                                                                                                                                                                                                                                           |  |
| altitudeRep     | array(AltitudeReport) | O | 1..N | Contains the UAV's altitude report(s).                                                                                                                                                                                                                                      |  |
| altitudeRepReqs | AltitudeRepReqs       | O | 0..1 | Indicates the altitude reporting requirements.                                                                                                                                                                                                                              |  |
| stopAltRepInd   | boolean               | O | 0..1 | Indicates whether to stop the altitude reporting for the UAV UE.<br><br>- "true" indicates to stop the altitude reporting for the UAV UE.<br><br>When present, this attribute shall be set to "true". The presence of this attribute set to the value "false" is forbidden. |  |

## 5.39.5.2.8 Type: AltitudeRepReqs

Table 5.39.5.2.8-1: Definition of type AltitudeRepReqs

| Attribute name                                                                       | Data type               | P | Cardinality | Description                                                                                                                                                          | Applicability |
|--------------------------------------------------------------------------------------|-------------------------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| repThresholds                                                                        | AltThresholds           | C | 0..1        | Contains the altitude threshold(s) for threshold-based reporting.                                                                                                    |               |
| repPeriodicity                                                                       | UInteger                | C | 0..1        | Contains the periodicity information for periodic reporting, i.e., the altitude reporting periodic interval in milliseconds.<br><br>Minimum: 120<br>Maximum: 1800000 |               |
| repEvents                                                                            | array(AltitudeRepEvent) | C | 1..N        | Contains the reporting event(s) for event-based reporting.                                                                                                           |               |
| NOTE: These attributes are mutually exclusive and only one of them shall be present. |                         |   |             |                                                                                                                                                                      |               |

## 5.39.5.2.9 Type: AltitudeReport

Table 5.39.5.2.9-1: Definition of type AltitudeReport

| Attribute name | Data type        | P | Cardinality | Description                                                                                                                                                                  | Applicability |
|----------------|------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| altitude       | Altitude         | M | 1           | Contains the altitude of the UAV.                                                                                                                                            |               |
| event          | AltitudeRepEvent | C | 0..1        | Contains the reported altitude event.<br><br>This attribute shall be present only when event-based reporting was requested when subscribing to the UAV's altitude reporting. |               |
| timeStamp      | DateTime         | O | 0..1        | Contains the time at which the altitude of the UAV provided within the "altitude" attribute was measured.                                                                    |               |

## 5.39.5.2.10 Type: AltThresholds

Table 5.39.5.2.10-1: Definition of type AltThresholds

| Attribute name                                           | Data type | P | Cardinality | Description                                                                                                             | Applicability |
|----------------------------------------------------------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|---------------|
| lowerBound                                               | Altitude  | C | 0..1        | Contains the threshold lower altitude, i.e., the threshold altitude below which reporting shall be triggered.<br>(NOTE) |               |
| upperBound                                               | Altitude  | C | 0..1        | Contains the threshold upper altitude, i.e., the threshold altitude above which reporting shall be triggered.<br>(NOTE) |               |
| NOTE: At least one of these attributes shall be present. |           |   |             |                                                                                                                         |               |

## 5.39.5.2.11 Type: RangSIUavData

Table 5.39.5.2.11-1: Definition of type RangSIUavData

| Attribute name                                           | Data type      | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                                                                             | Applicability |
|----------------------------------------------------------|----------------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| uavId                                                    | Gpsi           | M | 1           | Contains the identifier of the UAV.                                                                                                                                                                                                                                                                                                                                                                     |               |
| presetDistInd                                            | boolean        | C | 0..1        | Indicates whether the Ranging/Sidelink distance to the target UAV is smaller than the preset distance value.<br>- "true" indicates that the distance to the target UAV is smaller than the preset distance value.<br>- "false" indicates that the distance to the target UAV is not smaller than the preset distance value.<br>- The default value is "false" when this attribute is omitted.<br>(NOTE) |               |
| rangSIdistance                                           | LinearDistance | C | 0..1        | Contains the Ranging/Sidelink distance to the target UAV.<br>(NOTE)                                                                                                                                                                                                                                                                                                                                     |               |
| NOTE: At least one of these attributes shall be present. |                |   |             |                                                                                                                                                                                                                                                                                                                                                                                                         |               |

## 5.39.5.2.12 Type: UAVFlightInfoReq

Table 5.39.5.2.12-1: Definition of type UAVFlightInfoReq

| Attribute name  | Data type                      | P | Cardinality | Description                                                                                                                                                        | Applicability |
|-----------------|--------------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| gpsi            | Gpsi                           | M | 1           | Contains the target GPSI.                                                                                                                                          |               |
| retrievePurpose | RetrievePurpose                | M | 1           | Contains the purpose of the retrieved UAV flight information.                                                                                                      |               |
| targetUssList   | array(string)                  | O | 1..N        | Contains the list of the identifier(s) of the suitable target USS(s).                                                                                              |               |
| canFltPathsInfo | array(CandidateFlightPathInfo) | O | 1..N        | Contains a list of candidate Flight Path(s) related information.                                                                                                   |               |
| suppFeat        | SupportedFeatures              | C | 0..1        | Contains the list of supported features among the ones defined in clause 5.39.6.<br><br>This attribute shall be present only when feature negotiation is required. |               |

## 5.39.5.2.13 CandidateFlightPathInfo

Table 5.39.5.2.13-1: Definition of type CandidateFlightPathInfo

| Attribute name  | Data type      | P | Cardinality | Description                                                                                   | Applicability |
|-----------------|----------------|---|-------------|-----------------------------------------------------------------------------------------------|---------------|
| borderCrssPnt   | LocationArea5G | O | 0..1        | Contains the candidate border-crossing point.                                                 |               |
| accptDeviatDist | UInteger       | O | 0..1        | Contains an acceptable deviation distance for the flight route, expressed in units of meters. |               |
| accptDeviatTime | DurationSec    | O | 0..1        | Contains an acceptable deviation time for the flight plan.                                    |               |
| canFlightPath   | FlightPath     | O | 0..1        | Contains a candidate flight path.                                                             |               |

## 5.39.5.2.14 Type: UAVFlightInfoResp

Table 5.39.5.2.14-1: Definition of type UAVFlightInfoResp

| Attribute name                                                                                                                                                                                              | Data type                   | P | Cardinality | Description                                                                                                                                                        | Applicability |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| retrievedResults                                                                                                                                                                                            | array(UAVFlightAssistNotif) | M | 1..N        | Contains the retrieved results of UAV Flight information.<br><br>(NOTE)                                                                                            |               |
| suppFeat                                                                                                                                                                                                    | SupportedFeatures           | C | 0..1        | Contains the list of supported features among the ones defined in clause 5.39.6.<br><br>This attribute shall be present only when feature negotiation is required. |               |
| NOTE: The "subscriptionId" attribute of the UAVFlightAssistNotif data structure is not applicable and shall not be present when this data structure is used to encode the array elements of this attribute. |                             |   |             |                                                                                                                                                                    |               |

## 5.39.5.3 Simple data types and enumerations

## 5.39.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.39.5.3.2 Simple data types

The simple data types defined in table 5.39.5.3.2-1 shall be supported.

Table 5.39.5.3.2-1: Simple data types

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
| n/a       |                 |             |               |

## 5.39.5.3.3 Enumeration: UavStatus

The enumeration UavStatus represents the status of the UAV. It shall comply with the provisions defined in table 5.39.5.3.3-1.

Table 5.39.5.3.3-1: Enumeration UavStatus

| Enumeration value | Description | Applicability |
|-------------------|-------------|---------------|
|-------------------|-------------|---------------|

|           |                                                                                             |  |
|-----------|---------------------------------------------------------------------------------------------|--|
| LEAVING   | Indicates that the UAV status is leaving an area which is part of the planned flight path.  |  |
| ENTERING  | Indicates that the UAV status is entering an area which is part of the planned flight path. |  |
| DEVIATING | Indicates that the UAV status is deviating from the planned flight path.                    |  |

#### 5.39.5.3.4 Enumeration: RequestPurpose

The enumeration RequestPurpose represents UAV Flight Assistance request purpose. It shall comply with the provisions defined in table 5.39.5.3.4-1.

**Table 5.39.5.3.4-1: Enumeration RequestPurpose**

| Enumeration value    | Description                                                        | Applicability |
|----------------------|--------------------------------------------------------------------|---------------|
| USS_CHANGEOVER       | Indicates that the purpose of the request is USS changeover.       |               |
| IN_FLIGHT_MONITORING | Indicates that the purpose of the request is in-flight monitoring. |               |

#### 5.39.5.3.5 Enumeration: AltitudeRepEvent

The enumeration AltitudeRepEvent represents the UAV's altitude reporting event. It shall comply with the provisions defined in table 5.39.5.3.5-1.

**Table 5.39.5.3.5-1: Enumeration AltitudeRepEvent**

| Enumeration value   | Description                                                                                           | Applicability |
|---------------------|-------------------------------------------------------------------------------------------------------|---------------|
| TA_CHANGE           | Indicates that the UAV's altitude reporting trigger is the change of the UAV's serving TA.            |               |
| RAN_NODE_CHANGE     | Indicates that the UAV's altitude reporting trigger is the change of the UAV's serving RAN node.      |               |
| GEO_LOCATION_CHANGE | Indicates that the UAV's altitude reporting trigger is the change of the UAV's geographical location. |               |
| ANY_ALTITUDE_CHANGE | Indicates that the UAV's altitude reporting trigger is any change of the UAV's altitude.              |               |

#### 5.39.5.3.6 Enumeration: MonitoringMode

The enumeration MonitoringMode represents the UAV Flight Assistance monitoring mode. It shall comply with the provisions defined in table 5.39.5.3.6-1.

**Table 5.39.5.3.6-1: Enumeration MonitoringMode**

| Enumeration value            | Description                                                                             |
|------------------------------|-----------------------------------------------------------------------------------------|
| UAV_LOCATION                 | Indicates that the monitoring mode is UAV location monitoring.                          |
| FLIGHT_TRAJECTORY            | Indicates that the monitoring mode is flight trajectory monitoring.                     |
| FLIGHT_ENVIRONMENT           | Indicates that the monitoring mode is flight environment monitoring.                    |
| RANGING_SIDELINK_POSITION    | Indicates that the monitoring mode is Ranging/Sidelink positioning location monitoring. |
| QOS_SUSTAINABILITY_ANALYTICS | Indicates that the monitoring mode is QoS sustainability analytics monitoring.          |

#### 5.39.5.3.7 Enumeration: RetrievePurpose

The enumeration RetrievePurpose represents the purpose of the retrieved UAV flight information. It shall comply with the provisions of table 5.39.5.3.7-1.

**Table 5.39.5.3.7-1: Enumeration RetrievePurpose**

| Enumeration value   | Description                                                                                | Applicability |
|---------------------|--------------------------------------------------------------------------------------------|---------------|
| USS_CHANGEOVER      | Indicates that the purpose of the UAV Flight information retrieval is USS changeover.      |               |
| PRE_FLIGHT_PLANNING | Indicates that the purpose of the UAV Flight information retrieval is pre-flight planning. |               |

## 5.39.6 Used Features

The optional features in table 5.39.6-1 are defined for the UAVFlightAssistance API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.39.6-1: Features used by UAVFlightAssistance API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.39.7 Error handling

### 5.39.7.1 General

For the UAVFlightAssistance API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the UAVFlightAssistance API.

### 5.39.7.2 Protocol Errors

No specific procedures for the UAVFlightAssistance API are specified.

### 5.39.7.3 Application Errors

The application errors defined for the UAVFlightAssistance API are listed in table 5.39.7.3-1.

**Table 5.39.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.40 CagInfoParamProvision API

### 5.40.1 Introduction

The Nnef\_ParameterProvision service shall use the CagInfoParamProvision API for:

- CAG Information Parameters provisioning.

The API URI of the CagInfoParamProvision API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-caginfo-pp".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

5.40.2 Resources

5.40.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.40.2.1-1 and the resources and HTTP methods used for the CagInfoParamProvision API.

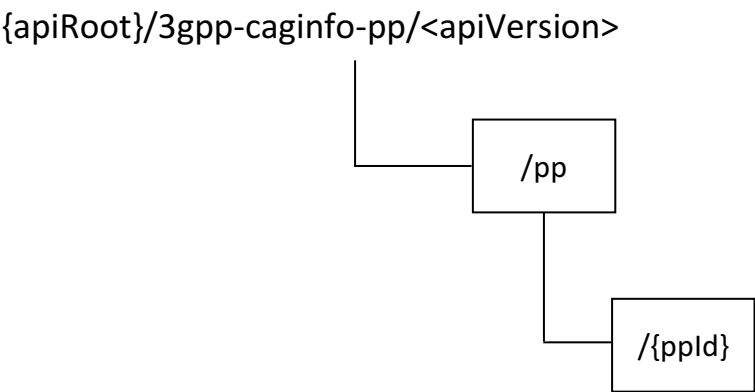


**Figure 5.40.2.1-1: Resource URI structure of the CagInfoParamProvision API**

Table 5.40.2.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 5.40.2.1-1: Resources and methods overview**

| Resource name                                      | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                                                        |
|----------------------------------------------------|--------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------|
| CAG Information Parameters Provisionings           | /pp                                        | GET                             | Retrieve all the active CAG Information Parameters Provisionings managed by the NEF.                   |
|                                                    |                                            | POST                            | Request the creation of a new CAG Information Parameters Provisioning at the NEF.                      |
| Individual CAG Information Parameters Provisioning | /pp/{ppId}                                 | GET                             | Retrieve an existing "Individual CAG Information Parameters Provisioning" resource managed by the NEF. |
|                                                    |                                            | PUT                             | Update an existing "Individual CAG Information Parameters Provisioning" resource managed by the NEF.   |
|                                                    |                                            | PATCH                           | Modify an existing "Individual CAG Information Parameters Provisioning" resource managed by the NEF.   |



|  |  |        |                                                                                                      |
|--|--|--------|------------------------------------------------------------------------------------------------------|
|  |  | DELETE | Delete an existing "Individual CAG Information Parameters Provisioning" resource managed by the NEF. |
|--|--|--------|------------------------------------------------------------------------------------------------------|

## 5.40.2.2 Resource: CAG Information Parameters Provisionings

### 5.40.2.2.1 Introduction

This resource represents the collection of CAG Information Parameters Provisionings managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [32]).

### 5.40.2.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-caginfo-pp/<apiVersion>/pp

This resource shall support the resource URI variables defined in table 5.40.2.2.2-1.

**Table 5.40.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.40.1. |

### 5.40.2.2.3 Resource Standard Methods

#### 5.40.2.2.3.1 GET

This method enables an AF to request to retrieve all the active CAG Information Parameters Provisionings managed by the NEF.

This method shall support the URI query parameters specified in table 5.40.2.2.3.1-1.

**Table 5.40.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.40.2.2.3.1-2 and the response data structures and response codes specified in table 5.40.2.2.3.1-3.

**Table 5.40.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.40.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type            | P | Cardinality | Response codes | Description                                                                                                                                                                                                                                                     |
|----------------------|---|-------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(CagInfoPpData) | M | 0..N        | 200 OK         | Successful case. All the "Individual CAG Information Parameters Provisioning" resource(s) managed by the NEF are returned.<br><br>If there are no active "Individual CAG Information Parameters Provisioning" resources at the NEF, an empty array is returned. |

|                                                                                                                                     |  |  |                        |                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                 |  |  | 307 Temporary Redirect | <p>Temporary redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| n/a                                                                                                                                 |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                              |

**Table 5.40.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.40.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.40.2.2.3.2 POST**

This method enables an AF to request the creation of a new CAG Information Parameters Provisioning at the NEF.

This method shall support the URI query parameters specified in table 5.40.2.2.3.2-1.

**Table 5.40.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.40.2.2.3.2-2 and the response data structures and response codes specified in table 5.40.2.2.3.2-3.

**Table 5.40.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type     | P | Cardinality | Description                                                                                          |
|---------------|---|-------------|------------------------------------------------------------------------------------------------------|
| CagInfoPpData | M | 1           | Contains the representation of the CAG Information Parameters Provisioning to be created at the NEF. |

**Table 5.40.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type     | P | Cardinality | Response codes | Description                                                                                                                                      |
|---------------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| CagInfoPpData | M | 1           | 201 Created    | Successful case. A representation of the created "Individual CAG Information Parameters Provisioning" resource is returned in the response body. |

|                                                                                                                                      |  |  |  |                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------------|
|                                                                                                                                      |  |  |  | The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |  |                                                                                 |

**Table 5.40.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                     |
|----------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-caginfo-pp/<apiVersion>/pp/{ppId} |

#### 5.40.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.40.2.3 Resource: Individual CAG Information Parameters Provisioning

#### 5.40.2.3.1 Introduction

This resource represents an "Individual CAG Information Parameters Provisioning" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [32]).

#### 5.40.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-caginfo-pp/<apiVersion>/pp/{ppId}

This resource shall support the resource URI variables defined in table 5.40.2.3.2-1.

**Table 5.40.2.3.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                                                                                      |
|---------|-----------|-------------------------------------------------------------------------------------------------|
| apiRoot | string    | See clause 5.40.1.                                                                              |
| ppId    | string    | Represents the identifier of the "Individual CAG Information Parameters Provisioning" resource. |

#### 5.40.2.3.3 Resource Standard Methods

##### 5.40.2.3.3.1 GET

This method enables an AF to request to retrieve an existing "Individual CAG Information Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.40.2.3.3.1-1.

**Table 5.40.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.40.2.3.3.1-2 and the response data structures and response codes specified in table 5.40.2.3.3.1-3.

**Table 5.40.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.40.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CagInfoPpData                                                                                                                       | M | 1           | 200 OK                 | Successful case. The requested "Individual CAG Information Parameters Provisioning" resource is successfully returned in the response body.                                                                                                           |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.40.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.40.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.40.2.3.3.2 PUT

This method enables an AF to request the update of an existing "Individual CAG Information Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.40.2.3.3.2-1.

**Table 5.40.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.40.2.3.3.2-2 and the response data structures and response codes specified in table 5.40.2.3.3.2-3.

**Table 5.40.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type     | P | Cardinality | Description                                                                                          |
|---------------|---|-------------|------------------------------------------------------------------------------------------------------|
| CagInfoPpData | M | 1           | Represents the updated "Individual CAG Information Parameters Provisioning" resource representation. |

**Table 5.40.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CagInfoPpData                                                                                                                       | M | 1           | 200 OK                 | Successful response. The "Individual CAG Information Parameters Provisioning" resource is successfully updated and a representation of the updated resource is returned in the response body.                                                         |
| n/a                                                                                                                                 |   |             | 204 No Content         | Successful response. The "Individual CAG Information Parameters Provisioning" resource is successfully updated and no content is returned in the response body.                                                                                       |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.40.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.40.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.40.2.3.3.3 PATCH

This method enables an AF to request the modification of an existing "Individual CAG Information Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.40.2.3.3.3-1.

**Table 5.40.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.40.2.3.3.3-2 and the response data structures and response codes specified in table 5.40.2.3.3.3-3.

**Table 5.40.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
|-----------|---|-------------|-------------|

|                    |   |   |                                                                                                              |
|--------------------|---|---|--------------------------------------------------------------------------------------------------------------|
| CagInfoPpDataPatch | M | 1 | Represents the requested modifications to the "Individual CAG Information Parameters Provisioning" resource. |
|--------------------|---|---|--------------------------------------------------------------------------------------------------------------|

**Table 5.40.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                             | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CagInfoPpData                                                                                                                         | M | 1           | 200 OK                 | Successful response. The "Individual CAG Information Parameters Provisioning" resource is successfully modified and a representation of the updated resource is returned in the response body.                                                        |
| n/a                                                                                                                                   |   |             | 204 No Content         | Successful response. The "Individual CAG Information Parameters Provisioning" resource is successfully modified and no content is returned in the response body.                                                                                      |
| n/a                                                                                                                                   |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                   |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.40.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.40.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

#### 5.40.2.3.3.4 DELETE

This method enables an AF to request the deletion of an existing "Individual CAG Information Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.40.2.3.3.4-1.

**Table 5.40.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.40.2.3.3.4-2 and the response data structures and response codes specified in table 5.40.2.3.3.4-3.

**Table 5.40.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.40.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful case. The "Individual CAG Information Parameters Provisioning" resource is successfully deleted.                                                                                                                                           |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.40.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.40.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.40.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.40.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.40.4 Notifications

There are no notifications defined for this API in this release of the specification.

## 5.40.5 Data Model

### 5.40.5.1 General

This clause specifies the application data model supported by the CagInfoParamProvision API. Table 5.40.5.1-1 specifies the data types defined for the CagInfoParamProvision API.

**Table 5.40.5.1-1: CagInfoParamProvision API specific Data Types**

| Data type          | Clause defined | Description                                                                         | Applicability |
|--------------------|----------------|-------------------------------------------------------------------------------------|---------------|
| CagInfoPpData      | 5.40.5.2.2     | Represents CAG Information Parameters Provisioning.                                 |               |
| CagInfoPpDataPatch | 5.40.5.2.3     | Represents the requested modification to a CAG Information Parameters Provisioning. |               |
| CagInformation     | 5.40.5.2.4     | Represents the CAG information.                                                     |               |

Table 5.40.5.1-2 specifies data types re-used by the CagInfoParamProvision API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the CagInfoParamProvision API.

**Table 5.40.5.1-2: CagInfoParamProvision API re-used Data Types**

| Data type               | Reference          | Comments                                                                                                         | Applicability |
|-------------------------|--------------------|------------------------------------------------------------------------------------------------------------------|---------------|
| CagProvisionInformation | 3GPP TS 29.571 [8] | Represents CAG provisioning information.                                                                         |               |
| Gpsi                    | 3GPP TS 29.571 [8] | Represents a GPSI.                                                                                               |               |
| SupportedFeatures       | 3GPP TS 29.571 [8] | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |               |

### 5.40.5.2 Structured data types

#### 5.40.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

#### 5.40.5.2.2 Type: CagInfoPpData

**Table 5.40.5.2.2-1: Definition of type CagInfoPpData**

| Attribute name | Data type             | P | Cardinality | Description                                                                                                                                                                  | Applicability |
|----------------|-----------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId           | string                | M | 1           | Represents the identifier of the AF that is sending the request.                                                                                                             |               |
| cagInfos       | array(CagInformation) | C | 1..N        | Represents the CAG information to be provisioned.<br><br>This attribute shall be present only when the AF requests to provision CAG information parameters.                  |               |
| suppFeat       | SupportedFeatures     | C | 0..1        | Represents the list of supported features among the ones defined in clause 5.40.6.<br><br>This attribute shall be present only when feature negotiation needs to take place. |               |

#### 5.40.5.2.3 Type: CagInfoPpDataPatch

**Table 5.40.5.2.3-1: Definition of type CagInfoPpDataPatch**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
|----------------|-----------|---|-------------|-------------|---------------|



|          |                       |   |      |                                                                      |  |
|----------|-----------------------|---|------|----------------------------------------------------------------------|--|
| cagInfos | array(CagInformation) | C | 1..N | Represents the updated CAG Information Parameters to be provisioned. |  |
|----------|-----------------------|---|------|----------------------------------------------------------------------|--|

#### 5.40.5.2.4 Type: CagInformation

**Table 5.40.5.2.4-1: Definition of type CagInformation**

| Attribute name | Data type               | P | Cardinality | Description                                                                                  | Applicability |
|----------------|-------------------------|---|-------------|----------------------------------------------------------------------------------------------|---------------|
| ueList         | array(Gpsi)             | M | 1..N        | Contains the identifier(s) of the UE(s) to which the provisioned CAG information is related. |               |
| cagProvInfo    | CagProvisionInformation | M | 1           | Contains the CAG information to be provisioned.                                              |               |

### 5.40.5.3 Simple data types and enumerations

#### 5.40.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.40.5.3.2 Simple data types

The simple data types defined in table 5.40.5.3.2-1 shall be supported.

**Table 5.40.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

### 5.40.5.5 Binary data

#### 5.40.5.5.1 Binary Data Types

**Table 5.40.5.5.1-1: Binary Data Types**

| Name | Clause defined | Content type |
|------|----------------|--------------|
|      |                |              |

### 5.40.6 Used Features

The optional features in table 6.1.8-1 are defined for the CagInfoParamProvision API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.40.6-1: Supported Features**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.40.7 Error handling

### 5.40.7.1 General

For the CagInfoParamProvision API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the CagInfoParamProvision API.

### 5.40.7.2 Protocol Errors

No specific procedures for the CagInfoParamProvision API are specified.

### 5.40.7.3 Application Errors

The application errors defined for the CagInfoParamProvision API are listed in table 5.40.7.3-1.

**Table 5.40.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 5.41 Void

## 5.42 ImsSessionManagement API

### 5.42.1 Introduction

The Nnef\_ImsSessionManagement service shall use the ImsSessionManagement API.

The API URI of the ImsSessionManagement API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>**

with the following components:

- The {apiRoot} shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].
- The <apiName> shall be "3gpp-ims-sm".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

### 5.42.2 Resources

#### 5.42.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.42.2.1-1 and the resources and HTTP methods used for the ImsSessionManagement API.

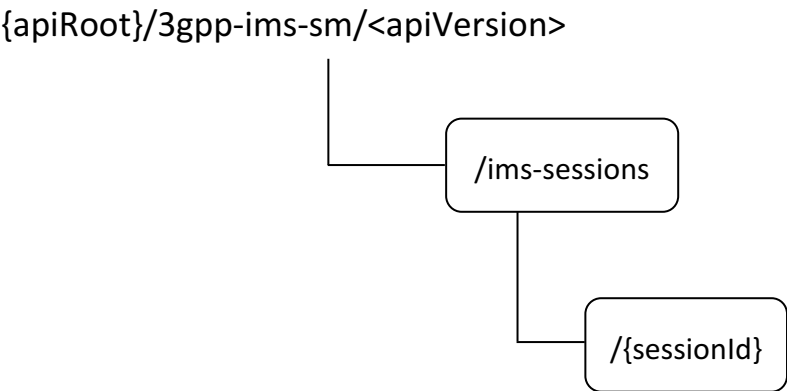


Figure 5.42.2.1-1: Resource URI structure of the ImsSessionManagement API

Table 5.42.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 5.42.2.1-1: Resources and methods overview

| Resource name          | Resource URI (relative path after API URI) | HTTP method or custom operation | Description (service operation)                         |
|------------------------|--------------------------------------------|---------------------------------|---------------------------------------------------------|
| IMS Sessions           | /ims-sessions                              | POST                            | Create a new IMS Session at the NEF.                    |
|                        |                                            | GET                             | Retrieve all the active IMS Session(s) at the NEF.      |
| Individual IMS Session | /ims-sessions/{sessionId}                  | GET                             | Retrieve an existing "Individual IMS Session" resource. |
|                        |                                            | PUT                             | Update an existing "Individual IMS Session" resource.   |
|                        |                                            | PATCH                           | Modify an existing "Individual IMS Session" resource.   |
|                        |                                            | DELETE                          | Delete an existing "Individual IMS Session" resource.   |

5.42.2.2 Resource: IMS Sessions

5.42.2.2.1 Description

This resource represents the collection of IMS Sessions managed by the NEF.

The resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [32]).

5.42.2.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-ims-sm/<apiVersion>/ims-sessions

This resource shall support the resource URI variables defined in table 5.42.2.2.2-1.

Table 5.42.2.2.2-1: Resource URI variables for this resource

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.42.1. |

## 5.42.2.2.3 Resource Standard Methods

## 5.42.2.2.3.1 POST

The HTTP POST method enables an AF to request the creation of a new IMS Session at the NEF.

This method shall support the URI query parameters specified in table 5.42.2.2.3.1-1.

**Table 5.42.2.2.3.1-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.42.2.2.3.1-2 and the response data structures and response codes specified in table 5.42.2.2.3.1-3.

**Table 5.42.2.2.3.1-2: Data structures supported by the POST Request Body on this resource**

| Data type  | P | Cardinality | Description                                                           |
|------------|---|-------------|-----------------------------------------------------------------------|
| ImsSession | M | 1           | Contains the parameters to request the creation of a new IMS Session. |

**Table 5.42.2.2.3.1-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes | Description                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ImsSession                                                                                                                             | M | 1           | 201 Created    | Successful response. The "Individual IMS Session" resource is successfully created and a representation of the created resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| ProblemDetails                                                                                                                         | O | 0..1        | 403 Forbidden  | (NOTE 2)                                                                                                                                                                                                                                                 |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                                                          |
| NOTE 2: Failure cases are described in clause 5.42.7.                                                                                  |   |             |                |                                                                                                                                                                                                                                                          |

**Table 5.42.2.2.3.1-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                |
|----------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-ims-sm/<apiVersion>/ims-sessions/{sessionId} |

## 5.42.2.2.3.2 GET

The HTTP GET method enables to retrieve all the active IMS Sessions managed by the NEF.

This method shall support the URI query parameters specified in table 5.42.2.2.3.2-1.

**Table 5.42.2.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.42.2.2.3.2-2 and the response data structures and response codes specified in table 5.42.2.2.3.2-3.

**Table 5.42.2.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.42.2.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(ImsSession)                                                                                                                   | M | 0..N        | 200 OK                 | Successful case. All the "Individual IMS Session" resource(s) managed by the NEF are returned.<br><br>If there are no active "Individual IMS Session" resources at the NEF, an empty array is returned.                                               |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.42.2.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.42.2.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.42.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

#### 5.42.2.3 Resource: Individual IMS Session

##### 5.42.2.3.1 Description

This resource represents an "Individual IMS Session" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [32]).

##### 5.42.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-ims-sm/<apiVersion>/ims-sessions/{sessionId}

This resource shall support the resource URI variables defined in table 5.42.2.3.2-1.

**Table 5.42.2.3.2-1: Resource URI variables for this resource**

| Name      | Data type | Definition                                                          |
|-----------|-----------|---------------------------------------------------------------------|
| apiRoot   | string    | See clause 5.42.1.                                                  |
| sessionId | string    | Represents the identifier of the "Individual IMS Session" resource. |

### 5.42.2.3.3 Resource Standard Methods

#### 5.42.2.3.3.0A GET

The HTTP GET method enables an AF to request to retrieve an existing "Individual IMS Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.42.2.3.3.0A-1.

**Table 5.42.2.3.3.0A-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.42.2.3.3.0A-2 and the response data structures and response codes specified in table 5.42.2.3.3.0A-3.

**Table 5.42.2.3.3.0A-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.42.2.3.3.0A-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| imsSession                                                                                                                          | M | 1           | 200 OK                 | Successful case. The requested "Individual IMS Session" resource is returned in the response body.                                                                                                                                                    |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.42.2.3.3.0A-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.42.2.3.3.0A-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.42.2.3.3.0B PUT**

The HTTP PUT method enables an AF to request the update of an existing "Individual IMS Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.42.2.3.3.0B-1.

**Table 5.42.2.3.3.0B-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.42.2.3.3.0B-2 and the response data structures and response codes specified in table 5.42.2.3.3.0B-3.

**Table 5.42.2.3.3.0B-2: Data structures supported by the PUT Request Body on this resource**

| Data type  | P | Cardinality | Description                                                              |
|------------|---|-------------|--------------------------------------------------------------------------|
| ImsSession | M | 1           | Represents the updated "Individual IMS Session" resource representation. |

**Table 5.42.2.3.3.0B-3: Data structures supported by the PUT Response Body on this resource**

| Data type      | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|----------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ImsSession     | M | 1           | 200 OK                 | Successful response. The "Individual IMS Session" resource is successfully updated and a representation of the updated resource is returned in the response body.                                                                                     |
| n/a            |   |             | 204 No Content         | Successful response. The "Individual IMS Session" resource is successfully updated and no content is returned in the response body.                                                                                                                   |
| n/a            |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a            |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                                              |

NOTE 1: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply.

NOTE 2: Failure cases are described in clause 5.42.7.

**Table 5.42.2.3.3.0B-4: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|

|          |        |   |   |                                                                                   |
|----------|--------|---|---|-----------------------------------------------------------------------------------|
| Location | string | M | 1 | Contains an alternative target URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-----------------------------------------------------------------------------------|

**Table 5.42.2.3.3.0B-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.42.2.3.3.1 PATCH**

The HTTP PATCH method enables an AF to request the modification of an existing "Individual IMS Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.42.2.3.3.1-1.

**Table 5.42.2.3.3.1-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.42.2.3.3.1-2 and the response data structures and response codes specified in table 5.42.2.3.3.1-3.

**Table 5.42.2.3.3.1-2: Data structures supported by the PATCH Request Body on this resource**

| Data type       | P | Cardinality | Description                                                                      |
|-----------------|---|-------------|----------------------------------------------------------------------------------|
| ImsSessionPatch | M | 1           | Represents the requested modifications to the "Individual IMS Session" resource. |

**Table 5.42.2.3.3.1-3: Data structures supported by the PATCH Response Body on this resource**

| Data type      | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|----------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ImsSession     | M | 1           | 200 OK                 | Successful response. The "Individual IMS Session" resource is successfully modified and a representation of the updated resource is returned in the response body.                                                                                    |
| n/a            |   |             | 204 No Content         | Successful response. The "Individual IMS Session" resource is successfully modified and no content is returned in the response body.                                                                                                                  |
| n/a            |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a            |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                                              |

NOTE 1: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply.

NOTE 2: Failure cases are described in clause 5.42.7.



**Table 5.42.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located on an alternative NEF. |

**Table 5.42.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located on an alternative NEF. |

#### 5.42.2.3.3.2 DELETE

The HTTP DELETE method enables an AF to request the deletion of an existing "Individual IMS Session" resource at the NEF.

This method shall support the URI query parameters specified in table 5.42.2.3.3.2-1.

**Table 5.42.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.42.2.3.3.2-2 and the response data structures and response codes specified in table 5.42.2.3.3.2-3.

**Table 5.42.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.42.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-----------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No content         | Successful response. The "Individual IMS Session" resource is successfully deleted.                                                                                                                                                                   |
| n/a       |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a       |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE 1: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply.

**Table 5.42.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located on an alternative NEF. |

**Table 5.42.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located on an alternative NEF. |

#### 5.42.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.42.3 Custom Operations without associated resources

There are no resource custom operations defined for this resource in this release of the specification.

## 5.42.4 Notifications

### 5.42.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.42.4.1-1: Notifications overview**

| Notification             | Callback URI | HTTP method or custom operation | Description (service operation)                                                      |
|--------------------------|--------------|---------------------------------|--------------------------------------------------------------------------------------|
| IMS Session Notification | {notifUri}   | POST                            | Enable the NEF to notify a previously subscribed AF on IMS Session related event(s). |

### 5.42.4.2 IMS Session Notification

#### 5.42.4.2.1 Description

The IMS Session Notification is used by the NEF to report IMS session related event(s) to a previously subscribed AF.

#### 5.42.4.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 5.43.4.2.2-1.

**Table 5.42.4.2.2-1: Callback URI variables**

| Name     | Definition                                                          |
|----------|---------------------------------------------------------------------|
| notifUri | Represents the callback URI encoded as a string formatted as a URI. |

#### 5.42.4.2.3 Operation Definition

This method shall support the request data structures specified in table 5.42.4.2.3-1 and the response data structures and response codes specified in table 5.42.4.2.3-2.

**Table 5.42.4.2.3-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
|-----------|---|-------------|-------------|

|                              |   |   |                                        |
|------------------------------|---|---|----------------------------------------|
| ImsSessionEvent Notification | M | 1 | Contains the IMS Session Notification. |
|------------------------------|---|---|----------------------------------------|

**Table 5.42.4.2.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                  |   |             | 204 No Content         | Successful case. The IMS Session Notification is successfully received and acknowledged.                                                                                                                                                                                                       |
| n/a                                                                                                                                  |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                  |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                |

**Table 5.42.4.2.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.42.4.2.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.42.5 Data Model

### 5.42.5.1 General

This clause specifies the application data model supported by the API.

Table 5.42.5.1-1 specifies the data types defined for the ImsSessionManagement service-based interface protocol.

**Table 5.42.5.1-1: ImsSessionManagement specific Data Types**

| Data type       | Clause defined | Description                                               | Applicability |
|-----------------|----------------|-----------------------------------------------------------|---------------|
| ImsSession      | 5.42.5.2.2     | Represent an IMS Session.                                 |               |
| ImsSessionPatch | 5.42.5.2.3     | Represents the requested modifications to an IMS Session. |               |

Table 5.42.5.1-2 specifies data types re-used by the ImsSessionManagement service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the ImsSessionManagement service based interface.

**Table 5.42.5.1-2: ImsSessionManagement re-used Data Types**

| Data type                   | Reference           | Comments                                                                                                         | Applicability |
|-----------------------------|---------------------|------------------------------------------------------------------------------------------------------------------|---------------|
| ImsSessionInfo              | 3GPP TS 29.175 [78] | Represents IMS Session related information.                                                                      |               |
| ImsSessionEventNotification | 3GPP TS 29.175 [78] | Represents the IMS Session Notification.                                                                         |               |
| SupportedFeatures           | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |               |
| Uri                         | 3GPP TS 29.122 [4]  | Represents a URI.                                                                                                |               |

**Editor's Note:** The data model of ImsSessionManagement is FFS.

## 5.42.5.2 Structured data types

### 5.42.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

### 5.42.5.2.2 Type: ImsSession

**Table 5.42.5.2.2-1: Definition of type ImsSession**

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                        | Applicability |
|----------------|-------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId           | string            | M | 1           | Contains the identifier of the AF that is sending the request.                                                                                                     |               |
| imsSessionInfo | ImsSessionInfo    | M | 1           | Contains the IMS session information.                                                                                                                              |               |
| notifUri       | Uri               | O | 0..1        | Contains the URI via which IMS Session notifications shall be delivered.                                                                                           |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Contains the list of supported features among the ones defined in clause 5.42.6.<br><br>This attribute shall be present only when feature negotiation is required. |               |

## 5.42.5.3 Simple data types and enumerations

### 5.42.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 5.42.5.3.2 Simple data types

The simple data types defined in table 5.42.5.3.2-1 shall be supported.

**Table 5.42.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

#### 5.42.5.4 Data types describing alternative data types or combinations of data types

There are no custom operations without associated resources defined for this API in this release of the specification.

#### 5.42.5.5 Binary data

##### 5.42.5.5.1 Binary Data Types

**Table 5.42.5.5.1-1: Binary Data Types**

| Name | Clause defined | Content type |
|------|----------------|--------------|
|      |                |              |

#### 5.42.6 Used Features

The optional features in table 5.42.6-1 are defined for the ImsSessionManagement API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.42.6-1: Supported Features**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

#### 5.42.7 Error Handling

##### 5.42.7.1 General

For the ImsSessionManagement API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the ImsSessionManagement API.

##### 5.42.7.2 Protocol Errors

No specific procedures for the ImsSessionManagement API are specified.

##### 5.42.7.3 Application Errors

The application errors defined for the ImsSessionManagement service are listed in Table 5.42.7.3-1.

**Table 5.42.7.3-1: Application errors**

| Application Error | HTTP status code | Description                                                                                                   | Applicability |
|-------------------|------------------|---------------------------------------------------------------------------------------------------------------|---------------|
| AF_NOT_AUTHORIZED | 403 Forbidden    | The creation/update/modification request for IMS session is rejected because the AF is not authorized by NEF. |               |

### 5.43 ImsEventExposure API

#### 5.43.1 Introduction

The Nnef\_ImsEventExposure service shall use the ImsEventExposure API.

The API URI of ImsEventExposure API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-ims-ee".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

5.43.2 Resources

5.43.2.1 Overview

This clause describes the structure for the Resource URIs as shown in Figure 5.43.2.1-1 and the resources and HTTP methods used for the ImsEventExposure API.

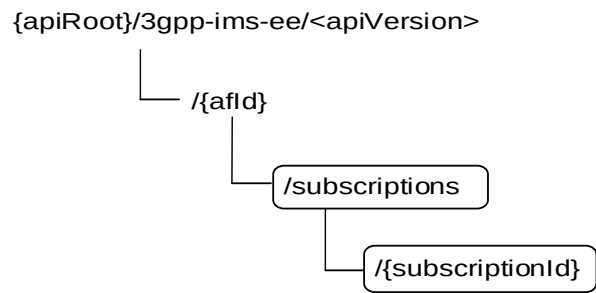


**Figure 5.43.2.1-1: Resource URI structure of the ImsEventExposure API**

Table 5.43.2.1-1 provides an overview of the resources and applicable HTTP methods applicable for the ImsEventExposure API.

**Table 5.43.2.1-1: Resources and methods overview**

| Resource name                  | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                    |
|--------------------------------|--------------------------------------------|---------------------------------|--------------------------------------------------------------------|
| IMS EE Subscriptions           | /{afld}/subscriptions                      | POST                            | Create a new IMS EE Subscription.                                  |
|                                |                                            | GET                             | Retreive all the active IMS EE Subscription(s) managed by the NEF. |
| Individual IMS EE Subscription | /{afld}/subscriptions/{subscriptionId}     | GET                             | Retreive an existing "Individual IMS EE Subscription" resource.    |
|                                |                                            | PUT                             | Update an existing "Individual IMS EE Subscription" resource.      |
|                                |                                            | PATCH                           | Modify an existing "Individual IMS EE Subscription" resource.      |

|  |  |        |                                                               |
|--|--|--------|---------------------------------------------------------------|
|  |  | DELETE | Delete an existing "Individual IMS EE Subscription" resource. |
|--|--|--------|---------------------------------------------------------------|

## 5.43.2.2 Resource: IMS EE Subscriptions

### 5.43.2.2.1 Introduction

This resource represents all the active IMS Event Exposure Subscription(s) managed by the NEF for a given AF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

### 5.43.2.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-ims-ee/<apiVersion>/{afId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.43.2.2.2-1.

**Table 5.43.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                           |
|---------|-----------|--------------------------------------|
| apiRoot | string    | See clause 5.43.1.                   |
| afId    | string    | Represents the identifier of the AF. |

### 5.43.2.2.3 Resource Standard Methods

#### 5.43.2.2.3.1 POST

The HTTP POST method enables to request the creation of a new IMS Event Exposure Subscription at the NEF.

This method shall support the URI query parameters specified in table 5.43.2.2.3.1-1.

**Table 5.43.2.2.3.1-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.43.2.2.3.1-2 and the response data structures and response codes specified in table 5.43.2.2.3.1-3.

**Table 5.43.2.2.3.1-2: Data structures supported by the POST request body on this resource**

| Data type   | P | Cardinality | Description                                                                                          |
|-------------|---|-------------|------------------------------------------------------------------------------------------------------|
| ImseEESubsc | M | 1           | Contains the parameters to request the creation of a new IMS Event Exposure Subscription at the NEF. |

**Table 5.43.2.2.3.1-3: Data structures supported by the POST response body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes | Description                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ImseEESubsc                                                                                                                            | M | 1           | 201 Created    | Successful case. A representation of the created "Individual IMS EE Subscription" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in an HTTP "Location" header. |
| ProblemDetails                                                                                                                         | O | 0..1        | 403 Forbidden  | (NOTE 2)                                                                                                                                                                                                            |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                     |
| NOTE 2: Failure cases are described in clause 5.43.7.                                                                                  |   |             |                |                                                                                                                                                                                                                     |

**Table 5.43.2.2.3.1-4: Headers supported by the 201 response code on this resource**

| HTTP response header | Data type | P | Cardinality | Description                                                                                                                                      |
|----------------------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Location             | string    | M | 1           | The URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-ims-<br>ee/<apiVersion>/afld/subscriptions/{subscriptionId} |

**5.43.2.2.3.2 GET**

The HTTP GET method enables to retrieve all the active IMS EE Subscriptions managed by the NEF.

This method shall support the URI query parameters specified in table 5.43.2.2.3.2-1.

**Table 5.43.2.2.3.2-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.43.2.2.3.2-2 and the response data structures and response codes specified in table 5.43.2.2.3.2-3.

**Table 5.43.2.2.3.2-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.43.2.2.3.2-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(ImsEESubsc)                                                                                                                   | M | 0..N        | 200 OK                 | Successful case. All the "Individual IMS EE Subscription" resource(s) managed by the NEF are returned.<br><br>If there are no active "Individual IMS EE Subscription" resources at the NEF, an empty array is returned.                               |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.43.2.2.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
|------|-----------|---|-------------|-------------|



|          |        |   |   |                                                                                   |
|----------|--------|---|---|-----------------------------------------------------------------------------------|
| Location | string | M | 1 | Contains an alternative target URI of the resource located in an alternative NEF. |
|----------|--------|---|---|-----------------------------------------------------------------------------------|

**Table 5.43.2.2.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.43.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.43.2.3 Resource: Individual IMS EE Subscription

#### 5.43.2.3.1 Introduction

This resource represents an "Individual IMS EE Subscription" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [3]).

#### 5.43.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-ims-ee/<apiVersion>/{afId}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.43.2.3.2-1.

**Table 5.43.2.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                                                                  |
|----------------|-----------|-----------------------------------------------------------------------------|
| apiRoot        | string    | See clause 5.43.1.                                                          |
| afId           | string    | Represents the identifier of the AF.                                        |
| subscriptionId | string    | Represents the identifier of the "Individual IMS EE Subscription" resource. |

#### 5.43.2.3.3 Resource Standard Methods

##### 5.43.2.3.3.1 GET

The HTTP GET method enables to retrieve an existing "Individual IMS EE Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.43.2.3.3.1-1.

**Table 5.43.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.43.2.3.3.1-2 and the response data structures and response codes specified in table 5.43.2.3.3.1-3.

**Table 5.43.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.43.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response | Description |
|-----------|---|-------------|----------|-------------|
|-----------|---|-------------|----------|-------------|

|                                                                                                                                     |   |   | codes                  |                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------|---|---|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| lmsEESubsc                                                                                                                          | M | 1 | 200 OK                 | Successful case. The requested "Individual IMS EE Subscription" resource is successfully returned in the response body.                                                                                                                               |
| n/a                                                                                                                                 |   |   | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |   | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |   |                        |                                                                                                                                                                                                                                                       |

**Table 5.43.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.43.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.43.2.3.3.2 PUT

The HTTP PUT method enables to request the update of an existing "Individual IMS EE Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.43.2.3.3.2-1.

**Table 5.43.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.43.2.3.3.2-2 and the response data structures and response codes specified in table 5.43.2.3.3.2-4.

**Table 5.43.2.3.3.2-2: Data structures supported by the PUT request body on this resource**

| Data type  | P | Cardinality | Description                                                                    |
|------------|---|-------------|--------------------------------------------------------------------------------|
| lmsEESubsc | M | 1           | Contains the updated "Individual IMS EE Subscription" resource representation. |

**Table 5.43.2.3.3.2-3: Data structures supported by the PUT response body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
|-----------|---|-------------|----------------|-------------|

|                                                                                                                                     |   |   |                        |                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------|---|---|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ImseEESubsc                                                                                                                         | M | 1 | 200 OK                 | Successful response. The "Individual IMS EE Subscription" resource is successfully updated and a representation of the updated resource is returned in the response body.                                                                             |
| n/a                                                                                                                                 |   |   | 204 No Content         | Successful response. The "Individual IMS EE Subscription" resource is successfully updated and no content is returned in the response body.                                                                                                           |
| n/a                                                                                                                                 |   |   | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |   | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |   |                        |                                                                                                                                                                                                                                                       |

**Table 5.43.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.43.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.43.2.3.3.3 PATCH**

This method enables to request the modification of an existing "Individual IMS EE Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.43.2.3.3.3-1.

**Table 5.43.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.43.2.3.3.3-2 and the response data structures and response codes specified in table 5.43.2.3.3.3-3.

**Table 5.43.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type        | P | Cardinality | Description                                                                            |
|------------------|---|-------------|----------------------------------------------------------------------------------------|
| ImseEESubscPatch | M | 1           | Contains the requested modifications to the "Individual IMS EE Subscription" resource. |

**Table 5.43.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                             | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| lmsEESubsc                                                                                                                            | M | 1           | 200 OK                 | Successful response. The "Individual IMS EE Subscription" resource is successfully modified and a representation of the updated resource is returned in the response body.                                                                            |
| n/a                                                                                                                                   |   |             | 204 No Content         | Successful response. The "Individual IMS EE Subscription" resource is successfully modified and no content is returned in the response body.                                                                                                          |
| n/a                                                                                                                                   |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                   |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.43.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.43.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.43.2.3.3.4 DELETE

The HTTP DELETE method enables to request the deletion of an existing "Individual IMS EE Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.43.2.3.3.4-1.

**Table 5.43.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.43.2.3.3.4-2 and the response data structures and response codes specified in table 5.43.2.3.3.4-3.

**Table 5.43.2.3.3.4-2: Data structures supported by the DELETE request body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.43.2.3.3.4-3: Data structures supported by the DELETE response body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response Codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful response. The "Individual IMS EE Subscription" resource is successfully deleted.                                                                                                                                                           |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.43.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.43.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.43.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.43.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.43.4 Notifications

### 5.43.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.43.4.1-1: Notifications overview**

| Notification        | Callback URI | HTTP method or custom operation | Description (service operation)                                                      |
|---------------------|--------------|---------------------------------|--------------------------------------------------------------------------------------|
| IMS EE Notification | {notifUri}   | POST                            | Enables to notify a previously subscribed AF on IMS Event Exposure related event(s). |

## 5.43.4.2 IMS Event Exposure Notification

### 5.43.4.2.1 Description

The IMS Event Exposure Notification is used by the NEF to report IMS Event Exposure related event(s) to a previously subscribed AF.

### 5.43.4.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 5.43.4.2.2-1.

**Table 5.43.4.2.2-1: Callback URI variables**

| Name     | Definition                                                          |
|----------|---------------------------------------------------------------------|
| notifUri | Represents the callback URI encoded as a string formatted as a URI. |

### 5.43.4.2.3 Operation Definition

This method shall support the request data structures specified in table 5.43.4.2.3-1 and the response data structures and response codes specified in table 5.43.4.2.3-2.

**Table 5.43.4.2.3-1: Data structures supported by the POST Request Body on this resource**

| Data type  | P | Cardinality | Description                                     |
|------------|---|-------------|-------------------------------------------------|
| ImsEENotif | M | 1           | Represents the IMS Event Exposure Notification. |

**Table 5.43.4.2.3-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                  |   |             | 204 No Content         | Successful case. The IMS Event Exposure Notification is successfully received and acknowledged.                                                                                                                                                                                                |
| n/a                                                                                                                                  |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                  |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                |

**Table 5.43.4.2.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.43.4.2.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.43.5 Data Model

### 5.43.5.1 General

This clause specifies the application data model supported by the ImsEventExposure API. Table 5.43.5.1-1 specifies the data types defined for the ImsEventExposure API.

**Table 5.43.5.1-1: ImsEventExposure API specific Data Types**

| Data type           | Clause defined | Description                                                       | Applicability |
|---------------------|----------------|-------------------------------------------------------------------|---------------|
| ImsEENotif          | 5.43.5.2.3     | Represents the IMS Event Exposure Notification.                   |               |
| ImsEventReport      | 5.43.5.2.6     | Represents the IMS Event Report.                                  |               |
| ImsEventRequirement | 5.43.5.2.5     | Represents the IMS Event related requirements.                    |               |
| ImsEventType        | 5.43.5.3.3     | Represents the IMS Event Type.                                    |               |
| ImsEESubsc          | 5.43.5.2.2     | Represents the IMS Event Exposure Subscription.                   |               |
| ImsEESubscPatch     | 5.43.5.2.4     | Represents the requested modifications to an IMS EE Subscription. |               |

Table 5.43.5.1-2 specifies data types re-used by the ImsEventExposure API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the ImsEventExposure API.

**Table 5.43.5.1-2: ImsEventExposure API re-used Data Types**

| Data type             | Reference           | Comments                                                                                                      | Applicability |
|-----------------------|---------------------|---------------------------------------------------------------------------------------------------------------|---------------|
| DateTime              | 3GPP TS 29.122 [4]  | Represents a date and a time.                                                                                 |               |
| ImsEvent              | 3GPP TS 29.571 [8]  | Represents the IMS Event.                                                                                     |               |
| ImsEventConfiguration | 3GPP TS 29.571 [8]  | Represents the IMS event configuration requirements.                                                          |               |
| ImsEventReportInfo    | 3GPP TS 29.571 [8]  | Represents the IMS event report information.                                                                  |               |
| ImsReportingOptions   | 3GPP TS 29.571 [8]  | Represents the IMS reporting requirement options.                                                             |               |
| ImsPublicId           | 3GPP TS 29.562 [80] | Represents the IMS Public Identity.                                                                           |               |
| SessionId             | 3GPP TS 29.571 [8]  | The IMS session ID.                                                                                           |               |
| SupportedFeatures     | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features. |               |

### 5.43.5.2 Structured data types

#### 5.43.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.43.5.2.2 Type: ImsEESubsc

**Table 5.43.5.2.17-1: Definition of type ImsEESubsc**

| Attribute name | Data type                  | P | Cardinality | Description                                        | Applicability |
|----------------|----------------------------|---|-------------|----------------------------------------------------|---------------|
| eventReqs      | array(ImsEventRequirement) | M | 1..N        | Contains the subscribed IMS Event(s) requirements. |               |
| imsReptReq     | ImsReportingOptions        | M | 1           | Contains the IMS reporting requirements.           |               |

|                                                                                      |                       |   |      |                                                                                                                                                                                                                                                                                                                                |  |
|--------------------------------------------------------------------------------------|-----------------------|---|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| immReports                                                                           | array(ImsEventReport) | C | 1..N | Contains the current status related to the subscribed event(s).<br><br>This attribute shall be present only in subscription creation/update responses and only when immediate reporting was requested in the corresponding subscription creation/update request when the information is available for the subscribed event(s). |  |
| tgtUeIds                                                                             | array(ImsPublicId)    | C | 1..N | Contains the identifier(s) of the UE(s) to which the subscription is related.<br><br>(NOTE)                                                                                                                                                                                                                                    |  |
| anyUeInd                                                                             | boolean               | C | 0..1 | Indicates whether the subscription is for any UE.<br><br>- "true" indicates that the subscription is for any UE.<br><br>When present, this attribute shall be set to "true". The presence of this attribute set to the value "false" is forbidden.<br><br>(NOTE)                                                               |  |
| notifUri                                                                             | Uri                   | M | 1    | Contains the URI via which IMS EE notifications shall be delivered.                                                                                                                                                                                                                                                            |  |
| suppFeat                                                                             | SupportedFeatures     | C | 0..1 | Contains the list of supported features among the ones defined in clause 5.43.6.<br><br>This attribute shall be present when only feature negotiation needs to take place.                                                                                                                                                     |  |
| NOTE: These attributes are mutually exclusive and only one of them shall be present. |                       |   |      |                                                                                                                                                                                                                                                                                                                                |  |

## 5.43.5.2.3 Type: ImsEENotif

Table 5.43.5.2.3-1: Definition of type ImsEENotif

| Attribute name  | Data type             | P | Cardinality | Description                                                                       | Applicability |
|-----------------|-----------------------|---|-------------|-----------------------------------------------------------------------------------|---------------|
| subscriptionId  | string                | M | 1           | Contains the identifier of the subscription to which the notification is related. |               |
| sessionId       | SessionId             | O | 0..1        | Identifies the session ID.                                                        |               |
| reports         | array(ImsEventReport) | M | 1..N        | Contains the IMS event report(s).                                                 |               |
| imsFailureCause | string                | O | 0..1        | Contains the failure cause provided from the IMS AS.                              |               |

## 5.43.5.2.4 Type: ImsEESubscPatch

Table 5.43.5.2.4-1: Definition of type ImsEESubscPatch

| Attribute name | Data type                  | P | Cardinality | Description                                                                 | Applicability |
|----------------|----------------------------|---|-------------|-----------------------------------------------------------------------------|---------------|
| eventReqs      | array(ImsEventRequirement) | O | 1..N        | Contains the updated IMS Event(s) requirements.                             |               |
| notifUri       | Uri                        | O | 1           | Contains the updated URI via which IMS EE notifications shall be delivered. |               |



## 5.43.5.2.5 Type: ImsEventRequirement

**Table 5.43.5.2.5-1: Definition of type ImsEventRequirement**

| Attribute name | Data type             | P | Cardinality | Description                                        | Applicability |
|----------------|-----------------------|---|-------------|----------------------------------------------------|---------------|
| imsEventType   | ImsEventType          | M | 1           | Contains the IMS Event Type.                       |               |
| imsEventConfig | ImsEventConfiguration | M | 1           | Indicates the IMS event configuration requirement. |               |

**Editor's Note:** The encoding of the "eventFilter" attribute is FFS and pending stage 2 progress.

## 5.43.5.2.6 Type: ImsEventReport

**Table 5.43.5.2.6-1: Definition of type ImsEventReport**

| Attribute name | Data type          | P | Cardinality | Description                                        | Applicability |
|----------------|--------------------|---|-------------|----------------------------------------------------|---------------|
| imsEvent       | ImsEvent           | M | 1           | Contains the IMS event within the requested scope. |               |
| timeStamp      | DateTime           | M | 1           | Contains the timestamp of this IMS event report.   |               |
| eventRptInfo   | ImsEventReportInfo | O | 0..1        | Contains the IMS event report information.         |               |

## 5.43.5.3 Simple data types and enumerations

## 5.43.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.43.5.3.2 Simple data types

The simple data types defined in table 5.43.5.3.2-1 shall be supported.

**Table 5.43.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.43.5.3.3 Enumeration: ImsEventType

The enumeration ImsEventType represents the IMS Event type. It shall comply with the provisions defined in table 5.43.5.3.3-1.

**Table 5.43.5.3.3-1: Enumeration ImsEventType**

| Enumeration value       | Description                                                                    | Applicability |
|-------------------------|--------------------------------------------------------------------------------|---------------|
| SUBSCRIBER_SPECIFIC     | Indicates that the IMS Event type is Subscriber Specific for data channel.     |               |
| NON_SUBSCRIBER_SPECIFIC | Indicates that the IMS Event type is Non-Subscriber Specific for data channel. |               |

#### 5.43.5.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

#### 5.43.5.5 Binary data

##### 5.43.5.5.1 Binary Data Types

**Table 5.43.5.5.1-1: Binary Data Types**

| Name | Clause defined | Content type |
|------|----------------|--------------|
|      |                |              |

#### 5.43.6 Used Features

The optional features listed in table 5.43.6-1 are defined for the ImsEventExposure API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.43.6-1: Features used by ImsEventExposure API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

#### 5.43.7 Error handling

##### 5.43.7.1 General

For the ImsEventExposure API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the ImsEventExposure API.

##### 5.43.7.2 Protocol Errors

No specific procedures for the ImsEventExposure API are specified.

##### 5.43.7.3 Application Errors

The application errors defined for the ImsEventExposure API are listed in table 5.43.7.3-1.

**Table 5.43.7.3-1: Application errors**

| Application Error | HTTP status code | Description                                                                                                                 | Applicability |
|-------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------|
| AF_NOT_AUTHORIZED | 403 Forbidden    | The subscribe request for subscriber/non-subscriber specific IMS event is rejected because the AF is not authorized by NEF. |               |

#### 5.44 ImsParamProvision API

##### 5.44.1 Introduction

The Nnef\_ImsParameterProvision service shall use the ImsParamProvision API for:

- IMS Parameters provisioning.

The API URI of the ImsParamProvision API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-ims-pp".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

## 5.44.2 Resources

### 5.44.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.44.2.1-1 and the resources and HTTP methods used for the ImsParamProvision API.

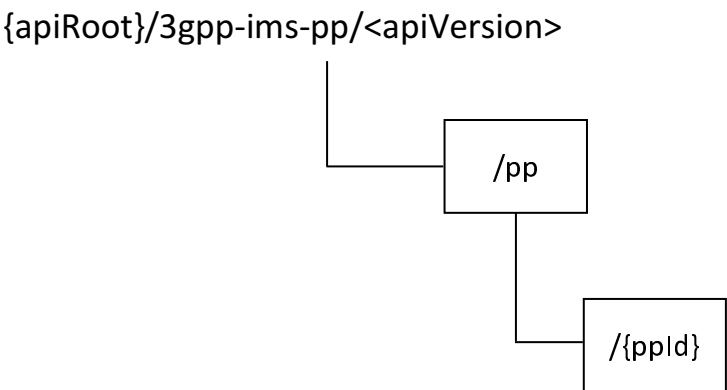


**Figure 5.44.2.1-1: Resource URI structure of the ImsParamProvision API**

Table 5.44.2.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 5.44.2.1-1: Resources and methods overview**

| Resource name                          | Resource URI (relative path under API URI) | HTTP method or custom operation | Description (service operation)                                                   |
|----------------------------------------|--------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------|
| IMS Parameters Provisionings           | /pp                                        | GET                             | Retrieve all the active IMS Parameters Provisionings managed by the NEF.          |
|                                        |                                            | POST                            | Request the creation of a new IMS Parameters Provisioning at the NEF.             |
| Individual IMS Parameters Provisioning | /pp/{ppId}                                 | GET                             | Retrieve an existing "Individual IMS Parameters Provisioning" managed by the NEF. |
|                                        |                                            | PUT                             | Update an existing "Individual IMS Parameters Provisioning" managed by the NEF.   |

|  |  |        |                                                                                 |
|--|--|--------|---------------------------------------------------------------------------------|
|  |  |        | Provisioning" managed by the NEF.                                               |
|  |  | DELETE | Delete an existing "Individual IMS Parameters Provisioning" managed by the NEF. |

## 5.44.2.2 Resource: IMS Parameters Provisionings

### 5.44.2.2.1 Introduction

This resource represents the collection of IMS Parameters Provisionings managed by the NEF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [32]).

### 5.44.2.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-ims-pp/<apiVersion>/pp

This resource shall support the resource URI variables defined in table 5.44.2.2.2-1.

**Table 5.44.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.44.1. |

### 5.44.2.2.3 Resource Methods

#### 5.44.2.2.3.1 GET

This method enables an AF to request to retrieve all the active "IMS Parameters Provisionings" resources managed by the NEF.

This method shall support the URI query parameters specified in table 5.44.2.2.3.1-1.

**Table 5.44.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.44.2.2.3.1-2 and the response data structures and response codes specified in table 5.44.2.2.3.1-3.

**Table 5.44.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.44.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type        | P | Cardinality | Response codes | Description                                                                                                                                                                                                                                     |
|------------------|---|-------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(ImsPpData) | M | 0..N        | 200 OK         | Successful case. All the "Individual IMS Parameters Provisioning" resources managed by the NEF are returned.<br><br>If there are no existing "Individual IMS Parameters Provisioning" resources managed at the NEF, an empty array is returned. |

|                                                                                                                                     |  |  |                        |                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                 |  |  | 307 Temporary Redirect | <p>Temporary redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| n/a                                                                                                                                 |  |  | 308 Permanent Redirect | <p>Permanent redirection.</p> <p>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.</p> <p>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4].</p> |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |                        |                                                                                                                                                                                                                                                              |

**Table 5.44.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.44.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**5.44.2.2.3.2 POST**

This method enables an AF to request the creation of a new IMS Parameters Provisioning at the NEF.

This method shall support the URI query parameters specified in table 5.44.2.2.3.2-1.

**Table 5.44.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.44.2.2.3.2-2 and the response data structures and response codes specified in table 5.44.2.2.3.2-3.

**Table 5.44.2.2.3.2-2: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description                                                                              |
|-----------|---|-------------|------------------------------------------------------------------------------------------|
| ImsPpData | M | 1           | Contains the representation of the IMS Parameters Provisioning to be created at the NEF. |

**Table 5.44.2.2.3.2-3: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description                                                                                                                          |
|-----------|---|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------|
| ImsPpData | M | 1           | 201 Created    | Successful case. A representation of the created "Individual IMS Parameters Provisioning" resource is returned in the response body. |

|                                                                                                                                      |  |  |  |                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------------|
|                                                                                                                                      |  |  |  | The URI of the created resource shall be returned in an HTTP "Location" header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |  |                                                                                 |

**Table 5.44.2.2.3.2-4: Headers supported by the 201 response code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                 |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-ims-pp/<apiVersion>/pp/{ppId} |

#### 5.44.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.44.2.3 Resource: Individual IMS Parameters Provisioning

#### 5.44.2.3.1 Introduction

This resource represents an "Individual IMS Parameters Provisioning" resource managed by the NEF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [32]).

#### 5.44.2.3.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-ims-pp/<apiVersion>/pp/{ppId}**

This resource shall support the resource URI variables defined in table 5.44.2.3.2-1.

**Table 5.44.2.3.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                                                                          |
|---------|-----------|-------------------------------------------------------------------------------------|
| apiRoot | string    | See clause 5.44.1.                                                                  |
| ppId    | string    | Represents the identifier of the "Individual IMS Parameters Provisioning" resource. |

#### 5.44.2.3.3 Resource Methods

##### 5.44.2.3.3.1 GET

This method enables an AF to request to retrieve an existing "Individual IMS Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.44.2.3.3.1-1.

**Table 5.44.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.44.2.3.3.1-2 and the response data structures and response codes specified in table 5.44.2.3.3.1-3.

**Table 5.44.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.44.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ImsPpData                                                                                                                           | M | 1           | 200 OK                 | Successful case. The requested "Individual IMS Parameters Provisioning" resource is returned in the response body.                                                                                                                                    |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.44.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.44.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.44.2.3.3.2 PUT

This method enables an AF to request the update of an existing "Individual IMS Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.44.2.3.3.2-1.

**Table 5.44.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.44.2.3.3.2-2 and the response data structures and response codes specified in table 5.44.2.3.3.2-3.

**Table 5.44.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type | P | Cardinality | Description                                                                              |
|-----------|---|-------------|------------------------------------------------------------------------------------------|
| ImsPpData | M | 1           | Represents the updated "Individual IMS Parameters Provisioning" resource representation. |

**Table 5.44.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ImsPpData                                                                                                                           | M | 1           | 200 OK                 | Successful response. The "Individual IMS Parameters Provisioning" resource is successfully updated and a representation of the updated resource is returned in the response body.                                                                     |
| n/a                                                                                                                                 |   |             | 204 No Content         | Successful response. The "Individual IMS Parameters Provisioning" resource is successfully updated and no content is returned in the response body.                                                                                                   |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.44.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

**Table 5.44.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                |
|----------|-----------|---|-------------|----------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI of the resource located in an alternative NEF. |

5.44.2.3.3.3           Void

5.44.2.3.3.4           DELETE

This method enables an AF to request the deletion of an existing "Individual IMS Parameters Provisioning" resource at the NEF.

This method shall support the URI query parameters specified in table 5.44.2.3.3.4-1.

**Table 5.44.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.44.2.3.3.4-2 and the response data structures and response codes specified in table 5.44.2.3.3.4-3.



**Table 5.44.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.44.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful case. The "Individual IMS Parameters Provisioning" resource is successfully deleted.                                                                                                                                                       |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.44.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.44.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.44.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.44.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.44.4 Notifications

There are no notifications defined for this API in this release of the specification.

## 5.44.5 Data Model

### 5.44.5.1 General

This clause specifies the application data model supported by the ImsParamProvision API. Table 5.44.5.1-1 specifies the data types defined for the ImsParamProvision API.

**Table 5.44.5.1-1: ImsParamProvision API specific Data Types**

| Data type | Clause defined | Description                                  | Applicability |
|-----------|----------------|----------------------------------------------|---------------|
| ImsData   | 5.44.5.2.2     | Represents IMS Parameters data.              |               |
| ImsPpData | 5.44.5.2.3     | Represents IMS Parameters Provisioning data. |               |

Table 5.44.5.1-2 specifies data types re-used by the ImsParamProvision API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the ImsParamProvision API.

**Table 5.44.5.1-2: ImsParamProvision API re-used Data Types**

| Data type         | Reference           | Comments                                                                                                      | Applicability |
|-------------------|---------------------|---------------------------------------------------------------------------------------------------------------|---------------|
| ImsPublicId       | 3GPP TS 29.562 [80] | Represents the IMS public Identity.                                                                           |               |
| RcdProperties     | 3GPP TS 29.571 [8]  | Represents the RCD properties data.                                                                           |               |
| SupportedFeatures | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features. |               |

### 5.44.5.2 Structured data types

#### 5.44.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

#### 5.44.5.2.2 Type: ImsData

**Table 5.44.5.2.2-1: Definition of type ImsData**

| Attribute name | Data type     | P | Cardinality | Description                                                            | Applicability |
|----------------|---------------|---|-------------|------------------------------------------------------------------------|---------------|
| tgtUeId        | ImsPublicId   | M | 1           | Contains the identifier of the IMS public subscriber of the target UE. |               |
| rcdPropData    | RcdProperties | O | 0..1        | Contains the RCD properties related data.                              |               |

#### 5.44.5.2.3 Type: ImsPpData

**Table 5.44.5.2.3-1: Definition of type ImsPpData**

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                        | Applicability |
|----------------|-------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId           | string            | M | 1           | Contains the identifier of the AF that is sending the request.                                                                                                     |               |
| imsData        | ImsData           | C | 0..1        | Contains the IMS data that the AF requests to provision.<br><br>This attribute shall be present only when the AF requests to provision IMS parameters.             |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Contains the list of supported features among the ones defined in clause 5.44.6.<br><br>This attribute shall be present when only feature negotiation is required. |               |

#### 5.44.5.2.4 Void

### 5.44.5.3 Simple data types and enumerations

#### 5.44.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.44.5.3.2 Simple data types

The simple data types defined in table 5.44.5.3.2-1 shall be supported.

**Table 5.44.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

#### 5.44.5.4 Data types describing alternative data types or combinations of data types

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.44.5.5 Binary data

#### 5.44.5.5.1 Binary Data Types

**Table 5.44.5.5.1-1: Binary Data Types**

| Name | Clause defined | Content type |
|------|----------------|--------------|
|      |                |              |

### 5.44.6 Used Features

The optional features in table 5.44.6-1 are defined for the ImsParamProvision API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.44.6-1: Supported Features**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

### 5.44.7 Error handling

#### 5.44.7.1 General

For the ImsParamProvision API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the ImsParamProvision API.

#### 5.44.7.2 Protocol Errors

No specific procedures for the ImsParamProvision API are specified.

5.44.7.3      Application Errors

The application errors defined for the ImsParamProvision API are listed in table 5.44.7.3-1.

Table 5.44.7.3-1: Application errors

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

5.45      AIoT API

5.45.1      Introduction

The Nnef\_AIoT service shall use the AIoT API.

The API URI of AIoT API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as described in clause 5.2.4 in 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-aiot".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

5.45.2 Resources

There are no resources defined for this API in this release of the specification.

5.45.3      Custom Operations without associated resources

5.45.3.1      Overview

The structure of the custom operation URIs of the AIoT API is shown in Figure 5.45.3.1-1.

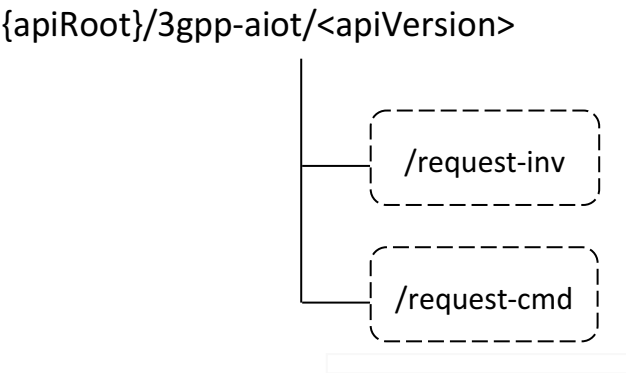


Figure 5.45.3.1-1: Custom operation URI structure of the AIoT API

Table 5.45.3.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the AIoT API.

**Table 5.45.3.1-1: Custom operations without associated resources**

| Custom operation name | Custom operation URI | Mapped HTTP method | Description                                                |
|-----------------------|----------------------|--------------------|------------------------------------------------------------|
| InventoryRequest      | /request-inv         | POST               | Enables to request to perform an AIoT Inventory operation. |
| CommandRequest        | /request-cmd         | POST               | Enables to request to perform an AIoT Command operation.   |

The custom operations shall support the URI variables defined in table 5.45.3.1-2.

**Table 5.45.3.1-2: URI variables for this custom operation**

| Name    | Data type | Definition         |
|---------|-----------|--------------------|
| apiRoot | string    | See clause 5.45.1. |

## 5.45.3.2 Operation: InventoryRequest

### 5.45.3.2.1 Description

The custom operation enables to request to perform an AIoT Inventory operation at the NEF.

### 5.45.3.2.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.45.3.2.2-1 and table 5.45.3.2.2-2.

**Table 5.45.3.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type    | P | Cardinality | Description                                                                |
|--------------|---|-------------|----------------------------------------------------------------------------|
| InventoryReq | M | 1           | Contains the parameters to request to perform an AIoT Inventory operation. |

**Table 5.45.3.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type      | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                           |
|----------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| InventoryResp  | M | 1           | 200 OK                 | Successful case. The AIoT Inventory request is successfully received and processed, and AIoT Inventory related information is returned in the response body.                                                                          |
| n/a            |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a            |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]  |
| ProblemDetails | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                              |

NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply.  
 NOTE 2: Failure cases are described in clause 5.45.7.

**Table 5.45.3.2.2-3: Headers supported by the 307 Response Code on this custom operation**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI located in an alternative NEF. |

**Table 5.45.3.2.2-4: Headers supported by the 308 Response Code on this custom operation**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI located in an alternative NEF. |

### 5.45.3.3 Operation: CommandRequest

#### 5.45.3.3.1 Description

The custom operation enables to request to perform an AIoT Command operation at the NEF.

#### 5.45.3.3.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.45.3.3.2-1 and table 5.45.3.3.2-2.

**Table 5.45.3.3.2-1: Data structures supported by the POST Request Body on this resource**

| Data type  | P | Cardinality | Description                                                              |
|------------|---|-------------|--------------------------------------------------------------------------|
| CommandReq | M | 1           | Contains the parameters to request to perform an AIoT Command operation. |

**Table 5.45.3.3.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CommandResp                                                                                                                            | M | 1           | 200 OK                 | Successful case. The AIoT Command request is successfully received and processed, and AIoT Command related information is returned in the response body.                                                                              |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]  |
| ProblemDetails                                                                                                                         | O | 0..1        | 403 Forbidden          | (NOTE 2)                                                                                                                                                                                                                              |
| NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                       |

NOTE 2: Failure cases are described in clause 5.45.7.

**Table 5.45.3.3.2-3: Headers supported by the 307 Response Code on this custom operation**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI located in an alternative NEF. |

**Table 5.45.3.3.2-4: Headers supported by the 308 Response Code on this custom operation**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI located in an alternative NEF. |

## 5.45.4 Notifications

### 5.45.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.45.4.1-1: Notifications overview**

| Notification                 | Callback URI | HTTP method or custom operation | Description (service operation)                                                          |
|------------------------------|--------------|---------------------------------|------------------------------------------------------------------------------------------|
| AIoT Operations Notification | {notifUri}   | POST                            | Enable the NEF to notify a previously subscribed AF on AIoT operations related event(s). |

### 5.45.4.2 AIoT Operations Notification

#### 5.45.4.2.1 Description

The AIoT Operations Notification is used by the NEF to report AIoT operations related event(s) to a previously subscribed AF.

#### 5.45.4.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 5.45.4.2.2-1.

**Table 5.45.4.2.2-1: Callback URI variables**

| Name     | Definition                                                          |
|----------|---------------------------------------------------------------------|
| notifUri | Represents the callback URI encoded as a string formatted as a URI. |

#### 5.45.4.2.3 Standard Methods

##### 5.45.4.2.3.1 POST

This method shall support the request data structures specified in table 5.45.4.2.3.1-1 and the response data structures and response codes specified in table 5.45.4.2.3.1-2.

**Table 5.45.4.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
|-----------|---|-------------|-------------|

|           |   |   |                                              |
|-----------|---|---|----------------------------------------------|
| AloTNotif | M | 1 | Represents the AloT Operations Notification. |
|-----------|---|---|----------------------------------------------|

**Table 5.45.4.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                  |   |             | 204 No Content         | Successful case. The AloT Operations Notification is successfully received and acknowledged.                                                                                                                                                                                                   |
| n/a                                                                                                                                  |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                  |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                                                                |

**Table 5.45.4.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.45.4.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.45.5 Data Model

### 5.45.5.1 General

This clause specifies the application data model supported by the AIoT API. Table 5.45.5.1-1 specifies the data types defined for the AIoT API.

**Table 5.45.5.1-1: AIoT service specific Data Types**

| Data type    | Clause defined | Description                                  | Applicability |
|--------------|----------------|----------------------------------------------|---------------|
| AloTNotif    | 5.45.5.2.6     | Represents the AloT Operations Notification. |               |
| CommandReq   | 5.45.5.2.4     | Represents the AloT Command request.         |               |
| CommandResp  | 5.45.5.2.5     | Represents the AloT Command response.        |               |
| CommandType  | 5.45.5.3.3     | Represents the type of AloT Command.         |               |
| ExtAloTArea  | 5.45.5.2.7     | Represents the External AloT Service Area.   |               |
| InventoryReq | 5.45.5.2.2     | Represents the AloT Inventory request.       |               |



|               |            |                                         |  |
|---------------|------------|-----------------------------------------|--|
| InventoryResp | 5.45.5.2.3 | Represents the AIoT Inventory response. |  |
|---------------|------------|-----------------------------------------|--|

Table 5.45.5.1-2 specifies data types re-used by the AIoT API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the AIoT API.

**Table 5.45.5.1-2: Re-used Data Types**

| Data type         | Reference           | Comments                                                                                                         | Applicability |
|-------------------|---------------------|------------------------------------------------------------------------------------------------------------------|---------------|
| AIoTDevices       | 3GPP TS 29.569 [83] | Represents the AIoT device(s) related information.                                                               |               |
| AiotDevPermlId    | 3GPP TS 29.571 [8]  | Represents the permanent identifier of the AIoT Device.                                                          |               |
| Bytes             | 3GPP TS 29.571 [16] | Represents a sequence of bytes.                                                                                  |               |
| CivicAddress      | 3GPP TS 29.572 [34] | Represents a civic address.                                                                                      |               |
| DevicesRepInfo    | 3GPP TS 29.569 [83] | Represents the AIoT device(s) related reporting information.                                                     |               |
| DurationSec       | 3GPP TS 29.122 [4]  | Represents a time duration in units of seconds.                                                                  |               |
| GeographicArea    | 3GPP TS 29.572 [34] | Represents a geographical area.                                                                                  |               |
| ProblemDetails    | 3GPP TS 29.571 [8]  | Represents error related information.                                                                            |               |
| SupportedFeatures | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |               |
| UInteger          | 3GPP TS 29.571 [8]  | Represents an unsigned integer.                                                                                  |               |
| Uri               | 3GPP TS 29.122 [4]  | Represents a URI.                                                                                                |               |

## 5.45.5.2 Structured data types

### 5.45.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

### 5.45.5.2.2 Type: InventoryReq

**Table 5.45.5.2.2-1: Definition of type InventoryReq**

| Attribute name                                           | Data type         | P | Cardinality | Description                                                                                                                                                        | Applicability |
|----------------------------------------------------------|-------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId                                                     | string            | M | 1           | Contains the identifier of the AF that is sending the request.                                                                                                     |               |
| targetArea                                               | ExtAloTArea       | C | 0..1        | Contains the target AIoT Service Area within which the requested Inventory operation shall apply.<br><br>(NOTE)                                                    |               |
| targetDevices                                            | AIoTDevices       | C | 0..1        | Contains the target AIoT device(s) related information.<br><br>(NOTE)                                                                                              |               |
| numDevices                                               | UInteger          | O | 0..1        | Contains the approximative number of the targeted AIoT device(s).                                                                                                  |               |
| timeInterval                                             | DurationSec       | O | 0..1        | Contains the time interval to be used for results aggregation.                                                                                                     |               |
| notifUri                                                 | Uri               | M | 1           | Contains the URI via which the AIoT Inventory operation related notifications shall be delivered.                                                                  |               |
| suppFeat                                                 | SupportedFeatures | C | 0..1        | Contains the list of supported features among the ones defined in clause 5.45.6.<br><br>This attribute shall be present only when feature negotiation is required. |               |
| NOTE: At least one of these attributes shall be present. |                   |   |             |                                                                                                                                                                    |               |

## 5.45.5.2.3 Type: InventoryResp

Table 5.45.5.2.3-1: Definition of type InventoryResp

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                        | Applicability |
|----------------|-------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afTransId      | string            | M | 1           | Contains the identifier of the AF transaction that is created for the inventory request.                                                                           |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Contains the list of supported features among the ones defined in clause 5.45.6.<br><br>This attribute shall be present only when feature negotiation is required. |               |

## 5.45.5.2.4 Type: CommandReq

Table 5.45.5.2.4-1: Definition of type CommandReq

| Attribute name | Data type   | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                                                                                                         | Applicability |
|----------------|-------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afId           | string      | M | 1           | Contains the identifier of the AF that is sending the request.                                                                                                                                                                                                                                                                                                                                                                      |               |
| commandType    | CommandType | M | 1           | Contains the type of the requested command.                                                                                                                                                                                                                                                                                                                                                                                         |               |
| targetArea     | ExtAloTArea | C | 0..1        | Contains the target AloT Service Area within which the requested command operation shall apply.<br><br>(NOTE)                                                                                                                                                                                                                                                                                                                       |               |
| targetDevices  | AloTDevices | C | 0..1        | Contains the target AloT device(s) related information.<br><br>(NOTE)                                                                                                                                                                                                                                                                                                                                                               |               |
| numDevices     | UInteger    | O | 0..1        | Contains the approximative number of the targeted AloT device(s).                                                                                                                                                                                                                                                                                                                                                                   |               |
| msgSize        | UInteger    | O | 0..1        | Contains the approximative message size in units of Bytes.<br><br>This attribute may be present only if the "commandType" attribute is set to "READ".                                                                                                                                                                                                                                                                               |               |
| offset         | UInteger    | C | 0..1        | Contains the offset, expressed in units of bytes.<br><br>This attribute shall be present only if the "commandType" attribute is set to "READ" or "WRITE":<br><br>- If the "commandType" attribute is set to "READ", this attribute contains the offset from which to read the application data.<br>- If the "commandType" attribute is set to "WRITE", this attribute contains the offset from which to write the application data. |               |
| length         | UInteger    | C | 0..1        | Contains the length of application data, expressed in units of bytes (i.e., byte length).<br><br>This attribute shall be present only if the "commandType" attribute is set to "READ" or "WRITE".                                                                                                                                                                                                                                   |               |

|                                                          |                   |   |      |                                                                                                                                                                                                                                                                                                    |  |
|----------------------------------------------------------|-------------------|---|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                          |                   |   |      | <ul style="list-style-type: none"> <li>- If the "commandType" attribute is set to "READ", this attribute contains the length of application data to read.</li> <li>- If the "commandType" attribute is set to "WRITE", this attribute contains the length of application data to write.</li> </ul> |  |
| data                                                     | Bytes             | C | 0..1 | Contains the application data to write.<br><br>This attribute shall be present only if the "commandType" attribute is set to "WRITE".                                                                                                                                                              |  |
| notifUri                                                 | Uri               | M | 1    | Contains the URI via which the AIoT Command operation related notifications shall be delivered.                                                                                                                                                                                                    |  |
| suppFeat                                                 | SupportedFeatures | C | 0..1 | Contains the list of supported features among the ones defined in clause 5.45.6.<br><br>This attribute shall be present only when feature negotiation is required.                                                                                                                                 |  |
| NOTE: At least one of these attributes shall be present. |                   |   |      |                                                                                                                                                                                                                                                                                                    |  |

## 5.45.5.2.5 Type: CommandResp

Table 5.45.5.2.5-1: Definition of type CommandResp

| Attribute name | Data type         | P | Cardinality | Description                                                                                                                                                        | Applicability |
|----------------|-------------------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afTransId      | string            | M | 1           | Contains the identifier of the AF transaction that is created for the command request.                                                                             |               |
| suppFeat       | SupportedFeatures | C | 0..1        | Contains the list of supported features among the ones defined in clause 5.45.6.<br><br>This attribute shall be present only when feature negotiation is required. |               |

## 5.45.5.2.6 Type: AIoTNotif

Table 5.45.5.2.6-1: Definition of type AIoTNotif

| Attribute name | Data type             | P | Cardinality | Description                                                                                                                                                                                                                                                                                                                                                                                                                   | Applicability |
|----------------|-----------------------|---|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| afTransId      | string                | M | 1           | Contains the identifier of the AF transaction to which the notification is related.                                                                                                                                                                                                                                                                                                                                           |               |
| devicesRepData | array(DevicesRepInfo) | C | 1..N        | Contains the AIoT device(s) related reporting information.<br><br>(NOTE)                                                                                                                                                                                                                                                                                                                                                      |               |
| lastRepInd     | boolean               | C | 0..1        | Contains the Last Report Indication, i.e., indicates whether this is the last reporting from the AIOTF for the AIoT service operation identified by the "transId" attribute.<br><br><ul style="list-style-type: none"> <li>- "true" indicates that this is the last report.</li> <li>- "false" indicates that this is not the last report.</li> <li>- The default value is "false" when this attribute is omitted.</li> </ul> |               |

|                                                          |  |  |        |  |
|----------------------------------------------------------|--|--|--------|--|
|                                                          |  |  | (NOTE) |  |
| NOTE: At least one of these attributes shall be present. |  |  |        |  |

#### 5.45.5.2.7 Type: ExtAloTArea

**Table 5.45.5.2.7-1: Definition of type ExtAloTArea**

| Attribute name                                                                       | Data type             | P | Cardinality | Description                                                                                              | Applicability |
|--------------------------------------------------------------------------------------|-----------------------|---|-------------|----------------------------------------------------------------------------------------------------------|---------------|
| extArealds                                                                           | array(ExtAiotAreald)  | C | 1..N        | Contains the target external AIoT Area identifier(s).<br>(NOTE)                                          |               |
| geographicAreas                                                                      | array(GeographicArea) | C | 1..N        | Contains the target AIoT Service Area, expressed in the form of a set of geographical area(s).<br>(NOTE) |               |
| civicAddresses                                                                       | array(CivicAddress)   | C | 1..N        | Contains the target AIoT Service Area, expressed in the form of a set of civic address(es).<br>(NOTE)    |               |
| NOTE: These attributes are mutually exclusive and only one of them shall be present. |                       |   |             |                                                                                                          |               |

### 5.45.5.3 Simple data types and enumerations

#### 5.45.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.45.5.3.2 Simple data types

The simple data types defined in table 5.45.5.3.2-1 shall be supported.

**Table 5.45.5.3.2-1: Simple data types**

| Type Name     | Type Definition | Description                                   | Applicability |
|---------------|-----------------|-----------------------------------------------|---------------|
| ExtAiotAreald | string          | Represents the External AIoT Area identifier. |               |

#### 5.45.5.3.3 Enumeration: CommandType

The enumeration CommandType represents the type of AIoT Command. It shall comply with the provisions defined in table 5.45.5.3.3-1.

**Table 5.45.5.3.3-1: Enumeration CommandType**

| Enumeration value | Description                                                                                                  | Applicability |
|-------------------|--------------------------------------------------------------------------------------------------------------|---------------|
| READ              | Indicates that the AIoT Command is Read (i.e., retrieve information).                                        |               |
| WRITE             | Indicates that the AIoT Command is Write (i.e., provision information).                                      |               |
| PERMANENT_DISABLE | Indicates that the AIoT Command is Permanent Disable (i.e., disable the capability to transmit information). |               |

#### 5.45.5.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

#### 5.45.5.5 Binary data

##### 5.45.5.1 Binary Data Types

**Table 5.45.5.1-1: Binary Data Types**

| Name | Clause defined | Content type |
|------|----------------|--------------|
|      |                |              |

#### 5.45.6 Used Features

The optional features listed in table 5.45.6-1 are defined for the AIoT API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.45.6-1: Features used by AIoT API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

#### 5.45.7 Error handling

##### 5.45.7.1 General

For the AIoT API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the AIoT API.

##### 5.45.7.2 Protocol Errors

No specific procedures for the AIoT API are specified.

##### 5.45.7.3 Application Errors

The application errors defined for the AIoT API are listed in table 5.45.7.3-1.

**Table 5.45.7.3-1: Application errors**

| Application Error   | HTTP status code          | Description                                                                                                 | Applicability |
|---------------------|---------------------------|-------------------------------------------------------------------------------------------------------------|---------------|
| AF_NOT_AUTHORIZED   | 403 Forbidden             | The request for AIoT services is rejected because the AF is not authorized for the requested AIoT Services. |               |
| UNSPECIFIED_FAILURE | 500 Internal Server Error | The request for AIoT services is rejected because the NEF failed to process it.                             |               |

## 5.46 VFLTraining API

### 5.46.1 Introduction

The Nnef\_VFLTraining service shall use the VFLTraining API.

The API URI of the VFLTraining API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as defined in clause 5.2.4 of 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-vfl-training".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.46.2 Resources

#### 5.46.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.46.2.1-1 and the resources and HTTP methods used for the VFLTraining API.

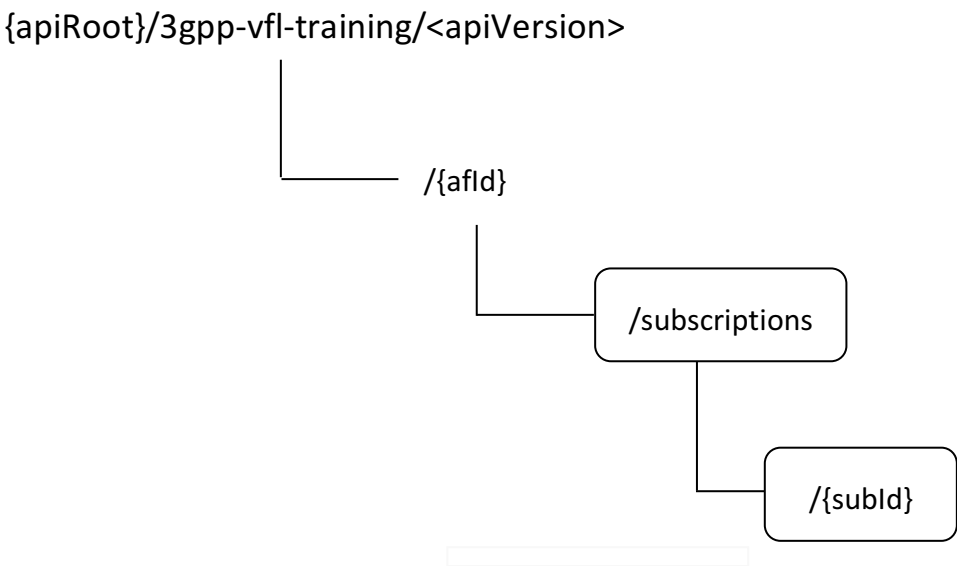


**Figure 5.46.2.1-1: Resource URI structure of the northbound VFLTraining API**

Table 5.46.2.1-1 provides an overview of the resources and HTTP methods applicable for the northbound VFLTraining API.

**Table 5.46.2.1-1: Resources and methods overview**

| Resource name | Resource URI | HTTP method | Description |
|---------------|--------------|-------------|-------------|
|---------------|--------------|-------------|-------------|

|                                      |                               |        |                                                                             |
|--------------------------------------|-------------------------------|--------|-----------------------------------------------------------------------------|
| VFL Training Subscriptions           | /{afld}/subscriptions         | GET    | Retrieve all the active VFL Training Subscriptions.                         |
|                                      |                               | POST   | Create a new Individual VFL Training Subscription resource.                 |
| Individual VFL Training Subscription | /{afld}/subscriptions/{subld} | GET    | Retrieve an existing Individual VFL Training Subscription resource.         |
|                                      |                               | PUT    | Update an existing Individual VFL Training Subscription resource.           |
|                                      |                               | PATCH  | Partially modify an existing Individual VFL Training Subscription resource. |
|                                      |                               | DELETE | Delete an existing Individual VFL Training Subscription resource.           |

## 5.46.2.2 Resource: VFL Training Subscriptions

### 5.46.2.2.1 Introduction

This resource represents all the active VFL Training Subscriptions managed by the NEF for a given AF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [3]).

### 5.46.2.2.2 Resource Definition

Resource URI: {apiRoot}/3gpp-vfl-training/<apiVersion>/{afld}/subscriptions

This resource shall support the resource URI variables defined in table 5.46.2.2.2-1.

**Table 5.46.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                           |
|---------|-----------|--------------------------------------|
| apiRoot | string    | See clause 5.46.1.                   |
| afld    | string    | Represents the identifier of the AF. |

### 5.46.2.2.3 Resource Standard Methods

#### 5.46.2.2.3.1 GET

The HTTP GET method allows to retrieve all the active VFL Training Subscriptions at the NEF for a given AF.

This method shall support the URI query parameters specified in table 5.46.2.2.3.1-1.

**Table 5.46.2.2.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.46.2.2.3.1-2, the response data structures and response codes specified in table 5.46.2.2.3.1-3, and the location headers specified in table 5.46.2.2.3.1-4 and table 5.46.2.2.3.1-5.

**Table 5.46.2.2.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.46.2.2.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| array(VflTrainingSubs)                                                                                                              | M | 0..N        | 200 OK                 | Successful case. All the active "Individual VFL Training Subscription" resource(s) are returned.<br><br>If there are no active "Individual VFL Training Subscription" resources at the NEF, an empty array is returned.                               |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.46.2.2.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.46.2.2.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.46.2.2.3.2 POST

The HTTP POST method allows to create a new Individual VFL Training Subscription at the NEF for a given AF.

This method shall support the URI query parameters specified in table 5.46.2.2.3.2-1.

**Table 5.46.2.2.3.2-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.46.2.2.3.2-1, the response data structures and response codes specified in table 5.46.2.2.3.2-2, and the Location Headers specified in table 5.46.2.2.3.2-3.

**Table 5.46.2.2.3.2-1: Data structures supported by the POST Request Body on this resource**

| Data type       | P | Cardinality | Description                                                                                 |
|-----------------|---|-------------|---------------------------------------------------------------------------------------------|
| VflTrainingSubs | M | 1           | Contains the parameters to request the creation of an Individual VFL Training Subscription. |



**Table 5.46.2.2.3.2-2: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                            | P | Cardinality | Response codes | Description                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------|---|-------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VflTrainingSubs                                                                                                                      | M | 1           | 201 Created    | Successful case. A representation of the created "Individual VFL Training Subscription" resource is returned in the response body.<br><br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                |                                                                                                                                                                                                                            |

**Table 5.46.2.2.3.2-3: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                          |
|----------|-----------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure:<br>{apiRoot}/3gpp-vfl-training/<apiVersion>/{afId}/subscriptions/{subId} |

#### 5.46.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.46.2.3 Resource: Individual VFL Training Subscription

#### 5.46.2.3.1 Introduction

This resource represents an "Individual VFL Training Subscription" resource managed by the NEF.

#### 5.46.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-vfl-training/<apiVersion>/{afId}/subscriptions/{subId}

This resource shall support the resource URI variables defined in table 5.46.2.3.2-1.

**Table 5.46.2.3.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                                                                        |
|---------|-----------|-----------------------------------------------------------------------------------|
| apiRoot | string    | See clause 5.46.1.                                                                |
| afId    | string    | Represents the identifier of the AF.                                              |
| subId   | string    | Represents the identifier of the "Individual VFL Training Subscription" resource. |

#### 5.46.2.3.3 Resource Standard Methods

##### 5.46.2.3.3.1 GET

The HTTP GET method allows to retrieve an existing "Individual VFL Training Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.46.2.3.3.1-1.

**Table 5.46.2.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.46.2.3.3.1-2 and the response data structures and response codes specified in table 5.46.2.3.3.1-3.

**Table 5.46.2.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.46.2.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VflTrainingSubs                                                                                                                     | M | 1           | 200 OK                 | Successful case. The requested "Individual VFL Training Subscription" resource is successfully returned in the response body.                                                                                                                         |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.46.2.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.46.2.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.46.2.3.3.2 PUT

The HTTP PUT method allows to update an existing "Individual VFL Training Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.46.2.3.3.2-1.

**Table 5.46.2.3.3.2-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.46.2.3.3.2-2 and the response data structures and response codes specified in table 5.46.2.3.3.2-3.

**Table 5.46.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource**

| Data type       | P | Cardinality | Description                                                                                 |
|-----------------|---|-------------|---------------------------------------------------------------------------------------------|
| VflTrainingSubs | M | 1           | Contains the updated representation of the "Individual VFL Training Subscription" resource. |

**Table 5.46.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                           | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VflTrainingSubs                                                                                                                     | M | 1           | 200 OK                 | Successful case. The "Individual VFL Training Subscription" resource is successfully updated and a representation of the updated resource is returned in the response body.                                                                           |
| n/a                                                                                                                                 |   |             | 204 No Content         | Successful case. The "Individual VFL Training Subscription" resource is successfully updated and no content is returned in the response body.                                                                                                         |
| n/a                                                                                                                                 |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                 |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.46.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.46.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

### 5.46.2.3.3.3 PATCH

This method enables to request the modification of an existing "Individual VFL Training Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.46.2.3.3.3-1.

**Table 5.46.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.46.2.3.3.3-2 and the response data structures and response codes specified in table 5.46.2.3.3.3-3.

**Table 5.46.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type            | P | Cardinality | Description                                                                                  |
|----------------------|---|-------------|----------------------------------------------------------------------------------------------|
| VflTrainingSubsPatch | M | 1           | Contains the requested modifications to the "Individual VFL Training Subscription" resource. |

**Table 5.46.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                             | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VflTrainingSubs                                                                                                                       | M | 1           | 200 OK                 | Successful response. The "Individual VFL Training Subscription" resource is successfully modified and a representation of the updated resource is returned in the response body.                                                                      |
| n/a                                                                                                                                   |   |             | 204 No Content         | Successful response. The "Individual VFL Training Subscription" resource is successfully modified and no content is returned in the response body.                                                                                                    |
| n/a                                                                                                                                   |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                   |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.46.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.46.2.3.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.46.2.3.3.4 DELETE

The HTTP DELETE method allows to delete an existing "Individual VFL Training Subscription" resource at the NEF.

This method shall support the URI query parameters specified in table 5.46.2.3.3.4-1.

**Table 5.46.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.46.2.3.3.4-2 and the response data structures and response codes specified in table 5.46.2.3.3.4-3.

**Table 5.46.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a       |   |             |             |

**Table 5.46.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                              | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                                                                                                                                    |   |             | 204 No Content         | Successful case. The "Individual VFL Training Subscription" resource is successfully deleted.                                                                                                                                                         |
| n/a                                                                                                                                    |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                                    |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative target URI of the resource located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                        |                                                                                                                                                                                                                                                       |

**Table 5.46.2.3.3.4-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

**Table 5.46.2.3.3.4-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                       |
|----------|-----------|---|-------------|-----------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative target URI of the resource located in an alternative NEF. |

#### 5.46.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.46.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

## 5.46.4 Notifications

### 5.46.4.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.46.4.1-1: Notifications overview**

| Notification              | Callback URI | HTTP method or custom operation | Description (service operation)                                                        |
|---------------------------|--------------|---------------------------------|----------------------------------------------------------------------------------------|
| VFL Training Notification | {notifUri}   | POST                            | Enables the NEF to notify a previously subscribed AF on VFL Training related event(s). |

### 5.46.4.2 VFL Training Notification

#### 5.46.4.2.1 Description

The VFL Training Notification is used by the NEF to report VFL Training related event(s) to a previously subscribed AF.

#### 5.46.4.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 5.46.4.2.2-1.

**Table 5.46.4.2.2-1: Callback URI variables**

| Name     | Definition                                                          |
|----------|---------------------------------------------------------------------|
| notifUri | Represents the callback URI encoded as a string formatted as a URI. |

#### 5.46.4.2.3 Operation Definition

This method shall support the request data structures specified in table 5.46.4.2.3-1 and the response data structures and response codes specified in table 5.46.4.2.3-2.

**Table 5.46.4.2.3-1: Data structures supported by the POST Request Body on this resource**

| Data type         | P | Cardinality | Description                                           |
|-------------------|---|-------------|-------------------------------------------------------|
| VflTrainingNotify | M | 1..N        | Represents the VFL Training Notification information. |

**Table 5.46.4.2.3-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                    |
|-----------|---|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful case. The notification is successfully received and acknowledged.                                                                                                                                                                                                                   |
| n/a       |   |             | 307 Temporary Redirect | Temporary redirection.<br><br>The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a       |   |             | 308 Permanent Redirect | Permanent redirection.<br><br>The response shall include a Location header field containing an alternative URI                                                                                                                                                                                 |

|                                                                                                                                      |  |  |  |                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                      |  |  |  | representing the end point of an alternative AF towards which the notification should be sent.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |  |  |  |                                                                                                                                                                                 |

**Table 5.46.4.2.3-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.46.4.2.3-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                      |
|----------|-----------|---|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains an alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

## 5.46.5 Data Model

### 5.46.5.1 General

This clause specifies the application data model supported by the VFLTraining API. Table 5.46.5.1-1 specifies the data types defined for the VFLTraining API.

**Table 5.46.5.1-1: VFLTraining API specific Data Types**

| Data type            | Clause defined | Description                                                        | Applicability |
|----------------------|----------------|--------------------------------------------------------------------|---------------|
| VflTrainingSubs      | 5.46.5.3.2     | Represents VFL training subscription information.                  |               |
| VflTrainingSubsPatch | 5.46.5.3.3     | Represents modifications to VFL training subscription information. |               |

Table 5.46.5.1-2 specifies data types re-used by the VFLTraining API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the VFLTraining API.

**Table 5.46.5.1-2: VFLTraining API re-used Data Types**

| Data type            | Reference           | Comments                                                                                                         | Applicability |
|----------------------|---------------------|------------------------------------------------------------------------------------------------------------------|---------------|
| ReportingInformation | 3GPP TS 29.523 [22] | Describes reporting requirements.                                                                                |               |
| SupportedFeatures    | 3GPP TS 29.571 [8]  | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |               |
| Uri                  | 3GPP TS 29.571 [8]  | Represents a URI.                                                                                                |               |
| VflTrainingNotify    | 3GPP TS 29.520 [27] | Represents VFL training notification information.                                                                |               |
| VflTrainingSub       | 3GPP TS 29.520 [27] | Represents VFL training subscription information for a specific analytics ID.                                    |               |

### 5.46.5.3 Structured data types

#### 5.46.5.3.1 Introduction

This clause defines the structured data types to be used in resource representations.

## 5.46.5.3.2 Type: VflTrainingSubs

Table 5.46.5.3.2-1: Definition of type VflTrainingSubs

| Attribute name | Data type                | P | Cardinality | Description                                                                                                                                                            | Applicability |
|----------------|--------------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| notifUri       | Uri                      | M | 1           | Notification target address.                                                                                                                                           |               |
| notifCorrId    | string                   | M | 1           | Notification correlation identifier.                                                                                                                                   |               |
| vflTrainSubs   | array(VflTrainingSub)    | M | 1..N        | Each entry contains VFL training subscription request for a specific analytics ID.                                                                                     |               |
| reportingReqs  | ReportingInformation     | O | 0..1        | Reporting requirement information of the subscription. If omitted, the default values within the ReportingInformation data type apply.                                 |               |
| extNwdafId     | string                   | M | 1           | Contains the external identifier of the NWDAF which is being requested to act as a VFL client.                                                                         |               |
| trainReports   | array(VflTrainingNotify) | O | 1..N        | Contains the VFL Training related even(s) report(s).<br><br>This attribute may be present only if immediate reporting was requested via the "reportingReqs" attribute. |               |
| suppFeat       | SupportedFeatures        | C | 0..1        | List of supported features used as described in clause 5.46.6. This attribute shall be included when feature negotiation needs to take place.                          |               |

## 5.46.5.3.3 Type: VflTrainingSubsPatch

Table 5.46.5.3.3-1: Definition of type VflTrainingSubsPatch

| Attribute name | Data type             | P | Cardinality | Description                                                                                             | Applicability |
|----------------|-----------------------|---|-------------|---------------------------------------------------------------------------------------------------------|---------------|
| vflTrainSubs   | array(VflTrainingSub) | O | 1..N        | Contains modified information related to VFL training subscription request for a specific analytics ID. |               |
| notifUri       | Uri                   | O | 0..1        | Contains the updated URI via which VFL Training related notifications shall be delivered.               |               |
| notifCorrId    | string                | O | 0..1        | Contains the updated Notification Correlation Identifier.                                               |               |
| reportingReqs  | ReportingInformation  | O | 0..1        | Contains the reporting requirements applicable for VFL Training related reporting.                      |               |

## 5.46.5.4 Simple data types and enumerations

## 5.46.5.4.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.46.5.4.2 Simple data types

The simple data types defined in table 5.46.5.4.2-1 shall be supported.



**Table 5.46.5.4.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

#### 5.46.5.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

### 5.46.6 Used Features

The optional features listed in table 5.46.6-1 are defined for the VFLTraining API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.46.6-1: Features used by VFLTraining API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

### 5.46.7 Error handling

#### 5.46.7.1 General

For the VFLTraining API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the VFLTraining API.

#### 5.46.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the VFLTraining API.

#### 5.46.7.3 Application Errors

The application errors defined for VFLTraining API are listed in table 5.46.7.3-1.

**Table 5.46.7.3-1: Application errors**

| Application Error | HTTP status code | Description                                                               | Applicability |
|-------------------|------------------|---------------------------------------------------------------------------|---------------|
| OVERLOAD          | 403 Forbidden    | Indicates that the request cannot be served due to an overload situation. |               |

## 5.47 VFLInference API

### 5.47.1 Introduction

The Nnef\_VFLInference service shall use the VFLInference API.

The API URI of VFLInference API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- "apiRoot" is set as described in clause 5.2.4 in 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-vfl-inference".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

5.47.2 Resources

5.47.2.1 Overview

This clause describes the structure for the Resource URIs as shown in figure 5.47.2.1-1 and the resources and HTTP methods used for the VFLInference API.

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 5.47.2.1-1 depicts the resource URIs structure for the VFLInference API.

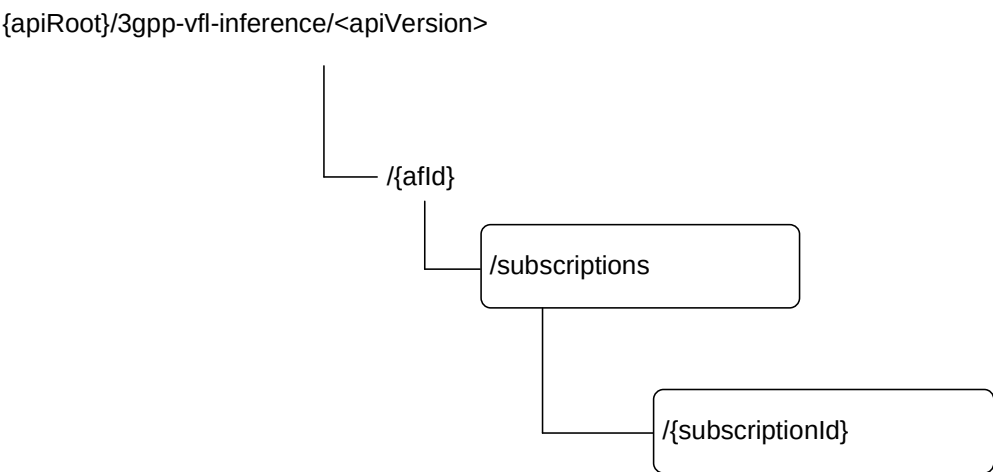


**Figure 5.47.2.1-1: Resource URI structure of the VFLInference API**

Table 5.47.2.1-1 provides an overview of the resources and HTTP methods applicable for the VFLInference API.

**Table 5.47.2.1-1: Resources and methods overview**

| Resource name                         | Resource URI                         | HTTP method | Description                                                      |
|---------------------------------------|--------------------------------------|-------------|------------------------------------------------------------------|
| VFL Inference subscriptions           | /afld/subscriptions                  | POST        | Create a new Individual VFL Inference subscription resource.     |
| Individual VFL Inference subscription | /afld/subscriptions/{subscriptionId} | PUT         | Update an existing subscription identified by {subscriptionId}.. |
|                                       |                                      | PATCH       | Modify an existing subscription identified by {subscriptionId}.  |
|                                       |                                      | DELETE      | Delete an existing subscription identified by {subscriptionId}.  |

## 5.47.2.2 Resource: VFL Inference subscriptions

### 5.47.2.2.1 Description

This resource allows an VFL server to request the creation of a new Individual VFL Inference subscription resource.

### 5.47.2.2.2 Resource Definition

Resource URI: **{apiRoot}/3gpp-vfl-inference/v1/{afId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.47.2.2.2-1.

**Table 5.47.2.2.2-1: Resource URI variables for this resource**

| Name    | Data type | Definition                          |
|---------|-----------|-------------------------------------|
| apiRoot | string    | Clause 5.2.4 of 3GPP TS 29.122 [4]. |
| afId    | string    | Identifier of the AF.               |

### 5.47.2.2.3 Resource Standard Methods

The following clauses specify the resource methods supported by the resource as described in clause 5.47.2.1.

#### 5.47.2.2.3.1 POST

The POST method creates a new resource to Individual VFL Inference subscription for a given untrusted AF acting as VFL server. The AF shall initiate the HTTP POST request message and the NEF shall respond to the message. The NEF shall construct the URI of the created resource.

This method shall support the URI query parameters specified in table 5.47.2.2.3.1-1.

**Table 5.47.2.2.3.1-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.47.2.2.3.1-2 and shall support the response data structures and response codes specified in table 5.47.2.2.3.1-3 and the Location Headers specified in table 5.47.2.2.3.1-4.

**Table 5.47.2.2.3.1-2: Data structures supported by the POST Request Body on this resource**

| Data type   | P | Cardinality | Description                                                   |
|-------------|---|-------------|---------------------------------------------------------------|
| VflInferSub | M | 1           | Creates a new Individual VFL Inference Subscription resource. |

**Table 5.47.2.2.3.1-3: Data structures supported by the POST Response Body on this resource**

| Data type                                                                                                                   | P | Cardinality | Response codes            | Description                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------|---|-------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VflInferSub                                                                                                                 | M | 1           | 201 Created               | Successful case.<br>The Individual VFL Inference subscription resource was created successfully.<br>The URI of the created resource shall be returned in the "Location" HTTP header. |
| ProblemDetails                                                                                                              | O | 0..1        | 403 Forbidden             | (NOTE 2)                                                                                                                                                                             |
| ProblemDetails                                                                                                              | O | 0..1        | 500 Internal Server Error | (NOTE 2)                                                                                                                                                                             |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                           |                                                                                                                                                                                      |

NOTE 2: Failure causes are described in clause 5.47.7.

**Table 5.47.2.2.3.1-4: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                       |
|----------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-vfl-inference/v1/{afId}/subscriptions/{subscriptionId} |

#### 5.42.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

### 5.47.2.3 Resource: Individual VFL Inference subscription

#### 5.47.2.3.1 Description

This resource allows an VFL server to update, partial modify or delete an existing Individual VFL Inference subscription.

#### 5.47.2.3.2 Resource Definition

Resource URI: {apiRoot}/3gpp-vfl-inference/v1/{afId}/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.47.2.3.2-1.

**Table 5.47.2.3.2-1: Resource URI variables for this resource**

| Name           | Data type | Definition                                                                              |
|----------------|-----------|-----------------------------------------------------------------------------------------|
| apiRoot        | string    | Clause 5.2.4 of 3GPP TS 29.122 [4].                                                     |
| afId           | string    | Identifier of the AF.                                                                   |
| subscriptionId | string    | Identifier of the VFL Inference subscription formatted according to IETF RFC 3986 [44]. |

#### 5.47.2.3.3 Resource Standard Methods

The following clauses specify the resource methods supported by the resource as described in clause 5.47.2.1.

##### 5.47.2.3.3.1 PUT

The PUT method allows to create a new VFL Inference Events subscription. The VFL server shall initiate the HTTP PUT request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.47.2.3.3.1-1.

**Table 5.47.2.3.3.1-1: URI query parameters supported by the PUT method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a  |           |   |             |             |

This method shall support the request data structures specified in table 5.47.2.3.3.1-2, the response data structures and response codes specified in table 5.47.2.3.3.1-3 and the Location Headers specified in table 5.47.2.3.3.1-4, table 5.47.2.3.3.1-5 and table 5.47.2.3.3.1-6.

**Table 5.47.2.3.3.1-2: Data structures supported by the PUT Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
|-----------|---|-------------|-------------|

|             |   |   |                                                                                         |
|-------------|---|---|-----------------------------------------------------------------------------------------|
| VflInferSub | M | 1 | Contains the information for the modification of the VFL Inference Events Subscription. |
|-------------|---|---|-----------------------------------------------------------------------------------------|

**Table 5.47.2.3.3.1-3: Data structures supported by the PUT Response Body on this resource**

| Data type                                                                                                                             | P | Cardinality | Response codes            | Description                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------|---|-------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VflInferSub                                                                                                                           | M | 1           | 200 OK                    | Successful case.<br>The VFL Inference Events Subscription was modified and a representation of it is returned. The representation of the VFL Inference Events Subscription is included within the properties of the VflInferSub data type.                                                     |
| N/A                                                                                                                                   |   |             | 204 No Content            | Successful case.<br>The VFL Inference Events Subscription was modified successfully, with no content to be sent in the response message body.                                                                                                                                                  |
| N/A                                                                                                                                   |   |             | 307 Temporary Redirect    | Temporary redirection, during the VFL Inference Events subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                                   |   |             | 308 Permanent Redirect    | Permanent redirection, during the VFL Inference Events subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                        | O | 0..1        | 403 Forbidden             | (NOTE 2)                                                                                                                                                                                                                                                                                       |
| ProblemDetails                                                                                                                        | O | 0..1        | 404 Not Found             | (NOTE 2)                                                                                                                                                                                                                                                                                       |
| ProblemDetails                                                                                                                        | O | 0..1        | 500 Internal Server Error | (NOTE 2)                                                                                                                                                                                                                                                                                       |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                           |                                                                                                                                                                                                                                                                                                |
| NOTE 2: Failure causes are described in clause 5.47.7.                                                                                |   |             |                           |                                                                                                                                                                                                                                                                                                |

**Table 5.47.2.3.3.1-4: Headers supported by the 201 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                                                                          |
|----------|-----------|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | Contains the URI of the resource in which an VFL Inference Events subscription has been created, according to the structure:<br>{apiRoot}/3gpp-vfl-inference/v1/{afld}/subscriptions |

**Table 5.47.2.3.3.1-5: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.47.2.3.3.1-6: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

## 5.47.2.3.3.2 PATCH

The PATCH method is used to modify an existing Individual VFL Inference subscription. The VFL server shall initiate the HTTP PATCH request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.47.2.3.3.2-1.

**Table 5.47.2.3.3.2-1: URI query parameters supported by the PATCH method on this resource**

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a  |           |   |             |             |               |

This method shall support the request data structures specified in table 5.47.2.3.3.2-2, the response data structures and response codes specified in table 5.47.2.3.3.2-3 and the Location Headers specified in table 5.47.2.3.3.2-4 and table 5.47.2.3.3.2-5.

**Table 5.47.2.3.3.2-2: Data structures supported by the PATCH Request Body on this resource**

| Data type        | P | Cardinality | Description                                                                              |
|------------------|---|-------------|------------------------------------------------------------------------------------------|
| VflInferSubPatch | M | 1           | Contains the modification(s) to be applied to the Individual VFL Inference subscription. |

**Table 5.47.2.3.3.2-3: Data structures supported by the PATCH Response Body on this resource**

| Data type                                                                                                                               | P | Cardinality | Response codes            | Description                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------|---|-------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VflInferSub                                                                                                                             | M | 1           | 200 OK                    | Successful case.<br>The updated information of the VFL Inference subscription.                                                                                                                                                                                                          |
| N/A                                                                                                                                     |   |             | 204 No Content            | The VFL Inference subscription was updated successfully.                                                                                                                                                                                                                                |
| N/A                                                                                                                                     |   |             | 307 Temporary Redirect    | Temporary redirection, during the VFL Inference subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                                     |   |             | 308 Permanent Redirect    | Permanent redirection, during the VFL Inference subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                          | O | 0..1        | 403 Forbidden             | (NOTE 2)                                                                                                                                                                                                                                                                                |
| ProblemDetails                                                                                                                          | O | 0..1        | 404 Not Found             | (NOTE 2)                                                                                                                                                                                                                                                                                |
| ProblemDetails                                                                                                                          | O | 0..1        | 500 Internal Server Error | (NOTE 2)                                                                                                                                                                                                                                                                                |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] shall also apply. |   |             |                           |                                                                                                                                                                                                                                                                                         |
| NOTE 2: Failure causes are described in clause 5.47.7.                                                                                  |   |             |                           |                                                                                                                                                                                                                                                                                         |

**Table 5.47.2.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.47.2.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**5.47.2.3.3.3 DELETE**

The DELETE method deletes an existing Individual VFL Inference subscription. The AF acting as VFL server shall initiate the HTTP DELETE request message and the NEF shall respond to the message.

This method shall support the URI query parameters specified in table 5.47.2.3.3.3-1.

**Table 5.47.2.3.3.3-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| N/A  |           |   |             |             |

This method shall support the request data structures specified in table 5.47.2.3.3.4-2 and the response data structures and response codes specified in table 5.47.2.3.3.3-3, and the Location Headers specified in table 5.47.2.3.3.3-4 and table 5.47.2.3.3.3-5.

**Table 5.47.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 5.47.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource**

| Data type                                                                                                                     | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A                                                                                                                           |   |             | 204 No Content         | Successful case.<br>The VFL Inference subscription was terminated successfully.                                                                                                                                                                                                        |
| N/A                                                                                                                           |   |             | 307 Temporary Redirect | Temporary redirection, during the VFL Inference subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A                                                                                                                           |   |             | 308 Permanent Redirect | Permanent redirection, during the VFL Inference subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NEF.<br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| ProblemDetails                                                                                                                | O | 0..1        | 404 Not Found          | (NOTE 2)                                                                                                                                                                                                                                                                               |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                                                                        |
| NOTE 2: Failure causes are described in clause 5.47.7.                                                                        |   |             |                        |                                                                                                                                                                                                                                                                                        |

**Table 5.47.2.3.3.3-4: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

**Table 5.47.2.3.3-5: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                       |
|----------|-----------|---|-------------|-------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI of the resource located in an alternative NEF. |

#### 6.1.3.2.4 Resource Custom Operations

There are no resource operations defined for this API in this release of the specification.

### 5.47.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

### 5.47.4 Notifications

#### 5.47.4.1 General

Upon receipt of VFL Inference Notification from the VFL client indicating the subscribed VFL inference event is detected, the NEF shall send an HTTP POST message including the notified VFL inference event to the VFL server.

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [4].

**Table 5.47.4.1-1: Notifications overview**

| Notification                     | Callback URI | HTTP method or custom operation | Description (service operation)                                                                     |
|----------------------------------|--------------|---------------------------------|-----------------------------------------------------------------------------------------------------|
| VFL Inference Event Notification | {notifUri}   | POST                            | The VFL inference changes event notification is provided by the NEF to the AF acting as VFL server. |

#### 5.47.4.2 VFL Inference Event Notification

##### 5.47.4.2.1 Description

The VFL Inference Notification is used by the NEF to report one or several observed VFL Inference events to VFL server that has subscribed to such Notifications.

##### 5.47.4.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 5.47.2.2-1.

**Table 5.47.4.2.2-1: Callback URI variables**

| Name     | Definition                                                                                                                                                                                                                                                                           |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| notifUri | Callback reference provided by the VFL server during creation/modification of the subscription within the VFL Inference Events subscription as defined in VflInferSub data type in Table 5.47.5.2.2-1 or in VflInferSubPatch data type in Table 5.10.6.2.3-1 of 3GPP TS 29.520 [27]. |

##### 5.47.4.2.3 Operation Definition

This method shall support the request data structures specified in table 5.47.4.2.3.1-1 and the response data structures and response codes specified in table 5.47.4.2.3.1-2 and the Location Headers specified in table 5.47.4.2.3.1-3 and table 5.47.4.2.3.1-4.



**Table 5.47.4.2.3.1-1: Data structures supported by the POST Request Body on this resource**

| Data type     | P | Cardinality | Description                                                                       |
|---------------|---|-------------|-----------------------------------------------------------------------------------|
| VflInferNotif | M | 1           | Provides information about the VFL inference events by the NEF to the VFL server. |

**Table 5.47.4.2.3.1-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                                                                                                 |
|-----------|---|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N/A       |   |             | 204 No Content         | The event notification is received successfully.                                                                                                                                                                                                                                                            |
| N/A       |   |             | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative VFL server where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| N/A       |   |             | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative VFL server where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

**Table 5.47.4.2.3.1-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                             |
|----------|-----------|---|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

**Table 5.47.4.2.3.1-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                                                                                     |
|----------|-----------|---|-------------|---------------------------------------------------------------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative URI representing the end point of an alternative VFL server towards which the notification should be redirected. |

## 5.47.5 Data Model

### 5.47.5.1 General

This clause specifies the application data model supported by the VFLInference API.

Table 5.47.5.1-1 specifies the data types defined for the VFLInference API.

**Table 5.47.5.1-1: VFLInference API specific Data Types**

| Data type        | Clause defined | Description                                                                        | Applicability |
|------------------|----------------|------------------------------------------------------------------------------------|---------------|
| VflInferSub      | 5.8.6.2.2      | Represents an Individual VLF Inference Subscription resource.                      |               |
| VflInferSubPatch | 5.8.6.2.3      | Represents parameters to request the modification of a VFL inference subscription. |               |

Table 5.47.5.1-2 specifies data types re-used by the VFLInference API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the VFLInference API.

**Table 5.47.5.1-2: Re-used Data Types**

| Data type            | Reference           | Comments                                                                           | Applicability |
|----------------------|---------------------|------------------------------------------------------------------------------------|---------------|
| RedirectResponse     | 3GPP TS 29.571 [16] | Contains redirection related information.                                          |               |
| ReportingInformation | 3GPP TS 29.523 [20] | Represents the type of reporting the subscription requires.                        |               |
| SupportedFeatures    | 3GPP TS 29.571 [8]  | Used to negotiate the applicability of the optional features.                      |               |
| Uri                  | 3GPP TS 29.571 [8]  | Represents a URI.                                                                  |               |
| VflInferAnaSub       | 3GPP TS 29.520 [17] | Represents an Individual NEF VFL Inference Subscription resource per analytics id. |               |
| VflInferNotif        | 3GPP TS 29.520 [17] | Represents notification of a VFL inference subscription.                           |               |
| VflInferReq          | 3GPP TS 29.520 [17] | Represents requirements for VFL inference                                          |               |
| VflInferResult       | 3GPP TS 29.520 [17] | Represents intermediate VFL inference result per target.                           |               |

## 5.47.5.2 Structured data types

### 5.47.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

### 5.47.5.2.2 Type VflInferSub

**Table 5.47.5.2.2-1: Definition of type VflInferSub**

| Attribute name  | Data type             | P | Cardinality | Description                                                                                                                                                                                                                                                            | Applicability |
|-----------------|-----------------------|---|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| notifCorrelId   | string                | M | 1           | The value of Notification Correlation ID in the corresponding notification.                                                                                                                                                                                            |               |
| notifUri        | Uri                   | M | 1           | URI at which the NF service consumer requests to receive notifications.                                                                                                                                                                                                |               |
| suppFeats       | SupportedFeatures     | C | 0..1        | List of Supported features used as described in clause 5.10.8. It shall be supplied by NF service consumer in the POST requests that request the creation of an NEF VFL Subscriptions resource and shall be supplied by the NEF in the reply of corresponding request. |               |
| vflClientId     | string                | O | 0..1        | Target VFL Client identity.                                                                                                                                                                                                                                            |               |
| vflInferAnaSubs | array(VflInferAnaSub) | M | 1..N        | Identifies the VFL inference subscription information for the subscribed analytics ID(s).                                                                                                                                                                              |               |
| vflInferResults | array(VflInferResult) | O | 1..N        | Represents intermediate VFL inference results.                                                                                                                                                                                                                         |               |
| vflReportInfo   | ReportingInformation  | O | 0..1        | Reporting requirement information of the VFL inference subscription. If omitted, the default values within the ReportingInformation data type apply.                                                                                                                   |               |

## 5.47.5.2.3 Type VflInferSubPatch

Table 5.47.5.2.3-1: Definition of type VflInferSubPatch

| Attribute name | Data type            | P | Cardinality | Description                                                                 | Applicability |
|----------------|----------------------|---|-------------|-----------------------------------------------------------------------------|---------------|
| notifUri       | Uri                  | O | 0..1        | URI at which the NF service consumer requests to receive notifications.     |               |
| notifCorrelId  | string               | O | 0..1        | The value of Notification Correlation ID in the corresponding notification. |               |
| vflInferReq    | VflInferReq          | O | 0..1        | Represents required conditions to apply VFL inference.                      |               |
| vflReportInfo  | ReportingInformation | O | 0..1        | Reporting requirement information of the VFL inference subscription.        |               |

## 5.47.5.3 Simple data types and enumerations

## 5.47.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

## 5.47.5.3.2 Simple data types

The simple data types defined in table 5.47.5.3.2-1 shall be supported.

Table 5.47.5.3.2-1: Simple data types

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

## 5.47.6 Used Features

The optional features in table 5.47.6-1 are defined for the VFLInference API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

Table 5.47.6-1: Supported Features

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|                |              |             |

## 5.47.7 Error handling

## 5.47.7.1 General

For the VFLInference API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the VFLInference API.

## 5.47.7.2 Protocol Errors

No specific procedures for the VFLInference API are specified.

### 5.47.7.3 Application Errors

The application errors defined for the VFLInference API are listed in table 5.47.7.3-1.

**Table 5.47.7.3-1: Application errors**

| Application Error                                                                                                                                                          | HTTP status code | Description                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------------------|
| OVERLOAD                                                                                                                                                                   | 403 Forbidden    | Indicates the NF is overloaded. |
| NOTE: Including a "ProblemDetails" data structure with the "cause" attribute in the HTTP response is optional unless explicitly mandated in the service operation clauses. |                  |                                 |

## 5.48 VFLNFDDiscovery API

### 5.48.1 Introduction

The Nnef\_VFLNFDDiscovery service shall use the VFLNFDDiscovery API.

The API URI of VFLNFDDiscovery API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [4], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>**

with the following components:

- "apiRoot" is set as described in clause 5.2.4 in 3GPP TS 29.122 [4].
- "apiName" shall be set to "3gpp-vfl-nf-discovery".
- "apiVersion" shall be set to "v1" for the current version defined in the present document.
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [4].

All resource URIs in the clauses below are defined relative to the above API URI.

### 5.48.2 Resources

There are no resources defined for this API in this release of the specification.

### 5.48.3 Custom Operations without associated resources

#### 5.48.3.1 Overview

The structure of the custom operation URIs of the VFLNFDDiscovery API is shown in Figure 5.48.3.1-1.

{apiRoot}/3gpp-nf-vfl-discovery/<apiVersion>

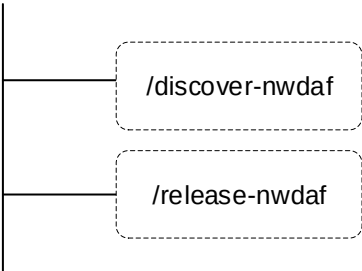


Figure 5.48.3.1-1: Custom operation URI structure of the VFLNFDISCOVERY API

Table 5.48.3.1-1 provides an overview of the custom operations and applicable HTTP methods.

Table 5.48.3.1-1: Custom operations without associated resources

| Operation name | Custom operation URI | Mapped HTTP method | Description                                                      |
|----------------|----------------------|--------------------|------------------------------------------------------------------|
| DiscoverNwdaf  | /discover-nwdaf      | POST               | Request the discovery of NWDAF that are to act as VFL client(s). |
| ReleaseNwdaf   | /release-nwdaf       | POST               | Request to inform the external NWDAF ID(s) are not used anymore  |

5.48.3.2      Operation: DiscoverNwdaf

5.48.3.2.1      Description

The custom operation enables an AF to discover an NWDAF that are to act as VFL client(s).

5.48.3.2.2      Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.48.3.2.2-1 and table 5.48.3.2.2-2.

Table 5.48.3.2.2-1: Data structures supported by the POST Request Body on this resource

| Data type             | P | Cardinality | Description                                                                         |
|-----------------------|---|-------------|-------------------------------------------------------------------------------------|
| NwdafDiscoveryRequest | M | 1           | Represents the parameters to request the NWDAF(s) that are to act as VFL client(s). |

Table 5.48.3.2.2-2: Data structures supported by the POST Response Body on this resource

| Data type                                                                                                                 | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NwdafDiscoveryResponse                                                                                                    | M | 1           | 200 OK                 | Successful case: The external NWDAF ID(s) to act as the VFL client(s) are returned.                                                                                                                                            |
| n/a                                                                                                                       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a                                                                                                                       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]  |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply. |   |             |                        |                                                                                                                                                                                                                                |

**Table 5.48.3.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**Table 5.48.3.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

### 5.48.3.3 Operation: ReleaseNwdaf

#### 5.48.3.3.1 Description

The custom operation enables an AF to inform the external NWDAF ID(s) are not used anymore.

#### 5.48.3.3.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 5.48.3.3.2-1 and table 5.48.3.3.2-2.

**Table 5.48.3.3.2-1: Data structures supported by the POST Request Body on this resource**

| Data type           | P | Cardinality | Description                                                                        |
|---------------------|---|-------------|------------------------------------------------------------------------------------|
| NwdafReleaseRequest | M | 1           | Represents the parameters to inform the external NWDAF ID(s) are not used anymore. |

**Table 5.48.3.3.2-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes         | Description                                                                                                                                                                                                                    |
|-----------|---|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a       |   |             | 204 No Content         | Successful case: The requested NWDAF ID(s) are released for the NF.                                                                                                                                                            |
| n/a       |   |             | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a       |   |             | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NEF.<br><br>Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]  |

NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [4] also apply.

**Table 5.48.3.3.2-3: Headers supported by the 307 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

**Table 5.48.3.3.2-4: Headers supported by the 308 Response Code on this resource**

| Name     | Data type | P | Cardinality | Description                                                              |
|----------|-----------|---|-------------|--------------------------------------------------------------------------|
| Location | string    | M | 1           | An alternative target URI of the resource located in an alternative NEF. |

## 5.48.4 Notifications

There are no Notifications defined for this API in this release of the specification.

## 5.48.5 Data Model

### 5.48.5.1 General

This clause specifies the application data model supported by the VFLNFDDiscovery API. Table 5.48.5.1-1 specifies the data types defined for the VFLNFDDiscovery API.

**Table 5.48.5.1-1: VFLNFDDiscovery specific Data Types**

| Data type              | Clause defined | Description                                                                         | Applicability |
|------------------------|----------------|-------------------------------------------------------------------------------------|---------------|
| NwdafDiscoveryRequest  | 5.48.5.2.2     | Represents the parameters to request the NWDAF(s) that are to act as VFL client(s). |               |
| NwdafDiscoveryResponse | 5.48.5.2.3     | Represents the external NWDAF ID(s).                                                |               |
| NwdafReleaseRequest    | 5.48.5.2.4     | Represents the external NWDAF ID(s) are not used anymore.                           |               |
| VFLCapabilityType      | 5.48.5.3.3     | Represents the requested VFL capability type.                                       |               |

Table 5.48.5.1-2 specifies data types re-used by the VFLNFDDiscovery API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the VFLNFDDiscovery API.

**Table 5.48.5.1-2: Re-used Data Types**

| Data type      | Reference           | Comments                                    |
|----------------|---------------------|---------------------------------------------|
| NwdafEvent     | 3GPP TS 29.520 [27] | Represents analytics ID(s).                 |
| TimeWindow     | 3GPP TS 29.122 [4]  | Represents the time period of interest.     |
| GeographicArea | 3GPP TS 29.572 [34] | Represents the service area of the request. |

### 5.48.5.2 Structured data types

#### 5.48.5.2.1 Introduction

This clause defines the structured data types to be used in resource representations.

#### 5.48.5.2.2 Type: NwdafDiscoveryRequest

**Table 5.48.5.2.2-1: Definition of type NwdafDiscoveryRequest**

| Attribute name | Data type         | P | Cardinality | Description                               | Applicability |
|----------------|-------------------|---|-------------|-------------------------------------------|---------------|
| analyticsIds   | array(NwdafEvent) | M | 1..N        | Contains the analytics ID(s).             |               |
| vflCapType     | VFLCapabilityType | M | 1           | Contains the type of VFL capability.      |               |
| vflInterInfo   | string            | O | 0..1        | Contains a VFL interoperability indicator |               |

|               |                       |   |      |                                              |  |
|---------------|-----------------------|---|------|----------------------------------------------|--|
| reqFeatureIds | array(string)         | O | 1..N | Contains the requested feature ID(s).        |  |
| timePeriod    | TimeWindow            | O | 0..1 | Contains the time period of interest.        |  |
| serviceAreas  | array(GeographicArea) | O | 1..N | Contains the service area(s) of the request. |  |

#### 5.48.5.2.3 Type: NwdafDiscoveryResponse

**Table 5.48.5.2.3-1: Definition of type NwdafDiscoveryResponse**

| Attribute name | Data type     | P | Cardinality | Description                                        | Applicability |
|----------------|---------------|---|-------------|----------------------------------------------------|---------------|
| exNwdafIds     | array(string) | M | 1..N        | Contains the list of current external NWDAF ID(s). |               |

#### 5.48.5.2.4 Type: NwdafReleaseRequest

**Table 5.48.5.2.4-1: Definition of type NwdafReleaseRequest**

| Attribute name | Data type     | P | Cardinality | Description                                        | Applicability |
|----------------|---------------|---|-------------|----------------------------------------------------|---------------|
| exNwdafIds     | array(string) | M | 1..N        | Contains the list of current external NWDAF ID(s). |               |

### 5.48.5.3 Simple data types and enumerations

#### 5.48.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

#### 5.48.5.3.2 Simple data types

The simple data types defined in table 5.48.5.3.2-1 shall be supported.

**Table 5.48.5.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
|           |                 |             |               |

#### 5.48.5.3.3 VFLCapabilityType

**Table 5.48.5.3.3-1: Enumeration VFLCapabilityType**

| Enumeration value | Description              | Applicability |
|-------------------|--------------------------|---------------|
| VFL_CLIENT        | VFL client is requested. |               |

### 5.48.6 Used Features

The optional features listed in table 5.48.6-1 are defined for the VFLNFDISCOVERY API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.48.6-1: Features used by VFLNFDISCOVERY API**

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
|----------------|--------------|-------------|



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

## 5.48.7 Error handling

### 5.48.7.1 General

For the VFLNFDISCOVERY API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [4]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [4] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [4].

In addition, the requirements in the following clauses are applicable for the VFLNFDISCOVERY API.

### 5.48.7.2 Protocol Errors

No specific procedures for the VFLNFDISCOVERY API are specified.

### 5.48.7.3 Application Errors

The application errors defined for the VFLNFDISCOVERY API are listed in table 5.48.7.3-1.

**Table 5.48.7.3-1: Application errors**

| Application Error | HTTP status code | Description | Applicability |
|-------------------|------------------|-------------|---------------|
|                   |                  |             |               |

## 6 Security

TLS shall be used to support secure communications between the NEF and the AF over the NEF Northbound interface as defined in clause 12.3 of 3GPP TS 33.501 [6].

When CAPIF is not supported and/or not used, the access to the NEF Northbound APIs shall be authorized by means of OAuth2 protocol (see IETF RFC 6749 [13]), based on local configuration, using the "Client Credentials" authorization grant as defined in clause 12.4 of 3GPP TS 33.501 [6]. When OAuth2 is used, a client shall obtain a "token" from the authorization server prior to consuming services offered by any NEF Northbound API.

When the NEF supports CAPIF for external exposure and CAPIF is used, the provisions of clause 7.2 shall apply for authorizing the access to the NEF Northbound APIs.

## 7 Using Common API Framework

### 7.1 General

When CAPIF is used with an NEF that is used for external exposure, the NEF shall support the following as defined in 3GPP TS 29.222 [12]:

- the API exposing function and related APIs over CAPIF-2/2e and CAPIF-3/3e reference points;
- the API publishing function and related APIs over CAPIF-4/4e reference point;
- the API management function and related APIs over CAPIF-5/5e reference point; and
- at least one of the security methods for authentication and authorization, and related security mechanisms.

In a centralized deployment as defined in 3GPP TS 23.222 [11], where the CAPIF core function and API provider domain functions are co-located, the interactions between the CAPIF core function and API provider domain functions may be independent of CAPIF-3/3e, CAPIF-4/4e and CAPIF-5/5e reference points.

## 7.2 Security

When CAPIF is used for external exposure, before invoking the API exposed by the NEF, the AF as API invoker shall negotiate the security method (PKI, TLS-PSK or OAuth2) with CAPIF core function and ensure the NEF has enough credential to authenticate the AF (see 3GPP TS 29.222 [12], clause 5.6.2.2 and clause 6.2.2.2).

If PKI or TLS-PSK is used as the selected security method between the AF and the NEF, upon API invocation, the NEF shall retrieve the authorization information from the CAPIF core function as described in 3GPP TS 29.222 [12], clause 5.6.2.4.

As indicated in 3GPP TS 33.122 [14], the access to the NEF northbound APIs may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [13]), using the "Client Credentials" authorization grant, where the CAPIF core function (see 3GPP TS 29.222 [12]) plays the role of the authorization server.

NOTE 1: In this release, only "Client Credentials" authorization grant is supported.

If OAuth2 is used as the selected security method between the AF and the NEF, the AF, prior to consuming services offered by the NEF northbound APIs, shall obtain a "token" from the authorization server, by invoking the Obtain\_Authorization service, as described in 3GPP TS 29.222 [12], clause 5.6.2.3.2.

The NEF northbound APIs do not define any scopes for OAuth2 authorization. It is the NEF responsibility to check whether the AF is authorized to use an API based on the "token". Once the NEF verifies the "token", it shall check whether the NEF identifier in the "token" matches its own published identifier, and whether the API name in the "token" matches its own published API name. If those checks are passed, the AF has full authority to access any resource or operation for the invoked API.

NOTE 2: For aforementioned security methods, the NEF needs to apply admission control according to access control policies after performing the authorization checks.

NOTE 3: The security requirement in the current clause does not apply for the NiddConfigurationTrigger and the MsisdnLessMoSms APIs since they are the NEF initiated interaction with the AF. How the security scheme works for the NiddConfigurationTrigger and MsisdnLessMoSms APIs is left to configuration.

---

# Annex A (normative): OpenAPI representation for NEF Northbound APIs

## A.1 General

This Annex is based on the OpenAPI Specification [5] and provides corresponding representations of all APIs defined in the present specification.

NOTE 1: An OpenAPIs representation embeds JSON Schema representations of HTTP message bodies.

This Annex shall take precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE 2: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see clause 5B of the 3GPP TR 21.900 [21] and clause 5.3.1 of the 3GPP TS 29.501 [32] for further information).

---

## A.2 TrafficInfluence API

openapi: 3.0.0

```
info:
  title: 3gpp-traffic-influence
  version: 1.4.0-alpha.4
  description: |
    API for AF traffic influence
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/3gpp-traffic-influence/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:
  /{afId}/subscriptions:
    parameters:
      - name: afId
        in: path
        description: Identifier of the AF
        required: true
        schema:
          type: string
    get:
      summary: read all of the active subscriptions for the AF
      operationId: ReadAllSubscriptions
      tags:
        - Traffic Influence Subscription
      responses:
        '200':
```

```

description: OK.
content:
  application/json:
    schema:
      type: array
      items:
        $ref: '#/components/schemas/TrafficInfluSub'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### post:

```

summary: Creates a new subscription resource
operationId: CreateNewSubscription
tags:
  - Traffic Influence Subscription
requestBody:
  description: Request to create a new subscription resource
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/TrafficInfluSub'
callbacks:
  notificationDestination:
    '{$request.body#/notificationDestination}':
      post:
        requestBody: # contents of the callback message
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EventNotification'
  afAcknowledgement:
    '{$request.body#/afAckUri}':
      post:
        requestBody: # contents of the callback message
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AfAckInfo'
  responses:
    '204':
      description: No Content (successful acknowledgement)
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':

```

```

        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    responses:
      '204':
        description: No Content (successful notification)
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  eventNotificationPayloadHeaders:
    '{$request.body#/notifUri}':
      post:
        requestBody: # contents of the callback message
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/HeaderHandlingReport'
  responses:
    '204':
      description: No Content (successful notification)
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'

```

```

        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
responses:
  '201':
    description: Created (Successful creation of subscription)
    content:
      application/json:
        schema:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/TrafficInfluSub'
    headers:
      Location:
        description: Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}:
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: subscriptionId
      in: path
      description: Identifier of the subscription resource
      required: true
      schema:
        type: string
  get:
    summary: read an active subscriptions for the SCS/AS and the subscription Id
    operationId: ReadAnSubscription
    tags:
      - Individual Traffic Influence Subscription
    responses:
      '200':
        description: OK (Successful get the active subscription)
        content:
          application/json:
            schema:
              $ref: 'TS29122_CommonData.yaml#/components/schemas/TrafficInfluSub'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'

```

```
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

put:

```
summary: Fully updates/replaces an existing subscription resource
operationId: FullyUpdateAnSubscription
tags:
  - Individual Traffic Influence Subscription
requestBody:
  description: Parameters to update/replace the existing subscription
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/TrafficInfluSub'
responses:
  '200':
    description: OK (Successful update of the subscription)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/TrafficInfluSub'
  '204':
    description: No Content
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

patch:

```
summary: Partially updates/replaces an existing subscription resource
operationId: PartialUpdateAnSubscription
tags:
  - Individual Traffic Influence Subscription
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/TrafficInfluSubPatch'
responses:
  '200':
    description: OK. The subscription was modified successfully.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/TrafficInfluSub'
  '204':
    description: No Content
  '307':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**delete:**

summary: Deletes an already existing subscription

operationId: DeleteAnSubscription

tags:

- Individual Traffic Influence Subscription

responses:

```

  '204':
    description: No Content (Successful deletion of the existing subscription)
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

TrafficInfluSub:

description: Represents a traffic influence subscription.

type: object

properties:

afServiceId:

type: string

description: Identifies a service on behalf of which the AF is issuing the request.

afAppId:

type: string

description: Identifies an application.

afTransId:

type: string

description: Identifies an NEF Northbound interface transaction, generated by the AF.



```
appReloInd:
  type: boolean
  description: >
    Identifies whether an application can be relocated once a location of
    the application has been selected.
dnn:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
snssai:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
externalGroupId:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
externalGroupIds:
  type: array
  items:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
  minItems: 1
  description: Each element identifies a group of users.
extSubscCats:
  type: array
  items:
    type: string
  minItems: 1
anyUeInd:
  type: boolean
  description: >
    Identifies whether the AF request applies to any UE. This attribute shall
    set to "true" if applicable for any UE, otherwise, set to "false".
subscribedEvents:
  type: array
  items:
    $ref: '#/components/schemas/SubscribedEvent'
  minItems: 1
  description: Identifies the requirement to be notified of the event(s).
gpsi:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
ipv4Addr:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv4Addr'
ipDomain:
  type: string
ipv6Addr:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv6Addr'
macAddr:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'
dnaiChgType:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DnaiChangeType'
notificationDestination:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
requestTestNotification:
  type: boolean
  description: >
    Set to true by the SCS/AS to request the NEF to send a test notification
    as defined in clause 5.2.5.3. Set to false or omitted otherwise.
websocketNotifConfig:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsocketNotifConfig'
self:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
trafficDataSets:
  type: object
  additionalProperties:
    $ref: '#/components/schemas/TrafficDataSet'
  minProperties: 2
  description: >
    Contains multiple sets of traffic filters with the corresponding N6 traffic
    routing requirements. The key of the map shall be the value of the setId attribute of
    the TrafficDataSet data structure.
trafficFilters:
  type: array
  items:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/FlowInfo'
  minItems: 1
  description: Identifies IP packet filters.
ethTrafficFilters:
  type: array
  items:
    $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'
  minItems: 1
  description: Identifies Ethernet packet filters.
trafficRoutes:
```

```
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
    minItems: 1
    description: Identifies the N6 traffic routing requirement.
  sfcIdDl:
    type: string
    description: >
      Reference to a pre-configured steering of user traffic to service function chain in downlink.
  sfcIdUl:
    type: string
    description: >
      Reference to a pre-configured steering of user traffic to service function chain in uplink.
  metadata:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Metadata'
  tfcCorrInd:
    type: boolean
  tempValidities:
    type: array
    items:
      $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/TemporalValidity'
  validGeoZoneIds:
    type: array
    items:
      type: string
    minItems: 1
    description: >
      Identifies a geographic zone that the AF request applies only to the traffic of UE(s) located in this specific zone.
    deprecated: true
  geoAreas:
    type: array
    items:
      $ref: 'TS29522_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'
    minItems: 1
    description: Identifies geographical areas within which the AF request applies.
  afAckInd:
    type: boolean
  addrPreserInd:
    type: boolean
  simConnInd:
    type: boolean
    description: >
      Indicates whether simultaneous connectivity should be temporarily maintained for the source and target PSA.
  simConnTerm:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  maxAllowedUpLat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  easIpReplaceInfos:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/EasIpReplacementInfo'
    minItems: 1
    description: Contains EAS IP replacement information.
  easRedisInd:
    type: boolean
    description: >
      Indicates the EAS rediscovery is required for the application if it is included and set to "true".
  eventReq:
    $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
  eventReports:
    type: array
    items:
      $ref: '#/components/schemas/EventNotification'
    minItems: 1
  candDnaiInd:
    type: boolean
    description: >
      Indicates whether the reporting of the candidate DNAI(s) is requested.
      true indicates that the reporting of the candidate DNAI(s) is requested for the PDU session.
      false indicates that the reporting of the candidate DNAI(s) is not requested for the PDU session.
      The default value is false if this attribute is omitted.
```

```

    tfcCorreInfo:
      $ref: 'TS29519_Application_Data.yaml#/components/schemas/TrafficCorrelationInfo'
    plmnId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    portNumber:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Port'
    n6DelayInd:
      type: boolean
    hHndlgControInfo:
      $ref:
'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/AfHeaderHandlingControlInfo'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  allof:
    - oneOf:
      - required: [afAppId]
      - required: [trafficFilters]
      - required: [ethTrafficFilters]
      - required: [trafficDataSets]
    - oneOf:
      - required: [ipv4Addr]
      - required: [ipv6Addr]
      - required: [macAddr]
      - required: [gpsi]
      - required: [externalGroupId]
      - required: [anyUeInd]
  anyOf:
    - not:
      required: [subscribedEvents]
    - required: [notificationDestination]

TrafficInfluSubPatch:
  description: >
    Represents parameters to request the modification of a traffic influence
    subscription resource.
  type: object
  properties:
    appReloInd:
      type: boolean
      description: >
        Identifies whether an application can be relocated once a location of
        the application has been selected.
      nullable: true
    trafficDataSets:
      type: object
      additionalProperties:
        $ref: '#/components/schemas/TrafficDataSetRm'
      minProperties: 1
      description: >
        Contains one or several set(s) of traffic filters with the corresponding N6 traffic
        routing requirements. The key of the map shall be the value of the setId attribute of
        the TrafficDataSet data structure.
    trafficFilters:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/FlowInfo'
      minItems: 1
      description: Identifies IP packet filters.
    ethTrafficFilters:
      type: array
      items:
        $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'
      minItems: 1
      description: Identifies Ethernet packet filters.
    trafficRoutes:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
      minItems: 1
      description: Identifies the N6 traffic routing requirement.
    sfcIdDl:
      type: string
      description: >
        Reference to a pre-configured steering of user traffic to service function chain in
        downlink.
      nullable: true
    sfcIdUl:
      type: string

```

```

    description: >
      Reference to a pre-configured steering of user traffic to service function chain in
      uplink.
    nullable: true
  metadata:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Metadata'
  tfcCorrInd:
    type: boolean
    nullable: true
  tempValidities:
    type: array
    items:
      $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/TemporalValidity'
    minItems: 1
    nullable: true
  validGeoZoneIds:
    type: array
    items:
      type: string
    minItems: 1
    description: >
      Identifies a geographic zone that the AF request applies only to the traffic
      of UE(s) located in this specific zone.
    nullable: true
    deprecated: true
  geoAreas:
    type: array
    items:
      $ref: 'TS29522_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'
    minItems: 1
    description: Identifies geographical areas within which the AF request applies.
    nullable: true
  afAckInd:
    type: boolean
    nullable: true
  addrPreserInd:
    type: boolean
    nullable: true
  simConnInd:
    type: boolean
    description: >
      Indicates whether simultaneous connectivity should be temporarily maintained
      for the source and target PSA.
  simConnTerm:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  maxAllowedUpLat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UintegerRm'
  easIpReplaceInfos:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/EasIpReplacementInfo'
    minItems: 1
    description: Contains EAS IP replacement information.
    nullable: true
  easRedisInd:
    type: boolean
    description: >
      Indicates the EAS rediscovery is required for the application if it is included
      and set to "true".
  notificationDestination:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
  eventReq:
    $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
  tfcCorreInfo:
    $ref: 'TS29519_Application_Data.yaml#/components/schemas/TrafficCorrelationInfo'
  n6DelayInd:
    type: boolean
    nullable: true
  hHndlgControInfo:
    $ref:
'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/AfHeaderHandlingControlInfo'

EventNotification:
  description: Represents a traffic influence event notification.
  type: object
  properties:
    afTransId:
      type: string

```

```

    description: Identifies an NEF Northbound interface transaction, generated by the AF.
  dnaiChgType:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DnaiChangeType'
  sourceTrafficRoute:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
  subscribedEvent:
    $ref: '##/components/schemas/SubscribedEvent'
  targetTrafficRoute:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
  sourceDnai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
  targetDnai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
  traffRouteReqOutcome:
    $ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/TraffRouteReqOutcome'
  candidateDnais:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
    minItems: 1
    description: The candidate DNAI(s) for the PDU Session.
  candDnaisPrioInd:
    type: boolean
    description: >
      Indicates whether the candidate DNAI(s) provided within the candidateDnais attribute are
      in descending priority order, i.e., the lower the array index of the candidateDnais
      attribute the higher the priority of the respective DNAI.
      true indicates that the candidate DNAI(s) provided within the candidateDnais attribute
      are in descending priority order.
      false indicates that the candidate DNAI(s) provided within the candidateDnais attribute
      are not in descending priority order.
      The default value is false if this attribute is omitted.
      This attribute may only be present if the candidateDnais attribute is also present and
      the dnaiChgType attribute is set to the value "EARLY".
  easRediscoverInd:
    type: boolean
    description: >
      Indication of EAS re-discovery. If present and set to "true", it indicates the EAS
      re-discovery is performed, e.g. due to change of common EAS. Default value is "false" if
      omitted. May be included for event "UP_PATH_CHANGE".
  gpsi:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
  srcUeIpv4Addr:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv4Addr'
  srcUeIpv6Prefix:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'
  tgtUeIpv4Addr:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv4Addr'
  tgtUeIpv6Prefix:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'
  ueMac:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'
  afAckUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
  offloadPlmnId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
  hDnn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  hSnssai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  suppFeatures:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - subscribedEvent

AfResultInfo:
  description: Identifies the result of application layer handling.
  type: object
  properties:
    afStatus:
      $ref: '##/components/schemas/AfResultStatus'
    trafficRoute:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
    upBuffInd:
      type: boolean
      description: >
        If present and set to "true" it indicates that buffering of uplink traffic
        to the target DNAI is needed.

```

```
easIpReplaceInfos:
  type: array
  items:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/EasIpReplacementInfo'
  minItems: 1
  description: Contains EAS IP replacement information.
  required:
    - afStatus

AfAckInfo:
  description: Represents acknowledgement information of a traffic influence event notification.
  type: object
  properties:
    afTransId:
      type: string
    ackResult:
      $ref: '##/components/schemas/AfResultInfo'
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
  required:
    - ackResult

TrafficDataSet:
  description: >
    Represents a set of traffic filters and the corresponding N6 traffic routing requirements.
  properties:
    setId:
      type: string
    trafficFilters:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/FlowInfo'
      minItems: 1
    ethTrafficFilters:
      type: array
      items:
        $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'
      minItems: 1
    trafficRoutes:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
      minItems: 1
  required:
    - setId
    - trafficRoutes
  oneOf:
    - required: [trafficFilters]
    - required: [ethTrafficFilters]

TrafficDataSetRm:
  description: >
    This data type is defined in the same way as the TrafficDataSet data, but with the OpenAPI
    nullable property set to true. Removable attributes trafficFilters and ethTrafficFilters and
    trafficRoutes are defined as nullable in the OpenAPI.
  properties:
    setId:
      type: string
    trafficFilters:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/FlowInfo'
      minItems: 1
      nullable: true
    ethTrafficFilters:
      type: array
      items:
        $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'
      minItems: 1
      nullable: true
    trafficRoutes:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
      minItems: 1
      nullable: true
  nullable: true
  required:
```

- setId

HeaderHandlingReport:

description: >

Represents the header handling action request.

properties:

afTransId:

type: string

repEvents:

type: array

items:

\$ref:

'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/HeaderHandlingActionRequest'

minItems: 1

description: >

Contains multiple sets of header handling reports.

required:

- afTransId
- repEvents

SubscribedEvent:

anyOf:

- type: string

enum:

- UP\_PATH\_CHANGE
- TRAFF\_ROUTE\_REQ\_OUTCOME
- SIM\_CONN\_FAIL

- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration but is not used to encode content defined in the present version of this API.

description: |

Represents the type of UP path management events for which the AF requests to be notified. Possible values are:

- UP\_PATH\_CHANGE: The AF requests to be notified when the UP path changes for the PDU session.
- TRAFF\_ROUTE\_REQ\_OUTCOME: The AF requests to be notified of the installation outcome of the traffic routing requirements requested by the AF.
- SIM\_CONN\_FAIL: The AF requests to be notified if the requested Simultaneous Connectivity over the source and the target PDU Session Anchor fails.

AfResultStatus:

anyOf:

- type: string

enum:

- SUCCESS
- TEMPORARY\_CONGESTION
- RELOC\_NO\_ALLOWED
- OTHER

- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration but is not used to encode content defined in the present version of this API.

description: |

Represents the status of application handling result.

Possible values are:

- SUCCESS: The application layer is ready or the relocation is completed.
- TEMPORARY\_CONGESTION: The application relocation fails due to temporary congestion.
- RELOC\_NO\_ALLOWED: The application relocation fails because application relocation is not allowed.
- OTHER: The application relocation fails due to other reason.

---

## A.3 NiddConfigurationTrigger API

openapi: 3.0.0

info:

title: 3gpp-nidd-configuration-trigger

version: 1.1.1

description: |

API for NIDD Configuration Trigger.

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externalDocs:

description: >

3GPP TS 29.522 V17.7.0; 5G System; Network Exposure Function Northbound APIs.

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.522/'

```

security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.
paths:
  /:
    post:
      operationId: NiddConfigurationTrigger
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/NiddConfigurationTrigger'
      responses:
        '200':
          description: Success
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/NiddConfigurationTriggerReply'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
  schemas:
    NiddConfigurationTrigger:
      description: Represents a NIDD configuration trigger.
      type: object
      properties:
        afId:
          type: string
          description: Identifies the trigger receiving entity.
        nefId:
          type: string
          description: Identifies the trigger sending entity.
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - afId

```



```

    - nefId
    - gpsi
    - suppFeat
  NiddConfigurationTriggerReply:
    description: Represents a reply to a NIDD configuration trigger.
    type: object
    properties:
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - suppFeat

```

---

## A.4 AnalyticsExposure API

openapi: 3.0.0

```

info:
  title: 3gpp-analyticsexposure
  version: 1.3.0-alpha.4
  description: |
    API for Analytics Exposure.
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    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

servers:
  - url: '{apiRoot}/3gpp-analyticsexposure/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

```

paths:
  /{afId}/subscriptions:
    get:
      summary: read all of the active subscriptions for the AF
      operationId: ReadAllSubscriptions
      tags:
        - Analytics Exposure Subscriptions
      parameters:
        - name: afId
          in: path
          description: Identifier of the AF
          required: true
          schema:
            type: string
        - name: supp-feat
          in: query
          description: Contains the list of supported features.
          required: false
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      responses:
        '200':
          description: OK (Successful get all of the active subscriptions for the AF)
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/AnalyticsExposureSubsc'
                minItems: 0
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Creates a new subscription resource
  operationId: CreateNewSubscription
  tags:
    - Analytics Exposure Subscriptions
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
  requestBody:
    description: new subscription creation
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AnalyticsExposureSubsc'
  callbacks:
    notification:
      '{$request.body#/notifUri}':
        post:
          requestBody: # contents of the callback message
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/AnalyticsEventNotification'
  responses:
    '204':
      description: No Content (successful notification)
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  responses:
    '201':

```

```

description: Created (Successful creation)
content:
  application/json:
    schema:
      $ref: '#/components/schemas/AnalyticsExposureSubsc'
headers:
  Location:
    description: Contains the URI of the newly created resource.
    required: true
    schema:
      type: string
'204':
  description: >
    Successful case. The resource has been successfully created and no additional
    content is to be sent in the response message.
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**/{afId}/subscriptions/{subscriptionId}:**

**get:**

```

summary: read an active subscription for the AF and the subscription Id
operationId: ReadAnSubscription
tags:
  - Individual Analytics Exposure Subscription
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
  - name: subscriptionId
    in: path
    description: Identifier of the subscription resource
    required: true
    schema:
      type: string
  - name: supp-feat
    in: query
    description: Contains the list of supported features.
    required: false
    schema:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
responses:
  '200':
    description: OK (Successful get the active subscription)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AnalyticsExposureSubsc'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'

```

```

'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

summary: Fully updates/replaces an existing subscription resource  
 operationId: FullyUpdateAnSubscription

tags:

- Individual Analytics Exposure Subscription

parameters:

- name: afId
  - in: path
  - description: Identifier of the AF
  - required: true
  - schema:
    - type: string
- name: subscriptionId
  - in: path
  - description: Identifier of the subscription resource
  - required: true
  - schema:
    - type: string

requestBody:

description: Parameters to update/replace the existing subscription  
 required: true

content:

- application/json:
  - schema:
    - \$ref: '#/components/schemas/AnalyticsExposureSubsc'

responses:

```

'200':
  description: OK (Successful deletion of the existing subscription)
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/AnalyticsExposureSubsc'
'204':
  description: >
    Successful case. The resource has been successfully updated and no additional
    content is to be sent in the response message.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```
delete:
  summary: Deletes an already existing subscription
  operationId: DeleteAnSubscription
  tags:
    - Individual Analytics Exposure Subscription
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: subscriptionId
      in: path
      description: Identifier of the subscription resource
      required: true
      schema:
        type: string
  responses:
    '204':
      description: No Content (Successful deletion of the existing subscription)
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
/{afId}/fetch:
  post:
    summary: Fetch analytics information
    operationId: FetchAnalyticsInfo
    tags:
      - AnalyticsExposure API Fetch analytics information
    parameters:
      - name: afId
        in: path
        description: Identifier of the AF
        required: true
        schema:
          type: string
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AnalyticsRequest'
    responses:
      '200':
        description: The requested information was returned successfully.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AnalyticsData'
      '204':
        description: No Content (The requested Analytics data does not exist)
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
```

```

    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      description: >
        The request is rejected by the NEF and more details (not only the ProblemDetails)
        are returned.
      content:
        application/problem+json:
          schema:
            $ref:
'TS29520_Nnwdaf_AnalyticsInfo.yaml#/components/schemas/ProblemDetailsAnalyticsInfoRequest'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

schemas:
  AnalyticsExposureSubsc:
    description: Represents an analytics exposure subscription.
    type: object
    properties:
      analyEventsSubs:
        type: array
        items:
          $ref: '#/components/schemas/AnalyticsEventSubsc'
        minItems: 1
      analyRepInfo:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      notifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      notifId:
        type: string
      eventNotifis:
        type: array
        items:
          $ref: '#/components/schemas/AnalyticsEventNotif'
        minItems: 1
      failEventReports:
        type: array
        items:
          $ref: '#/components/schemas/AnalyticsFailureEventInfo'
        minItems: 1
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      self:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
      requestTestNotification:
        type: boolean
        description: >
          Set to true by the AF to request the NEF to send a test notification
          as defined in clause 5.2.5.3 of 3GPP TS 29.122. Set to false or omitted otherwise.
      websocketNotifConfig:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsocketNotifConfig'
    required:
      - analyEventsSubs
      - notifUri
      - notifId

AnalyticsEventNotification:

```

```
description: Represents an analytics event(s) notification.
type: object
properties:
  notifId:
    type: string
  analyEventNotifs:
    type: array
    items:
      $ref: '#/components/schemas/AnalyticsEventNotif'
    minItems: 1
  termCause:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/TermCause'
required:
  - notifId
  - analyEventNotifs
```

```
AnalyticsEventNotif:
description: Represents an analytics event to be reported.
type: object
properties:
  analyEvent:
    $ref: '#/components/schemas/AnalyticsEvent'
  expiry:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  timeStamp:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  failNotifyCode:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NwdafFailureCode'
  rvWaitTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  ueMobilityInfos:
    type: array
    items:
      $ref: '#/components/schemas/UeMobilityExposure'
    minItems: 1
  ueCommInfos:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/UeCommunication'
    minItems: 1
  abnormalInfos:
    type: array
    items:
      $ref: '#/components/schemas/AbnormalExposure'
    minItems: 1
  congestInfos:
    type: array
    items:
      $ref: '#/components/schemas/CongestInfo'
    minItems: 1
  dataVlTrnsTmIfs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/E2eDataVolTransTimeInfo'
    minItems: 1
  nwPerfInfos:
    type: array
    items:
      $ref: '#/components/schemas/NetworkPerfExposure'
    minItems: 1
  qosSustainInfos:
    type: array
    items:
      $ref: '#/components/schemas/QosSustainabilityExposure'
    minItems: 1
  disperInfos:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/DispersionInfo'
    minItems: 1
  dnPerfInfos:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/DnPerfInfo'
    minItems: 1
  svcExps:
    type: array
    items:
```

```

    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/ServiceExperienceInfo'
  minItems: 1
  movBehavInfos:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MovBehavInfo'
  minItems: 1
  wlanInfos:
    type: array
    items:
      $ref: '#/components/schemas/WlanPerformInfo'
  minItems: 1
  relProxInfos:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/RelProxInfo'
  minItems: 1
  start:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  timeStampGen:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  locArea:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  pauseInd:
    type: boolean
    description: >
      Pause analytics consumption indication. Set to "true" to indicate the consumer to stop
      the consumption of the analytics. Default value is "false" if omitted.
  resumeInd:
    type: boolean
    description: >
      Resume analytics consumption indication. Set to "true" to indicate the consumer to
      resume the consumption of the analytics. Default value is "false" if omitted.
  accuInfo:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/AccuracyInfo'
  cancelAccuInd:
    type: boolean
    description: >
      Indicates cancelled subscription of the analytics accuracy information.
      Set to "true" indicates the NWDAF cancelled subscription of analytics accuracy
      information as the NWDAF does not support the accuracy checking capability.
      Otherwise set to "false". Default value is "false" if omitted.
  nsiLoadLevelData:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NsiLoadLevelInfo'
    minItems: 1
  signalStorms:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/SignalStormInfo'
    minItems: 1
  required:
    - analyEvent
    - timeStamp

AnalyticsEventSubsc:
  description: Represents a subscribed analytics event.
  type: object
  properties:
    analyEvent:
      $ref: '#/components/schemas/AnalyticsEvent'
    analyEventFilter:
      $ref: '#/components/schemas/AnalyticsEventFilterSubsc'
    tgtUe:
      $ref: '#/components/schemas/TargetUeId'
  required:
    - analyEvent

AnalyticsEventFilterSubsc:
  description: Represents an analytics event filter.
  type: object
  properties:
    nwPerfReqs:
      type: array
      items:
        $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NetworkPerfRequirement'
      minItems: 1

```



```

locArea:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
fineGranAreas:
  type: array
  items:
    $ref: 'TS29522_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'
  minItems: 1
  description: Indicates the fine granularity areas to which the subscription applies.
temporalGranSize:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
spatialGranSizeTa:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
spatialGranSizeCell:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
appIds:
  type: array
  items:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationId'
  minItems: 1
dnn:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
dnns:
  type: array
  items:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  minItems: 1
dnais:
  type: array
  items:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
  minItems: 1
dataVlTrnsTmRqs:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/E2eDataVolTransTimeReq'
  minItems: 1
excepRequs:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/Exception'
  minItems: 1
exptAnaType:
  $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/ExpectedAnalyticsType'
exptUeBehav:
  $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/ExpectedUeBehaviourData'
matchingDir:
  $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MatchingDirection'
reptThlds:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/ThresholdLevel'
  minItems: 1
snssai:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
snssais:
  type: array
  items:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  minItems: 1
nsiIdInfos:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NsiIdInfo'
  minItems: 1
nsLevelThrds:
  type: object
  additionalProperties:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  minProperties: 1
  description: >
    Contains the network slice load level related thresholds.
    The key of the map shall be set to the value of the S-NSSAI (among the ones provided
    within the nsiIdInfos attribute to which the provided thresholds within the map value
    apply.
    Each map value shall have a maximum value of 100.
qosReq:
  $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/QosRequirement'
qosFlowRetThds:

```

```
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/RetainabilityThreshold'
    minItems: 1
  ranUeThrouThds:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
    minItems: 1
  e2eDelayThds:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketDelBudget'
    minItems: 1
  deviations:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    minItems: 1
  disperReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/DispersionRequirement'
    minItems: 1
  listOfAnaSubsets:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/AnalyticsSubset'
    minItems: 1
  dnPerfReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/DnPerformanceReq'
    minItems: 1
  bwRequs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/BwRequirement'
    minItems: 1
  ratFreqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/RatFreqInformation'
    minItems: 1
  appServerAdrs:
    type: array
    items:
      $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AddrFqdn'
    minItems: 1
  wlanReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/WlanPerformanceReq'
    minItems: 1
  extraReportReq:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/EventReportingRequirement'
  maxNumOfTopAppUl:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
  maxNumOfTopAppDl:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
  visitedLocAreas:
    type: array
    items:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    minItems: 1
  pduSesInfos:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/PduSessionInfo'
    minItems: 1
  ueCommReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/UeCommReq'
    minItems: 1
  userDataConOrderCri:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/UserDataConOrderCrit'
  locGranularity:
```

```

    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/LocInfoGranularity'
  locOrientation:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/LocationOrientation'
  ueMobilityReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/UeMobilityReq'
    minItems: 1
  movBehavReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MovBehavReq'
    minItems: 1
  relProxReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/RelProxReq'
    minItems: 1
  useCaseCxt:
    type: string
    description: >
      Indicates the context of usage of the analytics. The value and format of this parameter
      are not standardized.
  pauseFlg:
    type: boolean
    description: >
      Pause analytics consumption flag. Set to "true" to indicate the NWDAF to stop sending
      the notifications of analytics. Default value is "false" if omitted.
  resumeFlg:
    type: boolean
    description: >
      Resume analytics consumption flag. Set to "true" to indicate the NWDAF to resume sending
      the notifications of analytics. Default value is "false" if omitted.
  accuReq:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/AccuracyReq'
  feedback:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/AnalyticsFeedbackInfo'
  sigStormReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/SignalStormReq'
    minItems: 1
  nfInstanceIds:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    minItems: 1
  nfSetIds:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    minItems: 1
  lastUeLocs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/TimestampedLocation'
    minItems: 1
    description: Contains the last known location of target UE(s).

TargetUeId:
  description: Represents the target UE(s) information.
  type: object
  properties:
    anyUeInd:
      type: boolean
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    exterGroupId:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'

UeMobilityExposure:
  description: Represents a UE mobility information.
  type: object
  properties:
    ts:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    recurringTime:
      $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'

```

```
duration:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
durationVariance:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
locInfo:
  type: array
  items:
    $ref: '#/components/schemas/UeLocationInfo'
  minItems: 1
directionInfos:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/DirectionInfo'
  minItems: 1
required:
- duration
- locInfo

UeLocationInfo:
description: Represents a UE location information.
type: object
properties:
  loc:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  geoLoc:
    $ref: 'TS29522_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'
  ratio:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SamplingRatio'
  confidence:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  geoDistrInfos:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/GeoDistributionInfo'
    minItems: 1
required:
- loc

AnalyticsRequest:
description: Represents the parameters to request to retrieve analytics information.
type: object
properties:
  analyEvent:
    $ref: '#/components/schemas/AnalyticsEvent'
  analyEventFilter:
    $ref: '#/components/schemas/AnalyticsEventFilter'
  analyRep:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/EventReportingRequirement'
  tgtUe:
    $ref: '#/components/schemas/TargetUeId'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
- analyEvent
- suppFeat

AnalyticsEventFilter:
description: Represents analytics event filter information.
type: object
properties:
  locArea:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  fineGranAreas:
    type: array
    items:
      $ref: 'TS29522_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'
    minItems: 1
    description: Indicates the fine granularity areas to which the request applies.
  temporalGranSize:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  spatialGranSizeTa:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  spatialGranSizeCell:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  dnn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  dnns:
    type: array
```

```
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    minItems: 1
  dnais:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
    minItems: 1
  nwPerfTypes:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NetworkPerfType'
    minItems: 1
  appIds:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationId'
    minItems: 1
  excepIds:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/ExceptionId'
    minItems: 1
  exptAnaType:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/ExpectedAnalyticsType'
  exptUeBehav:
    $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/ExpectedUeBehaviourData'
  snssai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  snssais:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    minItems: 1
  nsiIdInfos:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NsiIdInfo'
    minItems: 1
  qosReq:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/QosRequirement'
  listOfAnaSubsets:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/AnalyticsSubset'
    minItems: 1
  dnPerfReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/DnPerformanceReq'
    minItems: 1
  dataVlTrnsTmReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/E2eDataVolTransTimeReq'
    minItems: 1
  bwRequs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/BwRequirement'
    minItems: 1
  ratFreqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/RatFreqInformation'
    minItems: 1
  appServerAddrs:
    type: array
    items:
      $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AddrFqdn'
    minItems: 1
  wlanReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/WlanPerformanceReq'
    minItems: 1
  disperReqs:
    type: array
```

```

    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/DispersionRequirement'
    minItems: 1
  maxNumOfTopAppUl:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  maxNumOfTopAppDl:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  visitedLocAreas:
    type: array
    items:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    minItems: 1
  pduSesInfos:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/PduSessionInfo'
    minItems: 1
  ueCommReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/UeCommReq'
    minItems: 1
  userDataConReq:
    $ref: 'TS29520_Nnwdaf_AnalyticsInfo.yaml#/components/schemas/UserDataCongestReq'
  locGranularity:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/LocInfoGranularity'
  locOrientation:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/LocationOrientation'
  ueMobilityReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/UeMobilityReq'
    minItems: 1
  movBehavReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MovBehavReq'
    minItems: 1
  useCaseCxt:
    type: string
    description: >
      Indicates the context of usage of the analytics. The value and format of this parameter
      are not standardized.
  accuReq:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/AccuracyReq'
  relProxReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/RelProxReq'
    minItems: 1
  sigStormReqs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/SignalStormReq'
    minItems: 1
  nfInstanceIds:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    minItems: 1
  nfSetIds:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    minItems: 1
  lastUeLocs:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/TimestampedLocation'
    minItems: 1
    description: Contains the last known location of target UE(s).

AnalyticsData:
  description: Represents analytics data.
  type: object
  properties:
    start:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'

```

```

expiry:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
timeStampGen:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
ueMobilityInfos:
  type: array
  items:
    $ref: '#/components/schemas/UeMobilityExposure'
  minItems: 1
ueCommInfos:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/UeCommunication'
  minItems: 1
nwPerfInfos:
  type: array
  items:
    $ref: '#/components/schemas/NetworkPerfExposure'
  minItems: 1
abnormalInfos:
  type: array
  items:
    $ref: '#/components/schemas/AbnormalExposure'
  minItems: 1
congestInfos:
  type: array
  items:
    $ref: '#/components/schemas/CongestInfo'
  minItems: 1
dataVlTrnsTmInfos:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/E2eDataVolTransTimeInfo'
  minItems: 1
qosSustainInfos:
  type: array
  items:
    $ref: '#/components/schemas/QosSustainabilityExposure'
  minItems: 1
dnPerfInfos:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/DnPerfInfo'
  minItems: 1
svcExps:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/ServiceExperienceInfo'
  minItems: 1
disperReqs:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/DispersionRequirement'
  minItems: 1
movBehavInfos:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MovBehavInfo'
  minItems: 1
wlanInfos:
  type: array
  items:
    $ref: '#/components/schemas/WlanPerformInfo'
  minItems: 1
accuInfo:
  $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/AccuracyInfo'
cancelAccuInd:
  type: boolean
  description: >
    Indicates cancelled request of the analytics accuracy information.
    Set to "true" indicates the NWDAF cancelled request of analytics accuracy
    information as the NWDAF does not support the accuracy checking capability.
    Otherwise set to "false". Default value is "false" if omitted.
relProxInfos:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/RelProxInfo'
  minItems: 1

```

```
nsLoadLevelData:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NsiLoadLevelInfo'
  minItems: 1
signalStorms:
  type: array
  items:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/SignalStormInfo'
  minItems: 1
suppFeat:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
- suppFeat
```

```
NetworkPerfExposure:
  description: Represents network performance information.
  type: object
  properties:
    locArea:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    anaPeriod:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Timewindow'
    nwPerfType:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NetworkPerfType'
    relativeRatio:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SamplingRatio'
    absoluteNum:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    rscUsgReq:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/ResourceUsageRequirement'
    confidence:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  required:
  - locArea
  - nwPerfType
```

```
AbnormalExposure:
  description: Represents a user's abnormal behavior information.
  type: object
  properties:
    gpsis:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      minItems: 1
    appId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationId'
    dnn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    snssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    excep:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/Exception'
    ratio:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SamplingRatio'
    confidence:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    addtMeasInfo:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/AdditionalMeasurement'
  required:
  - excep
```

```
CongestInfo:
  description: Represents a UE's user data congestion information.
  type: object
  properties:
    locArea:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    cngAnas:
      type: array
      items:
        $ref: '#/components/schemas/CongestionAnalytics'
      minItems: 1
  required:
  - locArea
  - cngAnas
```



**CongestionAnalytics:**

```

description: >
  Represents data congestion analytics for transfer over the user plane,
  control plane or both.
type: object
properties:
  cngType:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/CongestionType'
  tmWdw:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  nsi:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/ThresholdLevel'
  confidence:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
  topApplListUl:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/TopApplication'
    minItems: 1
  topApplListDl:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/TopApplication'
    minItems: 1
required:
  - cngType
  - tmWdw
  - nsi

```

**QoS Sustainability Exposure:**

```

description: Represents a QoS sustainability information.
type: object
properties:
  locArea:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  fineAreaInfos:
    type: array
    items:
      $ref: 'TS29522_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'
    minItems: 1
    description: This attribute contains the geographical locations in a fine granularity.
  startTs:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  endTs:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  qosFlowRetThd:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/RetainabilityThreshold'
  ranUeThrouThd:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
  e2eDelayThd:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketDelBudget'
  snssai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  confidence:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
required:
  - locArea
  - startTs
  - endTs

```

**WlanPerformInfo:**

```

description: The WLAN performance related information.
type: object
properties:

```

```

  locArea:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  wlanPerSsidInfos:
    type: array
    items:
      $ref:

```

```

    'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/WlanPerSsidPerformanceInfo'
    minItems: 1

```

```

  wlanPerUeIdInfos:
    type: array
    items:
      $ref:

```

```

    'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/WlanPerUeIdPerformanceInfo'
    minItems: 1

```

```
description: >
  WLAN performance information for UE Id(s) of WLAN access points deployed in the Area
  of Interest.
required:
- wlanPerSsidInfos
```

AnalyticsFailureEventInfo:

```
description: >
  Represents an event for which the subscription request was not successful
  and including the associated failure reason.
type: object
properties:
  event:
    $ref: '#/components/schemas/AnalyticsEvent'
  failureCode:
    $ref: '#/components/schemas/AnalyticsFailureCode'
required:
- event
- failureCode
```

AnalyticsEvent:

```
anyOf:
- type: string
  enum:
    - UE_MOBILITY
    - UE_COMM
    - ABNORMAL_BEHAVIOR
    - CONGESTION
    - NETWORK_PERFORMANCE
    - QOS_SUSTAINABILITY
    - DISPERSION
    - DN_PERFORMANCE
    - SERVICE_EXPERIENCE
    - E2E_DATA_VOL_TRANS_TIME
    - MOVEMENT_BEHAVIOUR
    - RELATIVE_PROXIMITY
    - WLAN_PERFORMANCE
    - NS_LOAD_LEVEL
    - SIGNALLING_STORM
- type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration but is not used to encode
    content defined in the present version of this API.
```

```
description: |
  Represents the analytics event that is subscribed or notified.
  Possible values are:
  - UE_MOBILITY: The AF requests to be notified about analytics information of UE mobility.
  - UE_COMM: The AF requests to be notified about analytics information of UE communication.
  - ABNORMAL_BEHAVIOR: The AF requests to be notified about analytics information of UE's
    abnormal behavior.
  - CONGESTION: The AF requests to be notified about analytics information of user data
    congestion information.
  - NETWORK_PERFORMANCE: The AF requests to be notified about analytics information
    of network performance.
  - QOS_SUSTAINABILITY: The AF requests to be notified about analytics information
    of QoS sustainability.
  - DISPERSION: The AF requests to be notified about analytics information of Dispersion
    analytics.
  - DN_PERFORMANCE: The AF requests to be notified about analytics information of DN
    performance.
  - SERVICE_EXPERIENCE: The AF requests to be notified about analytics information of service
    experience.
  - E2E_DATA_VOL_TRANS_TIME: The AF requests to be notified about analytics information of
    E2E data volume transfer time.
  - MOVEMENT_BEHAVIOUR: The AF requests to be notified about analytics information of
    Movement Behaviour.
  - RELATIVE_PROXIMITY: The AF requests to be notified about analytics information of
    Relative Proximity.
  - WLAN_PERFORMANCE: Indicates that the event subscribed is the Wlan Performance
    information.
  - NS_LOAD_LEVEL: Indicates that the event subscribed is load level information of Network
    Slice.
  - SIGNALLING_STORM: The AF requests to be notified about analytics information of Signalling
    Storm.
```

AnalyticsFailureCode:

```
anyOf:
```

```

- type: string
  enum:
    - UNAVAILABLE_DATA
    - BOTH_STAT_PRED_NOT_ALLOWED
    - UNSATISFIED_REQUESTED_ANALYTICS_TIME
    - NO_ROAMING_SUPPORT
    - PREDICTION_NOT_ALLOWED
    - OTHER
- type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration but is not used to encode
    content defined in the present version of this API.
  description: |
    Identifies the failure reason.
    Possible values are:
    - UNAVAILABLE_DATA: The event is rejected since necessary data to perform the service
      is unavailable.
    - BOTH_STAT_PRED_NOT_ALLOWED: The event is rejected since the start time is in the past
      and the end time is in the future, which means the AF requested both
      statistics and prediction for the analytics.
    - UNSATISFIED_REQUESTED_ANALYTICS_TIME: Indicates that the requested event is rejected
      since the analytics information is not ready when the time indicated by the timeAnaNeeded
      attribute (as provided during the creation or modification of subscription) is reached.
    - NO_ROAMING_SUPPORT: Indicates that the request shall be rejected because roaming analytics
      or data are required and the NWDAF that was invoked by the NEF neither supported roaming
      exchange capability nor could it forward the request to another NWDAF.
    - PREDICTION_NOT_ALLOWED: Indicates that the request for the prediction of the analytics
      event is not allowed.
    - OTHER: The event is rejected due to other reasons.

```

---

## A.5 5GLANParameterProvision API

openapi: 3.0.0

```

info:
  title: 3gpp-5glan-pp
  version: 1.3.0-alpha.2
  description: |
    API for 5G LAN Parameter Provision.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

security:
- {}
- oAuth2ClientCredentials: []

```

```

servers:
- url: '{apiRoot}/3gpp-5glan-pp/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

```

paths:
  /{afId}/subscriptions:
    get:
      summary: read all of the active subscriptions for the AF
      operationId: RealAllSubscriptions
      tags:
        - 5GLAN Parameters Provision Subscriptions
      parameters:
        - name: afId
          in: path
          description: Identifier of the AF
          required: true
          schema:
            type: string
      responses:
        '200':

```

```
description: OK (Successful get all of the active subscriptions for the AF)
content:
  application/json:
    schema:
      type: array
      items:
        $ref: '#/components/schemas/5GLanParametersProvision'
      minItems: 0
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

**post:**

```
summary: Creates a new subscription resource
operationId: CreateAnSubscription
tags:
  - 5GLAN Parameters Provision Subscriptions
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
requestBody:
  description: new subscription creation
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/5GLanParametersProvision'
responses:
  '201':
    description: Created (Successful creation)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/5GLanParametersProvision'
    headers:
      Location:
        description: Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  5GLANParamProvNotif:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/5GLANParamProvNotif'
        responses:
          '204':
            description: No Content. Successful reception of the notification.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}:
  get:
    summary: read an active subscription for the AF and the subscription Id
    operationId: ReadAnSubscription
    tags:
      - Individual 5GLAN Parameters Provision Subscription
    parameters:
      - name: afId
        in: path
        description: Identifier of the AF
        required: true
        schema:
          type: string
      - name: subscriptionId
        in: path
        description: Identifier of the subscription resource
        required: true
        schema:
          type: string
    responses:
      '200':
        description: OK (Successful get the active subscription)
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/5GLANParametersProvision'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

summary: Fully updates/replaces an existing subscription resource

operationId: FullyUpdateAnSubscription

tags:

- Individual 5GLAN Parameters Provision Subscription

parameters:

- name: afId
  - in: path
  - description: Identifier of the AF
  - required: true
  - schema:
    - type: string
- name: subscriptionId
  - in: path
  - description: Identifier of the subscription resource
  - required: true
  - schema:
    - type: string

requestBody:

description: Parameters to update/replace the existing subscription

required: true

content:

- application/json:
  - schema:
    - \$ref: '#/components/schemas/5GLanParametersProvision'

responses:

```

  '200':
    description: OK (Successful deletion of the existing subscription)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/5GLanParametersProvision'
  '204':
    description: >
      Successful case. The resource has been successfully updated and no additional
      content is to be sent in the response message.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'

```

```
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: Partial updates an existing subscription resource
  operationId: PartialUpdateAnSubscription
  tags:
    - Individual 5GLAN Parameters Provision Subscription
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: subscriptionId
      in: path
      description: Identifier of the subscription resource
      required: true
      schema:
        type: string
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/5GLanParametersProvisionPatch'
  responses:
    '200':
      description: OK. The subscription was modified successfully.
      content:
        application/json:
          schema:
            $ref: 'TS29122_CommonData.yaml#/components/schemas/5GLanParametersProvision'
    '204':
      description: >
        Successful case. The resource has been successfully updated and no additional
        content is to be sent in the response message.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: Deletes an already existing subscription
  operationId: DeleteAnSubscription
  tags:
    - Individual 5GLAN Parameters Provision Subscription
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: subscriptionId
```

```

    in: path
    description: Identifier of the subscription resource
    required: true
    schema:
      type: string
  responses:
    '204':
      description: No Content (Successful deletion of the existing subscription)
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    5GLanParametersProvision:
      description: Represents an individual 5G LAN parameters provision subscription resource.
      type: object
      properties:
        self:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
        5gLanParams:
          $ref: '#/components/schemas/5GLanParameters'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - 5gLanParams
        - suppFeat

    5GLanParametersProvisionPatch:
      description: >
        Represents the 5G LAN parameters to request the modification of a subscription
        to provision parameters.
      type: object
      properties:
        5gLanParamsPatch:
          $ref: '#/components/schemas/5GLanParametersPatch'
        5gLanParams:
          $ref: '#/components/schemas/5GLanParameters'

    5GLanParameters:
      description: Represents 5G LAN service related parameters that need to be provisioned.
      type: object
      properties:
        exterGroupId:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
        gpsi:
          type: object
          additionalProperties:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
          minProperties: 1
      description: >
        Contains the list of 5G VN Group members, each member is identified by GPSI.
        Any string value can be used as a key of the map.

```



```
dnn:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
aaaIpv4Addr:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
aaaIpv6Addr:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
aaaUsgs:
  type: array
  items:
    $ref: '#/components/schemas/AaaUsage'
  minItems: 1
  description: >
    This attribute shall contain at most 2 array elements. It is however kept
    defined as it is (i.e. with a cardinality of "1..N") for backward
    compatibility considerations.
mtcProviderId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
snssai:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
sessionType:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
sessionTypes:
  type: array
  items:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
  minItems: 1
  description: Further allowed PDU Session types.
appDesps:
  type: object
  additionalProperties:
    $ref: '#/components/schemas/AppDescriptor'
  minProperties: 1
  description: >
    Describes the operation systems and the corresponding applications for each
    operation systems. The key of map is osId.
vnGroupCommInd:
  type: boolean
  description: >
    Indicates whether the 5G VN group is associated with 5G VN group communication when
    When set to "true", it indicates that the 5G VN group is associated with 5G VN group
    communication. When set to "false", it indicates that the 5G VN group is not
    associated with 5G VN group communication. The default value when omitted is "false".
vnGroupCommType:
  $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/5GVnGroupCommunicationType'
maxGrpDataRateInfo:
  $ref: '#/components/schemas/MaxGrpDataRateInfo'
cpParams:
  $ref: '#/components/schemas/CpParams'
npConfigParams:
  $ref: '#/components/schemas/NpConfigParams'
lpiParams:
  $ref: '#/components/schemas/LpiParams'
acsParams:
  $ref: '#/components/schemas/AcsParams'
ecsAddrParams:
  $ref: '#/components/schemas/ECSAddrParams'
dnnSnssaiParams:
  $ref: '#/components/schemas/DnnSnssaiParams'
notifUri:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
upSecurity:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UpSecurity'
required:
- exterGroupId
- gpsis
- dnn
- snssai
- sessionType
- appDesps
5GLanParametersPatch:
  deprecated: true
  description: Represents 5G LAN service related parameters that need to be modified.
  type: object
  properties:
    gpsis:
      type: object
      additionalProperties:
```

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/GpsiRm'
  minProperties: 1
  description: >
    Contains the list of 5G VN Group members, each member is identified by GPSI.
    Any string value can be used as a key of the map.
  appDesps:
    type: object
    additionalProperties:
      $ref: '##/components/schemas/AppDescriptorRm'
    minProperties: 1
    description: >
      Describes the operation systems and the corresponding applications for
      each operation systems. The key of map is osId.
  cpParams:
    $ref: '##/components/schemas/CpParams'
  npConfigParams:
    $ref: '##/components/schemas/NpConfigParams'
  lpiParams:
    $ref: '##/components/schemas/LpiParams'
  acsParams:
    $ref: '##/components/schemas/AcsParams'
  ecsAddrParams:
    $ref: '##/components/schemas/ECSAddrParams'
  dnnSnssaiParams:
    $ref: '##/components/schemas/DnnSnssaiParams'
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'

```

```

AppDescriptor:
  description: Represents an operation system and the corresponding applications.
  type: object
  properties:
    osId:
      $ref: 'TS29519_Policy_Data.yaml#/components/schemas/OsId'
    appIds:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationId'
      minProperties: 1
      description: >
        Identifies applications that are running on the UE's operating system.
        Any string value can be used as a key of the map.
  required:
    - osId
    - appIds

```

```

AppDescriptorRm:
  description: >
    Represents the same as the AppDescriptor data type but with the nullable:true
    property.
  type: object
  properties:
    appIds:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationIdRm'
      minProperties: 1
      description: >
        Identifies applications that are running on the UE's operating system.
        Any string value can be used as a key of the map.

```

```

MaxGrpDataRateInfo:
  description: >
    Represents the Maximum Group Data Rate related information.
  type: object
  properties:
    maxGrpDataRateUl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
    maxGrpDataRateDl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
  anyOf:
    - required: [maxGrpDataRateUl]
    - required: [maxGrpDataRateDl]

```

```

CpParams:
  description: Represents Communication Pattern parameters.
  type: object
  properties:

```

```
cpParameterSets:
  type: object
  additionalProperties:
    $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/CpParameterSet'
  minProperties: 1
  description: >
    Contains one or more set(s) of CP parameters information for the 5G VN group.
    Any string value may be used as a key of the map.
cpReports:
  type: object
  additionalProperties:
    $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/CpReport'
  minProperties: 1
  description: >
    Contains the identifier(s) of the set(s) of CP parameters for which the provided CP
    parameters are not added or modified successfully with the corresponding failure reason.
    Each element provides the related information for one or more CP set identifier(s).
    The key of the map is a string representing the failure identifier.
  readOnly: true
required:
  - cpParameterSets

NpConfigParams:
  description: Represents Network Parameters Configuration information.
  type: object
  properties:
    maximumLatency:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    maximumResponseTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    suggestedNumberOfDlPackets:
      type: integer
      minimum: 0
      description: >
        Contains the number of packets that the serving gateway shall buffer in case the UE is
        not reachable.
    groupReportingGuardTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    validityTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'

LpiParams:
  description: Represents Location Privacy Indication parameters.
  type: object
  properties:
    lpi:
      $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/Lpi'
  required:
    - lpi

AcsParams:
  description: Represents ACS configuration parameters.
  type: object
  properties:
    acsInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AcsInfo'
  required:
    - acsInfo

ECSAddrParams:
  description: Represents ECS address configuration parameters.
  type: object
  properties:
    ecsServerAddr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/EcsServerAddr'
    spatialValidityCond:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SpatialValidityCond'
    ecsAuthMethods:
      type: array
      items:
        $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/EcsAuthMethod'
      minItems: 1
    supportedPlmns:
      type: array
      items:
        $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/SupportedPlmn'
      minItems: 1
  required:
```

```

- ecsServerAddr

DnnSnssaiParams:
  description: Represents DNN and S-NSSAI specific Group Parameters.
  type: object
  properties:
    defQos:
      $ref: 'TS29522_GroupParametersProvisioning.yaml#/components/schemas/AfReqDefaultQoS'
    ldnServArea:
      $ref: 'TS29522_GroupParametersProvisioning.yaml#/components/schemas/LdnServArea'
  anyOf:
    - required: [ defQos ]
    - required: [ ldnServArea ]

5GLanParamProvNotif:
  description: Represents a 5G LAN Parameter Provisioning Event Notification.
  type: object
  properties:
    npConfigNotif:
      $ref: '#/components/schemas/NpConfigNotif'

NpConfigNotif:
  description: Represents a Network Parameters Configuration related notification.
  type: object
  properties:
    configResults:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/ConfigResult'
      minItems: 1
    appliedParam:
      $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/AppliedParameterConfiguration'

AaaUsage:
  anyOf:
    - type: string
      enum:
        - AUTH
        - IP_ALLOC
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
  description: |
    Represents the usage of the DN-AAA server.
    Possible values are:
    - AUTH: secondary authentication/authorization needed from DN-AAA server.
    - IP_ALLOC: UE IP address allocation needed from DN-AAA server.

```

---

## A.6 ApplyingBdtPolicy API

```

openapi: 3.0.0
info:
  title: 3gpp-applying-bdt-policy
  version: 1.1.1
  description: |
    API for applying BDT policy
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: >
    3GPP TS 29.522 V17.7.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'
security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/3gpp-applying-bdt-policy/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.
paths:
  /{afId}/subscriptions:

```

```
parameters:
- name: afId
  in: path
  description: Identifier of the AF
  required: true
  schema:
    type: string
get:
  summary: read all of the active subscriptions for the AF
  operationId: ReadAllSubscriptions
  tags:
  - Applied BDT Policy Subscription
  responses:
    '200':
      description: OK.
      content:
        application/json:
          schema:
            type: array
            items:
              $ref: '#/components/schemas/AppliedBdtPolicy'
            minItems: 0
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
post:
  summary: Creates a new subscription resource
  operationId: CreateNewSubscription
  tags:
  - Applied BDT Policy Subscription
  requestBody:
    description: Request to create a new subscription resource
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AppliedBdtPolicy'
  responses:
    '201':
      description: Created (Successful creation of subscription)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AppliedBdtPolicy'
      headers:
        Location:
          description: Contains the URI of the newly created resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
```

```

    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}:
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: subscriptionId
      in: path
      description: Identifier of the subscription resource
      required: true
      schema:
        type: string
  get:
    summary: read an active subscriptions for the SCS/AS and the subscription Id
    operationId: ReadAnSubscription
    tags:
      - Individual Applied BDT Policy Subscription
    responses:
      '200':
        description: OK (Successful get the active subscription)
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AppliedBdtPolicy'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  patch:
    summary: Partial updates/replaces an existing subscription resource
    operationId: PartialUpdateAnSubscription
    tags:
      - Individual Applied BDT Policy Subscription
    requestBody:
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/AppliedBdtPolicyPatch'
    responses:
      '200':
        description: OK. The subscription was modified successfully.

```

```

    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AppliedBdtPolicy'
    '204':
      description: No content. The subscription was modified successfully.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  delete:
    summary: Deletes an already existing subscription
    operationId: DeleteAnSubscription
    tags:
      - Individual Applied BDT Policy Subscription
    responses:
      '204':
        description: No Content (Successful deletion of the existing subscription)
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
  schemas:
    AppliedBdtPolicy:
      description: Represents an applied BDT policy.
      type: object
      properties:
        externalGroupId:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'

```

```

    bdtRefId:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/BdtReferenceId'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    self:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
  required:
    - bdtRefId
    - suppFeat
  oneOf:
    - required: [gpsi]
    - required: [externalGroupId]
AppliedBdtPolicyPatch:
  description: >
    Represents the parameters to request the modification of a subscription to
    applied BDT policy.
  type: object
  properties:
    bdtRefId:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/BdtReferenceId'
  required:
    - bdtRefId

```

---

## A.7 IPTVConfiguration API

openapi: 3.0.0

```

info:
  title: 3gpp-iptvconfiguration
  version: 1.2.0
  description: |
    API for IPTV configuration.
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    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V18.6.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

servers:
  - url: '{apiRoot}/3gpp-iptvconfiguration/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

```

paths:
  /{afId}/configurations:
    get:
      summary: read all of the active configurations for the AF
      operationId: ReadAllSubscriptions
      tags:
        - IPTV Configurations
      parameters:
        - name: afId
          in: path
          description: Identifier of the AF
          required: true
          schema:
            type: string
      responses:
        '200':
          description: OK (Successful get all of the active configurations for the AF)
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/IptvConfigData'

```



```

      minItems: 0
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

post:

```

summary: Creates a new configuration resource
operationId: CreateNewSubscription
tags:
  - IPTV Configurations
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
requestBody:
  description: new configuration creation
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/IptvConfigData'
responses:
  '201':
    description: Created (Successful creation of configuration)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/IptvConfigData'
    headers:
      Location:
        description: Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```
/{afId}/configurations/{configurationId}:
get:
  summary: read an active configuration for the AF and the configuration Id
  operationId: ReadAnSubscription
  tags:
    - Individual IPTV Configuration
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: configurationId
      in: path
      description: Identifier of the configuration resource
      required: true
      schema:
        type: string
  responses:
    '200':
      description: OK (Successful get the active configuration)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/IptvConfigData'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Fully updates/replaces an existing configuration resource
  operationId: FullyUpdateAnSubscription
  tags:
    - Individual IPTV Configuration
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: configurationId
      in: path
      description: Identifier of the configuration resource
      required: true
      schema:
        type: string
  requestBody:
    description: Parameters to update/replace the existing configuration
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/IptvConfigData'
  responses:
    '200':
      description: OK (Successful deletion of the existing configuration)
```

```

    content:
      application/json:
        schema:
          $ref: '#/components/schemas/IptvConfigData'
    '204':
      description: >
        Successful case. The resource has been successfully updated and no additional
        content is to be sent in the response message.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

summary: Partial updates an existing configuration resource  
 operationId: PartialUpdateAnSubscription

tags:

- Individual IPTV Configuration

parameters:

- name: afId
  - in: path
  - description: Identifier of the AF
  - required: true
  - schema:
    - type: string
- name: configurationId
  - in: path
  - description: Identifier of the configuration resource
  - required: true
  - schema:
    - type: string

requestBody:

required: true

content:

```

    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/IptvConfigDataPatch'

```

responses:

```

    '200':
      description: OK. The configuration was modified successfully.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/IptvConfigData'
    '204':
      description: >
        Successful case. The resource has been successfully updated and no additional
        content is to be sent in the response message.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'

```

```

'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Deletes an already existing configuration

operationId: DeleteAnSubscription

#### tags:

- Individual IPTV Configuration

#### parameters:

- name: afId
  - in: path
  - description: Identifier of the AF
  - required: true
  - schema:
    - type: string
- name: configurationId
  - in: path
  - description: Identifier of the configuration resource
  - required: true
  - schema:
    - type: string

#### responses:

```

'204':
  description: No Content (Successful deletion of the existing configuration)
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### components:

##### securitySchemes:

##### oAuth2ClientCredentials:

type: oauth2

##### flows:

##### clientCredentials:

```

tokenUrl: '{tokenUrl}'
scopes: {}

```

#### schemas:

##### IptvConfigData:

description: Represents an individual IPTV Configuration resource.

type: object

##### properties:

##### self:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

##### gpsi:

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
  exteGroupId:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
  afAppId:
    type: string
  dnn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  snssai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  multiAccCtrls:
    type: object
    additionalProperties:
      $ref: '#/components/schemas/MulticastAccessControl'
    minProperties: 1
    description: >
      Identifies a list of multicast address access control information.
      Any string value can be used as a key of the map.
  mtcProviderId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - afAppId
    - multiAccCtrls
    - suppFeat

```

```

IptvConfigDataPatch:
  description: >
    Represents the parameters to request the modification of an IPTV Configuration resource.
  type: object
  properties:
    multiAccCtrls:
      type: object
      additionalProperties:
        $ref: '#/components/schemas/MulticastAccessControl'
      minProperties: 1
      description: >
        Identifies a list of multicast address access control information.
        Any string value can be used as a key of the map.

```

```

MulticastAccessControl:
  description: Represents multicast address access control information.
  type: object
  properties:
    srcIpv4Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    srcIpv6Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
    multicastV4Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    multicastV6Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
    accStatus:
      $ref: '#/components/schemas/AccessRightStatus'
  required:
    - accStatus

```

```

AccessRightStatus:
  anyOf:
    - type: string
      enum:
        - FULLY_ALLOWED
        - PREVIEW_ALLOWED
        - NO_ALLOWED
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration but
        is not used to encode content defined in the present version of this API.
  description: |
    Represents the access right status for parameter provision.
    Possible values are:
    - FULLY_ALLOWED: The User is fully allowed to access to the channel.
    - PREVIEW_ALLOWED: The User is preview allowed to access to the channel.
    - NO_ALLOWED: The User is not allowed to access to the channel.

```

## A.8 LpiParameterProvision API

openapi: 3.0.0

info:

title: 3gpp-lpi-pp  
version: 1.2.0  
description: |  
API for Location Privacy Indication Parameters Provisioning.  
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All rights reserved.

externalDocs:

description: >  
3GPP TS 29.522 V18.6.0; 5G System; Network Exposure Function Northbound APIs.  
url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.522/'

security:

- {}  
- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-lpi-pp/v1'  
variables:  
apiRoot:  
default: https://example.com  
description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{afId}/provisionedLpis:  
get:  
summary: read all of the active LPI Parameters Provisioning resources for the AF  
operationId: ReadAllResources  
tags:  
- LPI Parameters Provisionings  
parameters:  
- name: afId  
in: path  
description: Identifier of the AF  
required: true  
schema:  
type: string  
responses:  
'200':  
description: OK (Successful get all of the active resources for the AF)  
content:  
application/json:  
schema:  
type: array  
items:  
\$ref: '#/components/schemas/LpiParametersProvision'  
'307':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'  
'308':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'  
'400':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'  
'401':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'  
'403':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'  
'404':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'  
'406':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/406'  
'429':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'  
'500':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'  
'503':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'  
default:  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Creates a new LPI Parameters Provisioning resource  
operationId: CreateNewResource

```

tags:
- LPI Parameters Provisionings
parameters:
- name: afId
  in: path
  description: Identifier of the AF
  required: true
  schema:
    type: string
requestBody:
  description: new resource creation
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/LpiParametersProvision'
responses:
  '201':
    description: Created (Successful creation)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/LpiParametersProvision'
    headers:
      Location:
        description: Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/ {afId} / provisionedLpis / {provisionedLpiId} :

get:

summary: read an active LPI Parameters Provisioning resource for the AF and the provisioned LPI

Id

operationId: ReadAnResource

tags:

- Individual LPI Parameters Provisioning

parameters:

- name: afId

in: path

description: Identifier of the AF

required: true

schema:

type: string

- name: provisionedLpiId

in: path

description: Identifier of the provisioned LPI parameter resource

required: true

schema:

type: string

responses:

'200':

description: OK (Successful get the active resource)

content:

application/json:

schema:

```

    $ref: '#/components/schemas/LpiParametersProvision'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

```

summary: Fully updates/replaces an existing LPI Parameters Provisioning resource
operationId: FullyUpdateAnResource
tags:
  - Individual LPI Parameters Provisioning
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
  - name: provisionedLpiId
    in: path
    description: Identifier of the provisioned LPI parameter resource
    required: true
    schema:
      type: string
requestBody:
  description: Parameters to update/replace the existing resource
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/LpiParametersProvision'
responses:
  '200':
    description: >
      OK. The resource has been successfully updated and a representation of the updated
      resource is returned.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/LpiParametersProvision'
  '204':
    description: >
      Successful case. The resource has been successfully updated and no additional
      content is sent in the response message.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'

```



```

'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

summary: Partially modifies an existing LPI Parameters Provisioning resource.

operationId: PartialUpdateAnResource

tags:

- Individual LPI Parameters Provisioning

parameters:

- name: afId
  - in: path
  - description: Identifier of the AF
  - required: true
  - schema:
    - type: string
- name: provisionedLpiId
  - in: path
  - description: Identifier of the provisioned LPI parameter resource
  - required: true
  - schema:
    - type: string

requestBody:

description: Parameters to modify the existing resource.

required: true

content:

- application/json:
  - schema:
    - \$ref: '#/components/schemas/LpiParametersProvisionPatch'

responses:

```

'200':
  description: >
    OK. The resource has been successfully modified and a representation of the
    updated resource is returned.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/LpiParametersProvision'
'204':
  description: >
    Successful case. The resource has been successfully modified and no additional content
    is sent in the response message.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

summary: Deletes an already existing LPI Parameters Provisioning resource

```
operationId: DeleteAnResource
tags:
- Individual LPI Parameters Provisioning
parameters:
- name: afId
  in: path
  description: Identifier of the AF
  required: true
  schema:
    type: string
- name: provisionedLpiId
  in: path
  description: Identifier of the provisioned LPI parameter resource
  required: true
  schema:
    type: string
responses:
  '204':
    description: No Content (Successful deletion of the existing resource)
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
```

```
schemas:
  LpiParametersProvision:
    description: Represents an individual LPI Parameters Provisionings resource.
    type: object
    properties:
      self:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
      exterGroupId:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
      gpsi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      lpi:
        $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/Lpi'
      mtcProviderId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - lpi
      - suppFeat
```

```
LpiParametersProvisionPatch:
  description: >
    Represents the parameters to modify an existing Individual LPI Parameters
    Provisionings resource.
  type: object
  properties:
    lpi:
```

```
$ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/Lpi'
mtcProviderId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
```

---

## A.9 ServiceParameter API

openapi: 3.0.0

```
info:
  title: 3gpp-service-parameter
  version: 1.3.0-alpha.4
  description: |
    API for AF service parameter
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/3gpp-service-parameter/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:
  /{afId}/subscriptions:
    parameters:
      - name: afId
        in: path
        description: Identifier of the AF
        required: true
        schema:
          type: string
    get:
      summary: read all of the active subscriptions for the AF
      operationId: ReadAllSubscriptions
      tags:
        - Service Parameter Subscriptions
      parameters:
        - name: gpsis
          in: query
          description: The GPSI of the requested UE(s).
          required: false
          schema:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
            minItems: 1
        - name: ip-addr
          in: query
          description: The IP address(es) of the requested UE(s).
          required: false
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
                minItems: 1
        - name: ip-domain
          in: query
          description: >
            The IPv4 address domain identifier. The attribute may only be provided
            if IPv4 address is included in the ip-addr query parameter.
          required: false
          schema:
            type: string
        - name: mac-addr
```

```

    in: query
    description: The MAC address(es) of the requested UE(s).
    required: false
    schema:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'
      minItems: 1
  responses:
    '200':
      description: OK.
      content:
        application/json:
          schema:
            type: array
            items:
              $ref: '#/components/schemas/ServiceParameterData'
            minItems: 0
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Creates a new subscription resource
  operationId: CreateAnSubscription
  tags:
    - Service Parameter Subscriptions
  requestBody:
    description: Request to create a new subscription resource
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ServiceParameterData'
  responses:
    '201':
      description: Created (Successful creation of subscription)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ServiceParameterData'
      headers:
        Location:
          description: Contains the URI of the newly created resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'

```

```

    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    notificationDestination:
      '{$request.body#/notificationDestination}':
        post:
          requestBody:
            description: >
              Notifications upon AF Service Parameter Authorization Update,
              and/or AF subscribed event notification of the outcome related
              to the invocation of service parameters provisioning.
            required: true
            content:
              application/json:
                schema:
                  type: array
                  items:
                    $ref: '#/components/schemas/AfNotification'
                  minItems: 1
          responses:
            '204':
              description: Expected response to a successful callback processing without a body
            '307':
              $ref: 'TS29122_CommonData.yaml#/components/responses/307'
            '308':
              $ref: 'TS29122_CommonData.yaml#/components/responses/308'
            '400':
              $ref: 'TS29122_CommonData.yaml#/components/responses/400'
            '401':
              $ref: 'TS29122_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29122_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29122_CommonData.yaml#/components/responses/404'
            '411':
              $ref: 'TS29122_CommonData.yaml#/components/responses/411'
            '413':
              $ref: 'TS29122_CommonData.yaml#/components/responses/413'
            '415':
              $ref: 'TS29122_CommonData.yaml#/components/responses/415'
            '429':
              $ref: 'TS29122_CommonData.yaml#/components/responses/429'
            '500':
              $ref: 'TS29122_CommonData.yaml#/components/responses/500'
            '503':
              $ref: 'TS29122_CommonData.yaml#/components/responses/503'
            default:
              $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}:
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: subscriptionId
      in: path
      description: Identifier of the subscription resource
      required: true
      schema:
        type: string
  get:
    summary: read an active subscriptions for the SCS/AS and the subscription Id
    operationId: ReadAnSubscription
    tags:
      - Individual Service Parameter Subscription
    responses:
      '200':

```

```

    description: OK (Successful get the active subscription)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ServiceParameterData'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

```

summary: Fully updates/replaces an existing subscription resource
operationId: FullyUpdateAnSubscription
tags:
  - Individual Service Parameter Subscription
requestBody:
  description: Parameters to update/replace the existing subscription
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/ServiceParameterData'

```

responses:

```

'200':
  description: OK (Successful update of the subscription)
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/ServiceParameterData'
'204':
  description: OK (Successful update of the subscription)
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

```

summary: Partial updates/replaces an existing subscription resource

```

```
operationId: PartialUpdateAnSubscription
tags:
  - Individual Service Parameter Subscription
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/ServiceParameterDataPatch'
responses:
  '200':
    description: OK. The subscription was modified successfully.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ServiceParameterData'
  '204':
    description: OK. The subscription was modified successfully.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
delete:
  summary: Deletes an already existing subscription
  operationId: DeleteAnSubscription
  tags:
    - Individual Service Parameter Subscription
  responses:
    '204':
      description: No Content (Successful deletion of the existing subscription)
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
```

```

flows:
  clientCredentials:
    tokenUrl: '{tokenUrl}'
    scopes: {}

schemas:
  ServiceParameterData:
    description: Represents an individual Service Parameter subscription resource.
    type: object
    properties:
      afServiceId:
        type: string
        description: Identifies a service on behalf of which the AF is issuing the request.
      appId:
        type: string
        description: Identifies an application.
      dnn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      snssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      externalGroupId:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
      anyUeInd:
        type: boolean
        description: >
          Identifies whether the AF request applies to any non-roaming UE. This attribute,
          when provided, shall set to "true" if applicable for any UE, otherwise, set to "false".
      roamUeNetDescs:
        type: array
        items:
          $ref: '#/components/schemas/NetworkDescription'
        minItems: 1
        description: Each element identifies one or more PLMN IDs of inbound roamers.
      gpsi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      ueIpv4:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
      ueIpv6:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
      ueMac:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'
      self:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
      subNotifEvents:
        type: array
        items:
          $ref: '#/components/schemas/Event'
        minItems: 1
        description: >
          Identifies the AF subscribed event(s) notifications related to AF provisioned
          service parameters.
      notificationDestination:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      requestTestNotification:
        type: boolean
        description: >
          Set to true by the AF to request the NEF to send a test notification
          as defined in clause 5.2.5.3 of 3GPP TS 29.122. Set to false or omitted otherwise.
      websocketNotifConfig:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsocketNotifConfig'
      paramOverPc5:
        $ref: '#/components/schemas/ParameterOverPc5'
      paramOverUu:
        $ref: '#/components/schemas/ParameterOverUu'
      paramForProSeDd:
        $ref: '#/components/schemas/ParamForProSeDd'
      paramForProSeDc:
        $ref: '#/components/schemas/ParamForProSeDc'
      paramForProSeU2NRelUe:
        $ref: '#/components/schemas/ParamForProSeU2NRelUe'
      paramForProSeRemUe:
        $ref: '#/components/schemas/ParamForProSeRemUe'
      paramForProSeU2URelUe:
        $ref: '#/components/schemas/ParamForProSeU2URelUe'
      paramForProSeEndUe:
        $ref: '#/components/schemas/ParamForProSeEndUe'
      multiHopU2NRelUe:
        $ref: '#/components/schemas/ParamProSeMultiHopU2NRelUe'

```



```

multiHopU2NRemUe:
  $ref: '#/components/schemas/ParamProSeMultiHopRemUe'
multiHopU2NIntermUe:
  $ref: '#/components/schemas/ParamProSeMultiHopIntermUe'
multiHopU2UReUe:
  $ref: '#/components/schemas/ParamProSeMultiHopU2UReUe'
multiHopU2UEndUe:
  $ref: '#/components/schemas/ParamProSeMultiHopEndUe'
paramForRangingSlPos:
  $ref: '#/components/schemas/ParamForRangingSlPos'
urspGuidance:
  type: array
  items:
    $ref: '#/components/schemas/UrspRuleRequest'
  minItems: 1
  description: Contains the service parameter used to guide the URSP.
vpsUrspGuidance:
  type: array
  items:
    $ref: '#/components/schemas/UrspRuleRequest'
  minItems: 1
  description: >
    Contains the service parameters used to guide the VPLMN-specific URSP
    rule(s).
a2xParamsPc5:
  $ref: '#/components/schemas/A2xParamsPc5'
a2xParamsUu:
  $ref: '#/components/schemas/A2xParamsUu'
tnaps:
  type: array
  items:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/TnapId'
  minItems: 1
  description: Contains the TNAP IDs collocated with the 5G-RG(s) of a specific user.
mtcProviderId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
non3gppDevInfos:
  type: array
  items:
    $ref: '#/components/schemas/Non3gppDeviceInformation'
  minItems: 1
supFeat:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

```

#### ServiceParameterDataPatch:

```

description: >
  Represents the parameters to request the modification of a service parameter
  subscription resource.
type: object
properties:
  paramOverPc5:
    $ref: '#/components/schemas/ParameterOverPc5Rm'
  paramOverUu:
    $ref: '#/components/schemas/ParameterOverUuRm'
  paramForProSeDd:
    $ref: '#/components/schemas/ParamForProSeDdRm'
  paramForProSeDc:
    $ref: '#/components/schemas/ParamForProSeDcRm'
  paramForProSeU2NReUe:
    $ref: '#/components/schemas/ParamForProSeU2NReUeRm'
  paramForProSeRemUe:
    $ref: '#/components/schemas/ParamForProSeRemUeRm'
  paramForProSeU2UReUe:
    $ref: '#/components/schemas/ParamForProSeU2UReUeRm'
  paramForProSeEndUe:
    $ref: '#/components/schemas/ParamForProSeEndUeRm'
  multiHopU2NReUe:
    $ref: '#/components/schemas/ParamProSeMultiHopU2NReUeRm'
  multiHopU2NRemUe:
    $ref: '#/components/schemas/ParamProSeMultiHopRemUeRm'
  multiHopU2NIntermUe:
    $ref: '#/components/schemas/ParamProSeMultiHopIntermUeRm'
  multiHopU2UReUe:
    $ref: '#/components/schemas/ParamProSeMultiHopU2UReUeRm'
  multiHopU2UEndUe:
    $ref: '#/components/schemas/ParamProSeMultiHopEndUeRm'
  paramForRangingSlPos:
    $ref: '#/components/schemas/ParamForRangingSlPosRm'

```

```
    urspGuidance:
      type: array
      items:
        $ref: '#/components/schemas/UrspRuleRequest'
      minItems: 1
      description: Contains the service parameter used to guide the URSP.
    vpsUrspGuidance:
      type: array
      items:
        $ref: '#/components/schemas/UrspRuleRequest'
      minItems: 1
      description: >
        Contains the service parameters used to guide the VPLMN-specific
        URSP rule(s).
      nullable: true
    a2xParamsPc5:
      $ref: '#/components/schemas/A2xParamsPc5Rm'
    a2xParamsUu:
      $ref: '#/components/schemas/A2xParamsUuRm'
    tnap:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/TnapId'
      minItems: 1
      description: Contains the TNAP IDs collocated with the 5G-RG(s) of a specific user.
      nullable: true
    subNotifEvents:
      type: array
      items:
        $ref: '#/components/schemas/Event'
      minItems: 1
      nullable: true
      description: >
        Identifies the AF subscribed event(s) notifications related to AF provisioned
        service parameters.
    notificationDestination:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    non3gppDevInfos:
      type: array
      items:
        $ref: '#/components/schemas/Non3gppDeviceInformation'
      minItems: 1
      nullable: true

ParameterOverPc5:
  description: >
    Represents configuration parameters for V2X communications over PC5 reference point.
  type: string

ParameterOverPc5Rm:
  description: >
    Represents the same as the ParameterOverPc5 data type but with the nullable:true property.
  type: string
  nullable: true

ParameterOverUu:
  description: >
    Represents configuration parameters for V2X communications over Uu reference point.
  type: string

ParameterOverUuRm:
  description: >
    Represents the same as the ParameterOverUu data type but with the nullable:true property.
  type: string
  nullable: true

ParamForProSeDd:
  description: Represents the service parameters for 5G ProSe direct discovery.
  type: string

ParamForProSeDdRm:
  description: >
    This data type is defined in the same way as the ParamForProSeDd data type,
    but with the OpenAPI nullable property set to true.
  type: string
  nullable: true

ParamForProSeDc:
```

description: Represents the service parameters for 5G ProSe direct communications.  
type: string

ParamForProSeDcRm:

description: >  
This data type is defined in the same way as the ParamForProSeDc data type,  
but with the OpenAPI nullable property set to true.  
type: string  
nullable: true

ParamForProSeU2NRelUe:

description: Represents the service parameters for 5G ProSe UE-to-network relay UE.  
type: string

ParamForProSeU2NRelUeRm:

description: >  
This data type is defined in the same way as the ParamForProSeU2NRelay data type,  
but with the OpenAPI nullable property set to true.  
type: string  
nullable: true

ParamForProSeRemUe:

description: Represents the service parameters for 5G ProSe Remote UE.  
type: string

ParamForProSeRemUeRm:

description: >  
This data type is defined in the same way as the ParamForProSeRemUe data type,  
but with the OpenAPI nullable property set to true.  
type: string  
nullable: true

ParamForProSeU2URelUe:

description: Represents the service parameters for 5G ProSe UE-to-UE relay UE.  
type: string

ParamForProSeU2URelUeRm:

description: >  
This data type is defined in the same way as the ParamForProSeU2URelay data type,  
but with the OpenAPI nullable property set to true.  
type: string  
nullable: true

ParamForProSeEndUe:

description: Represents the service parameters for 5G ProSe End UE.  
type: string

ParamForProSeEndUeRm:

description: >  
This data type is defined in the same way as the ParamForProSeEndUe data type,  
but with the OpenAPI nullable property set to true.  
type: string  
nullable: true

ParamProSeMultiHopU2NRelUe:

description: >  
Represents the service parameters for 5G ProSe UE-to-Network Relay UE supporting  
5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay.  
type: string

ParamProSeMultiHopU2NRelUeRm:

description: >  
This data type is defined in the same way as the ParamProSeMultiHopU2NRelUe data type,  
but with the OpenAPI nullable property set to true.  
type: string  
nullable: true

ParamProSeMultiHopRemUe:

description: >  
Represents the service parameters for 5G ProSe Remote UE supporting 5G ProSe  
Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay.  
type: string

ParamProSeMultiHopRemUeRm:

description: >  
This data type is defined in the same way as the ParamProSeMultiHopRemUe data type,  
but with the OpenAPI nullable property set to true.  
type: string

nullable: true

ParamProSeMultiHopIntermUe:  
description: >  
Represents the service parameters for 5G ProSe Intermediate UE-to-Network Relay supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay.  
type: string

ParamProSeMultiHopIntermUeRm:  
description: >  
This data type is defined in the same way as the ParamProSeMultiHopIntermUe data type, but with the OpenAPI nullable property set to true.  
type: string  
nullable: true

ParamProSeMultiHopU2URelUe:  
description: >  
Represents the service parameters for 5G ProSe Layer-3 UE-to-UE Relay UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.  
type: string

ParamProSeMultiHopU2URelUeRm:  
description: >  
This data type is defined in the same way as the ParamProSeMultiHopU2URelUe data type, but with the OpenAPI nullable property set to true.  
type: string  
nullable: true

ParamProSeMultiHopEndUe:  
description: >  
Represents the service parameters for 5G ProSe Layer-3 End UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.  
type: string

ParamProSeMultiHopEndUeRm:  
description: >  
This data type is defined in the same way as the ParamProSeMultiHopEndUe data type, but with the OpenAPI nullable property set to true.  
type: string  
nullable: true

ParamForRangingSlPos:  
description: Represents the service parameters for ranging and sidelink positioning.  
type: string

ParamForRangingSlPosRm:  
description: >  
This data type is defined in the same way as the ParamForRangingslpos data type, but with the OpenAPI nullable property set to true.  
type: string  
nullable: true

A2xParamsPc5:  
description: >  
Represents configuration parameters for A2X communications over PC5 reference point.  
type: string

A2xParamsPc5Rm:  
description: >  
Represents the same as the A2xParamsPc5 data type but with the nullable:true property.  
type: string  
nullable: true

A2xParamsUu:  
description: >  
Represents configuration parameters for A2X communications over Uu reference point.  
type: string

A2xParamsUuRm:  
description: >  
Represents the same as the A2xParamsUu data type but with the nullable:true property.  
type: string  
nullable: true

UrspRuleRequest:  
description: Contains parameters that can be used to guide the URSP.  
type: object  
properties:

```

afReqUrspId:
  type: string
trafficDesc:
  $ref: '#/components/schemas/TrafficDescriptorComponents'
relatPrecedence:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
visitedNetDescs:
  type: array
  items:
    $ref: '#/components/schemas/NetworkDescription'
  minItems: 1
  description: >
    Each element identifies one or more PLMN IDs where AF guidance for VPLMN-specific
    URSP rule applies.
routeSelParamSets:
  type: array
  items:
    $ref: '#/components/schemas/RouteSelectionParameterSet'
  minItems: 1
  description: >
    Sets of parameters that may be used to guide the Route Selection Descriptors of the
    URSP.

RouteSelectionParameterSet:
  description: >
    Contains parameters that can be used to guide the Route Selection
    Descriptors of the URSP.
  type: object
  properties:
    dnn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    snssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    precedence:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    spatialValidityAreas:
      type: array
      items:
        $ref: 'TS29522_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'
      minItems: 1
      description: >
        Indicates where the route selection parameters apply. It may correspond
        to a geographical area, for example using a geographic shape that
        is known to the AF and is configured by the operator to correspond to a list
        of or TAIs.
    spatialValidityTais:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Tai'
      minItems: 1
      description: >
        Indicates the TAIs in which the route selection parameters apply. This attribute is
        applicable only within the 5GC and it shall not be included in the request messages of
        untrusted AFs for URSP guidance.
    pduSessType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'

Non3gppDeviceInformation:
  description: Represents the Non-3GPP device identifier(s) information.
  type: object
  properties:
    non3gppDevId:
      type: string
    dnnSnssaiInfo:
      $ref: 'TS29522_AMInfluence.yaml#/components/schemas/DnnSnssaiInformation'
    flowInfos:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/FlowInfo'
      minItems: 1
    ethFlowInfos:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/EthFlowInfo'
      minItems: 1
    qosReference:
      type: string
    indQosParamSet:

```

```

    $ref: 'TS29543_Npcf_PDTQPolicyControl.yaml#/components/schemas/QosParameterSet'
  required:
    - non3gppDevId
  oneOf:
    - required: [qosReference]
    - required: [indQosParamSet]
  not:
    required: [flowInfos, ethFlowInfos]

Event:
  anyOf:
    - type: string
      enum:
        - SUCCESS_UE_POL_DEL_SP
        - UNSUCCESS_UE_POL_DEL_SP
        - PARTLY_UNSUCC_UE_POL_DEL_SP
        - UNSUCCESS_PCF_SERVICE_AUTHORIZATION
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
  description: |
    Represents the AF subscribe to event notification of the outcome related to the
    invocation of AF provisioned service parameters.
    Possible values are:
    - SUCCESS_UE_POL_DEL_SP: Successful UE Policy Delivery related to
      the invocation of AF provisioned Service Parameters.
    - UNSUCCESS_UE_POL_DEL_SP: Unsuccessful UE Policy Delivery related to the invocation of AF
      provisioned Service Parameters.
    - PARTLY_UNSUCC_UE_POL_DEL_SP: Partially unsuccessful UE Policy Delivery related to the
      invocation of AF provisioned Service Parameters.
    - UNSUCCESS_PCF SERVICE AUTHORIZATION: Unsuccessful authorization in the PCF related to the
      invocation of AF provisioned Service Parameters.

AfNotification:
  description: >
    Notifications upon AF Service Parameter Authorization Update e.g. to
    revoke the authorization, and/or AF subscribed event notification of the
    outcome related to the invocation of service parameter provisioning.
  type: object
  properties:
    subscription:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
    reportEvent:
      $ref: '##/components/schemas/Event'
    authResult:
      $ref: '##/components/schemas/AuthorizationResult'
    gpsi:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      minItems: 1
    dnn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    snssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    eventInfo:
      $ref: '##/components/schemas/EventInfo'
    detEventInfo:
      type: object
      additionalProperties:
        $ref: '##/components/schemas/DetailedEventInfo'
      minProperties: 1
      description: >
        Detailed outcome of the AF service parameter request. The key of the map is the
        attribute "gpsi". It is only applicable if the "reportEvent" attribute has the value
        "PARTLY_UNSUCC_UE_POL_DEL_SP".
  required:
    - subscription
  anyOf:
    - required: [reportEvent]
    - required: [authResult]

TrafficDescriptorComponents:
  description: Traffic descriptor components for the requested URSP.
  type: object
  properties:
    appDescs:

```

```

    type: object
    additionalProperties:
      $ref: 'TS29522_5GLANParameterProvision.yaml#/components/schemas/AppDescriptor'
    minProperties: 1
    description: >
      Describes the operation systems and the corresponding applications for each
      operation systems. The key of map is osId.
  flowDescs:
    type: array
    items:
      type: string
    minItems: 1
    description: >
      Represents a 3-tuple with protocol, server ip and server port for UL/DL
      application traffic. The content of the string has the same encoding as the IPFilterRule
      AVP value as defined in IETF RFC 6733.
  domainDescs:
    type: array
    items:
      type: string
    minItems: 1
    description: >
      FQDN(s) or a regular expression which are used as a domain name matching
      criteria.
  ethFlowDescs:
    type: array
    items:
      $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'
    minItems: 1
    description: >
      Descriptor(s) for destination information of non-IP traffic in which only
      ethernet flow description is defined.
  dnns:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    minItems: 1
    description: This is matched against the DNN information provided by the application.
  connCaps:
    type: array
    items:
      $ref: '#/components/schemas/ConnectionCapabilities'
    minItems: 1
    description: >
      This is matched against the information provided by a UE application when it
      requests a network connection with certain capabilities.
  opSpecConnCaps:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
    minItems: 1
    maxItems: 128
    description: >
      Operator specific connection capabilities.
  pinId:
    type: string
    description: This is matched against a PIN ID for a specific PIN configured in the PEGC.
  connGroupId:
    type: string
    description: >
      This is matched against a Connectivity Group ID for a specific Connectivity Group
      configured in 5G-RG.
  oneOf:
    - required: [pinId]
    - anyOf:
      - required: [appDescs]
      - required: [flowDescs]
      - required: [domainDescs]
      - required: [ethFlowDescs]
      - required: [dnns]
      - required: [connCaps]
      - required: [opSpecConnCaps]

NetworkDescription:
  description: >
    Represents the description of a PLMN, by the definition of the PLMN ID, the MCC (and
    applicable MNC(s)) or the indication of any PLMN.
  type: object

```

```

properties:
  plmnId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
  mcc:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Mcc'
  mnccs:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Mnc'
    minItems: 1
    description: Represents the applicable MNC(s) for the indicated MCC.
  anyPlmnInd:
    type: boolean
    description: Indicates any PLMN.
oneOf:
  - required: [plmnId]
  - required: [mcc]
  - required: [anyPlmnInd]

AuthorizationResult:
  anyOf:
  - type: string
    enum:
      - AUTH_REVOKED
  - type: string
    description: >
      This string provides forward-compatibility with future extensions to the enumeration
      and is not used to encode content defined in the present version of this API.
  description: |
    Represents the NEF notify the AF about the service parameters authorization updates result,
    e.g. to revoke an authorization.
    Possible values are:
    - AUTH_REVOKED: Indicated the service parameters authorization is revoked.

EventInfo:
  description: Indicates the event information.
  type: object
  properties:
    failureCause:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Failure'
    plmnId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'

DetailedEventInfo:
  description: >
    Detailed information about the delivery outcome of service parameter provisioning requests.
  type: object
  properties:
    uePolEventInfos:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UePolEventInfo'
      minItems: 1
      description: contains the UE policy event information.
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
  required:
    - uePolEventInfos
    - gpsi

UePolEventInfo:
  description: >
    Event information about the outcome of Service Parameter provisioning requests for the UE
    policy delivery.
  type: object
  properties:
    policyType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UePolPartType'
    outcome:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Outcome'
    afReqUrspIds:
      type: array
      items:
        type: string
      minItems: 1
      description: >
        Contains the Unsuccessfully delivery URSP rule Ids that related to the AF provided
        Service parameter provisioning.

```



required:  
- policyType

Failure:

anyOf:  
- type: string  
enum:  
- UNSPECIFIED  
- UE\_NOT\_REACHABLE  
- UNKNOWN  
- UE\_TEMP\_UNREACHABLE  
- DNN\_NOT\_ALLOWED  
- SNSSAI\_NOT\_ALLOWED  
- type: string  
description: >  
This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |

Represents the failure reason for the unsuccessful result.

Possible values are:

- UNSPECIFIED: Indicates the PCF received the UE sent UE policy delivery service cause #111 (Protocol error, unspecified) or that the PCF does not authorize the service information for unspecified reasons.
- UE\_NOT\_REACHABLE: Indicates the PCF received the notification from the AMF that the UE is not reachable.
- UNKNOWN: Indicates unknown reasons upon no response from the UE, e.g. UPDS message type is not defined or not implemented by the UE, or not compatible with the UPDS state, in which the UE shall ignore the UPDS message.
- UE\_TEMP\_UNREACHABLE: Indicates the PCF received the notification from the AMF that the UE is not reachable but the PCF will retry again.
- DNN\_NOT\_ALLOWED: Indicates that the DNN is not authorized for the user.
- SNSSAI\_NOT\_ALLOWED: Indicates that the SNSSAI is not authorized for the user.

ConnectionCapabilities:

anyOf:  
- type: string  
enum:  
- IMS  
- MMS  
- SUPL  
- INTERNET  
- IOT\_DELAY\_TOLERANT  
- IOT\_NON\_DELAY\_TOLERANT  
- DL\_STREAMING  
- UL\_STREAMING  
- VEHIC\_COMM  
- REAL\_TIME\_INTERACTIVE  
- UNIFIED\_COMM  
- BACKGROUND  
- MISS\_CRITICAL  
- TIME\_CRITICAL  
- LOW\_LAT\_LOSS\_TOL\_UNACK

- type: string

description: >  
This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |

Represents the information provided by a UE application when it requests a network connection with certain capabilities.

Possible values are:

- IMS: Indicates the connection capability to support IMS service.
- MMS: Indicates the connection capability to support MMS service.
- SUPL: Indicates the connection capability to support SUPL service.
- INTERNET: Indicates the connection capability to support Internet service.
- IOT\_DELAY\_TOLERANT: Indicates the connection capability to support IoT delay-tolerant services.
- IOT\_NON\_DELAY\_TOLERANT: Indicates the connection capability to support IoT non-delay-tolerant services.
- DL\_STREAMING: Indicates the connection capability to support downlink streaming services.
- UL\_STREAMING: Indicates the connection capability to support uplink streaming services.
- VEHIC\_COMM: Indicates the connection capability to support vehicular communication services.
- REAL\_TIME\_INTERACTIVE: Indicates the connection capability to support real time interactive services.
- UNIFIED\_COMM: Indicates the connection capability to support unified communication services.

- BACKGROUND: Indicates the connection capability to support background services.
- MISS\_CRITICAL: Indicates the connection capability to support mission critical services.
- TIME\_CRITICAL: Indicates the connection capability to support time critical services.
- LOW\_LAT\_LOSS\_TOL\_UNACK: Indicates the connection capability to support low latency loss tolerant communications in un-acknowledged mode.

#### UePolPartType:

##### anyOf:

- type: string

##### enum:

- URSP
- V2XP
- A2XP
- PROSEP
- RSLPP

- type: string

##### description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

##### description: |

Represents the a UE policy part type.

Possible values are:

- URSP: Represents a URSP UE policy part type.
- V2XP: Represents a V2X UE policy part type.
- A2XP: Represents a A2X UE policy part type.
- PROSEP: Represents a ProSe UE policy part type.
- RSLPP: Represents a RSLPP UE policy part type.

#### Outcome:

##### anyOf:

- type: string

##### enum:

- REJECTED\_BY\_UE
- NOT\_AUTHORIZED\_BY\_PCF

- type: string

##### description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

##### description: |

Represents detailed outcome of the requests for AF provisioned service parameters.

Possible values are:

- REJECTED\_BY\_UE: The requested parameters were not successfully installed on the UE.
- NOT\_AUTHORIZED\_BY\_PCF: The requested parameters were not authorized by the PCF.

---

## A.10 ACSParameterProvision API

openapi: 3.0.0

#### info:

title: 3gpp-acs-pp

version: 1.1.2

description: |

API for 5G ACS Parameter Provision.

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#### externalDocs:

description: >

3GPP TS 29.522 V17.8.0; 5G System; Network Exposure Function Northbound APIs.

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.522/'

#### security:

- {}

- oAuth2ClientCredentials: []

#### servers:

- url: '{apiRoot}/3gpp-acs-pp/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

#### paths:

/{{afId}}/subscriptions:

get:

summary: read all of the active subscriptions for the AF

operationId: ReadAllSubscriptions

tags:

- ACS Configuration Subscriptions

parameters:

```

- name: afId
  in: path
  description: Identifier of the AF
  required: true
  schema:
    type: string
responses:
  '200':
    description: OK (Successful get all of the active subscriptions for the AF)
    content:
      application/json:
        schema:
          type: array
          items:
            $ref: '#/components/schemas/AcsConfigurationData'
          minItems: 0
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Creates a new subscription resource
  operationId: CreateAnSubscription
  tags:
    - ACS Configuration Subscriptions
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
  requestBody:
    description: new subscription creation
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AcsConfigurationData'
  responses:
    '201':
      description: Created (Successful creation)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AcsConfigurationData'
      headers:
        Location:
          description: Contains the URI of the newly created resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/{{afId}}/subscriptions/{{subscriptionId}}:

get:

summary: read an active subscription for the AF and the subscription Id  
 operationId: ReadAnSubscription

tags:

- Individual ACS Configuration Subscription

parameters:

```

- name: afId
  in: path
  description: Identifier of the AF
  required: true
  schema:
    type: string
- name: subscriptionId
  in: path
  description: Identifier of the subscription resource
  required: true
  schema:
    type: string

```

responses:

```

  '200':
    description: OK (Successful get the active subscription)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AcsConfigurationData'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

summary: Fully updates/replaces an existing subscription resource  
 operationId: FullyUpdateAnSubscription

tags:

- Individual ACS Configuration Subscription

parameters:

```

- name: afId
  in: path
  description: Identifier of the AF
  required: true
  schema:
    type: string
- name: subscriptionId

```

```

    in: path
    description: Identifier of the subscription resource
    required: true
    schema:
      type: string
  requestBody:
    description: Parameters to update/replace the existing subscription
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AcsConfigurationData'
  responses:
    '200':
      description: OK (Successful update of the existing subscription)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AcsConfigurationData'
    '204':
      description: >
        Successful case. The resource has been successfully updated and no additional
        content is to be sent in the response message.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: Partial modifies an existing subscription resource.
  operationId: PartialUpdateAnSubscription
  tags:
    - Individual ACS Configuration Subscription
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: subscriptionId
      in: path
      description: Identifier of the subscription resource
      required: true
      schema:
        type: string
  requestBody:
    description: Parameters to modify the existing subscription.
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/AcsConfigurationDataPatch'
  responses:
    '200':
      description: >

```

```

    OK. The subscription resource was successfully modified and a representation of the
    updated resource is returned.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/AcsConfigurationData'
  '204':
    description: >
      No Content. The resource has been successfully modified and no additional content is to
      be sent in the response message.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**delete:**

```

summary: Deletes an already existing subscription
operationId: DeleteAnSubscription
tags:
  - Individual ACS Configuration Subscription
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
  - name: subscriptionId
    in: path
    description: Identifier of the subscription resource
    required: true
    schema:
      type: string
responses:
  '204':
    description: No Content (Successful deletion of the existing subscription)
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
  schemas:
    AcsConfigurationData:
      description: Represents an individual ACS Configuration subscription resource.
      type: object
      properties:
        self:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
        exterGroupId:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        acsInfo:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/AcsInfo'
        mtcProviderId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - acsInfo
        - suppFeat
    AcsConfigurationDataPatch:
      description: >
        Represents the parameters to request to modify an existing Individual ACS Configuration
        subscription resource.
      type: object
      properties:
        acsInfo:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/AcsInfo'
        mtcProviderId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'

```

---

## A.11 MoLcsNotify API

```

openapi: 3.0.0
info:
  title: 3gpp-mo-lcs-notify
  version: 1.3.0-alpha.1
  description: |
    API for UE updated location information notification.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'
security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/3gpp-mo-lcs-notify/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.
paths:
  /:
    post:
      summary: UE location information update notification
      operationId: UELocationNotify
      tags:
        - AF level UE location update notification operation
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocUpdateData'
        required: true

```

```

responses:
  '200':
    description: Success
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/LocUpdateDataReply'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
  schemas:
    LocUpdateData:
      description: Represents a UE updated location information.
      type: object
      properties:
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        locInfo:
          $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
        lcsQosClass:
          $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LcsQosClass'
        svcId:
          $ref: 'TS29515_Ngmlc_Location.yaml#/components/schemas/ServiceIdentity'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        additionalLocInfo:
          type: array
          items:
            $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
          minItems: 1
      required:
        - gpsi
        - lcsQosClass
        - locInfo
        - suppFeat
    LocUpdateDataReply:
      description: Represents a reply to a M0 LCS notification.
      type: object
      properties:
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - suppFeat

```



## A.12 AKMA API

```
openapi: 3.0.0
info:
  title: 3gpp-akma
  version: 1.1.0
  description: |
    API for AKMA.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: >
    3GPP TS 29.522 V18.6.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'
security:
  - {}
  - OAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/3gpp-akma/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.
paths:
  /retrieve:
    post:
      summary: Retrieve AKMA Application Key Information.
      operationId: RetrieveAKMAAppKey
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AkmaAfKeyRequest'
      responses:
        '200':
          description: The requested information was returned successfully.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AkmaAfKeyData'
        '204':
          description: No Content.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    callbacks:
      ServiceDisablementNotification:
        '{$request.body#/notifUri}':
          post:
            requestBody:
              description: >
                Represents the AKMA service disablement information.
              required: true
```

```
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ServiceDisableNotif'
  responses:
    '204':
      description: No content. The notification is successfully received and processed.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes:
            nef-akma:gpsi-access: >
              Return GPSI in the AKMA Application Key information for the UE.
```

```
schemas:
  AkmaAfKeyRequest:
    description: >
      Represents the parameters to request the retrieval of AKMA Application Key information.
    type: object
    properties:
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      notifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      afId:
        $ref: '#/components/schemas/AfId'
      aKeyId:
        $ref: '#/components/schemas/AKeyId'
      anonInd:
        type: boolean
        description: >
          Indicates whether an anonymous user access. Set to "true" if an anonymous user access is
          requested; otherwise set to "false". Default value is "false" if omitted.
        default: false
    required:
      - afId
      - aKeyId
```

```
AkmaAfKeyData:
  description: Represents AKMA Application Key information data.
  type: object
  properties:
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    expiry:
```

```
$ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
kaf:
  type: string
supi:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
required:
- kaf
- expiry
```

```
ServiceDisableNotif:
  description: Represents the AKMA Service Disable Notification.
  type: object
  properties:
    akId:
      $ref: '##/components/schemas/AKId'
  required:
  - akId
```

#Simple Data types

```
AfId:
  description: Represents an AF identifier.
  type: string
AKId:
  description: Represents an AKMA Key Identifier.
  type: string
```

---

## A.13 TimeSyncExposure API

openapi: 3.0.0

```
info:
  title: 3gpp-time-sync
  version: 1.2.0-alpha.5
  description: |
    API for time synchronization exposure.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
```

```
externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'
```

```
security:
- {}
- oAuth2ClientCredentials: []
```

```
servers:
- url: '{apiRoot}/3gpp-time-sync/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.
```

```
paths:
  /{afId}/subscriptions:
    get:
      summary: read all of the active subscriptions for the AF
      operationId: ReadAllSubscriptions
      tags:
      - Time Synchronization Exposure Subscriptions
      parameters:
      - name: afId
        in: path
        description: Identifier of the AF
        required: true
        schema:
          type: string
      responses:
        '200':
          description: OK (Successful get all of the active subscriptions for the AF)
          content:
            application/json:
```

```

    schema:
      type: array
      items:
        $ref: '#/components/schemas/TimeSyncExposureSubsc'
      minItems: 0
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**post:**

```

summary: Creates a new subscription resource
operationId: CreateNewSubscription
tags:
  - Time Synchronization Exposure Subscriptions
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
requestBody:
  description: new subscription creation
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/TimeSyncExposureSubsc'
responses:
  '201':
    description: Created (Successful creation)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/TimeSyncExposureSubsc'
    headers:
      Location:
        description: 'Contains the URI of the newly created resource'
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'

```

```

    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    timeSyncSubsNotification:
      '{$request.body#/subsNotifUri}':
        post:
          requestBody:
            description: Notification for Time Synchronization Capability for a list of UEs.
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/TimeSyncExposureSubsNotif'
          responses:
            '204':
              description: Expected response to a successful callback processing without a body
            '307':
              $ref: 'TS29122_CommonData.yaml#/components/responses/307'
            '308':
              $ref: 'TS29122_CommonData.yaml#/components/responses/308'
            '400':
              $ref: 'TS29122_CommonData.yaml#/components/responses/400'
            '401':
              $ref: 'TS29122_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29122_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29122_CommonData.yaml#/components/responses/404'
            '411':
              $ref: 'TS29122_CommonData.yaml#/components/responses/411'
            '413':
              $ref: 'TS29122_CommonData.yaml#/components/responses/413'
            '415':
              $ref: 'TS29122_CommonData.yaml#/components/responses/415'
            '429':
              $ref: 'TS29122_CommonData.yaml#/components/responses/429'
            '500':
              $ref: 'TS29122_CommonData.yaml#/components/responses/500'
            '503':
              $ref: 'TS29122_CommonData.yaml#/components/responses/503'
            default:
              $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}:
  get:
    summary: read an active subscription for the AF and the subscription Id
    operationId: ReadAnSubscription
    tags:
      - Individual Time Synchronization Exposure Subscription
    parameters:
      - name: afId
        in: path
        description: Identifier of the AF
        required: true
        schema:
          type: string
      - name: subscriptionId
        in: path
        description: Identifier of the subscription resource
        required: true
        schema:
          type: string
    responses:
      '200':
        description: OK (Successful get the active subscription)
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/TimeSyncExposureSubsc'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**put:**

summary: Fully updates/replaces an existing subscription resource  
 operationId: FullyUpdateAnSubscription

**tags:**

- Individual Time Synchronization Exposure Subscription

**parameters:**

- name: afId
  - in: path
  - description: Identifier of the AF
  - required: true
  - schema:
    - type: string
- name: subscriptionId
  - in: path
  - description: Identifier of the subscription resource
  - required: true
  - schema:
    - type: string

**requestBody:**

description: Parameters to update/replace the existing subscription  
 required: true

**content:**

application/json:
 

- schema:
  - \$ref: '#/components/schemas/TimeSyncExposureSubsc'

**responses:**

```

  '200':
    description: OK (Successful deletion of the existing subscription)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/TimeSyncExposureSubsc'
  '204':
    description: >
      Successful case. The resource has been successfully updated and no additional
      content is to be sent in the response message.

```

```

  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

delete:
  summary: Deletes an already existing subscription
  operationId: DeleteAnSubscription
  tags:
    - Individual Time Synchronization Exposure Subscription
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: subscriptionId
      in: path
      description: Identifier of the subscription resource
      required: true
      schema:
        type: string
  responses:
    '204':
      description: No Content (Successful deletion of the existing subscription)
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}/configurations:
  get:
    summary: read all of the active configurations for the AF
    operationId: ReadAllConfigurations
    tags:
      - Time Synchronization Exposure Configurations
    parameters:
      - name: afId
        in: path
        description: Identifier of the AF
        required: true
        schema:
          type: string
      - name: subscriptionId
        description: >
          String identifying the individual synchronization Exposure Subscription resource
          in the NEF
        in: path
        required: true
        schema:
          type: string
    responses:
      '200':
        description: OK (Successful get all of the active configurations for the AF)
        content:
          application/json:
            schema:
              type: array
              items:
                $ref: '#/components/schemas/TimeSyncExposureConfig'
              minItems: 0
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'

```

```

'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

post:

```

summary: Creates a new configuration resource
operationId: CreateNewConfiguration
tags:
  - Time Synchronization Exposure Configurations
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
  - name: subscriptionId
    description: >
      String identifying the individual synchronization Exposure Subscription
      resource in the NEF.
    in: path
    required: true
    schema:
      type: string
requestBody:
  description: new configuration creation
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/TimeSyncExposureConfig'
responses:
  '201':
    description: Created (Successful creation)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/TimeSyncExposureConfig'
    headers:
      Location:
        description: 'Contains the URI of the newly created resource'
        required: true
        schema:
          type: string
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':

```



```

    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  timeSyncConfigNotification:
    '{$request.body#/configNotifUri}':
      post:
        requestBody:
          description: Notification for Time Synchronization Service status.
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/TimeSyncExposureConfigNotif'
        responses:
          '204':
            description: Expected response to a successful callback processing without a body
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}/configurations/{instanceReference}:
  get:
    summary: read an active subscription for the AF and the subscription Id
    operationId: ReadTimeSynSubscription
    tags:
      - Individual Time Synchronization Exposure Subscription
    parameters:
      - name: afId
        in: path
        description: Identifier of the AF
        required: true
        schema:
          type: string
      - name: subscriptionId
        in: path
        description: Identifier of the subscription resource
        required: true
        schema:
          type: string
      - name: instanceReference
        in: path
        description: Identifier of the configuration resource
        required: true
        schema:
          type: string
    responses:
      '200':
        description: OK (Successful get the active subscription)
        content:
          application/json:

```

```

    schema:
      $ref: '#/components/schemas/TimeSyncExposureConfig'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

summary: Fully updates/replaces an existing configuration resource  
 operationId: FullyUpdateAnConfiguration

tags:

- Individual Time Synchronization Exposure Configuration

parameters:

- name: afId
  - in: path
  - description: Identifier of the AF
  - required: true
  - schema:
    - type: string
- name: subscriptionId
  - in: path
  - description: Identifier of the subscription resource
  - required: true
  - schema:
    - type: string
- name: instanceReference
  - in: path
  - description: Identifier of the configuration resource
  - required: true
  - schema:
    - type: string

requestBody:

description: Parameters to update/replace the existing configuration  
 required: true  
 content:

application/json:  
 schema:  
 \$ref: '#/components/schemas/TimeSyncExposureConfig'

responses:

```

  '200':
    description: OK (Successful deletion of the existing configuration)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/TimeSyncExposureConfig'
  '204':
    description: >
      Successful case. The resource has been successfully updated and no additional
      content is to be sent in the response message.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**delete:**

summary: Deletes an already existing configuration

operationId: DeleteAnConfiguration

tags:

- Individual Time Synchronization Exposure Configuration

parameters:

- name: afId

in: path

description: Identifier of the AF

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

- name: instanceReference

in: path

description: Identifier of the configuration resource

required: true

schema:

type: string

responses:

'204':

description: No Content (Successful deletion of the existing configuration)

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

**components:**

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

**schemas:**

TimeSyncExposureSubsc:

description: >

Contains requested parameters for the subscription to the notification of time synchronization capability.

```

type: object
properties:
  exterGroupId:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
  gpsis:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    minItems: 1
    description: >
      Contains a list of UE for which the time synchronization capabilities is requested.
  anyUeInd:
    type: boolean
    description: >
      Any UE indication. This IE shall be present if the event subscription
      is applicable to any UE. Default value "false" is used, if not present.
  afServiceId:
    type: string
    description: Identifies a service on behalf of which the AF is issuing the request.
  dnn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  snssai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  subsNotifId:
    type: string
    description: Notification Correlation ID assigned by the AF.
  subsNotifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  subscribedEvents:
    type: array
    items:
      $ref: '#/components/schemas/SubscribedEvent'
    minItems: 1
    description: Subscribed events
  eventFilters:
    type: array
    items:
      $ref: '#/components/schemas/EventFilter'
    minItems: 1
    description: >
      Contains the filter conditions to match for notifying the event(s)
      of time synchronization capabilities for a list of UE(s).
  notifMethod:
    $ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/NotificationMethod'
  maxReportNbr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  expiry:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  repPeriod:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  requestTestNotification:
    type: boolean
    description: >
      Set to true by the SCS/AS to request the SCEF to send a test notification
      as defined in clause 5.2.5.3 of 3GPP TS 29.122. Set to false or omitted otherwise.
  websocketNotifConfig:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsocketNotifConfig'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - subsNotifUri
  - subsNotifId
oneOf:
  - required: [gpsis]
  - required: [anyUeInd]
  - required: [exterGroupId]

TimeSyncCapability:
description: Contains time synchronization capability.
type: object
properties:
  upNodeId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInt64'
  gmCapables:
    type: array
    items:
      $ref: '#/components/schemas/GmCapable'
    description: >

```

Indicates whether user plane node supports acting as a gPTP and/or PTP grandmaster.

asTimeRes:

\$ref: '#/components/schemas/AsTimeResource'

ptpCapForUes:

type: object

additionalProperties:

\$ref: '#/components/schemas/PtpCapabilitiesPerUe'

minProperties: 1

description: >

Contains the PTP capabilities supported by each of the UE(s).

The key of the map is the gpsi.

required:

- upNodeId

anyOf:

- required: [gmCapables]

- required: [asTimeRes]

TimeSyncExposureConfig:

description: Contains the Time Synchronization Configuration parameters.

type: object

properties:

upNodeId:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

reqPtpIns:

\$ref: '#/components/schemas/PtpInstance'

gmEnable:

type: boolean

description: >

Indicates that the AF requests 5GS to act as a grandmaster for PTP or gPTP if it is included and set to true.

gmPrio:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/UInteger'

timeDom:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/UInteger'

timeSyncErrBdgt:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/UInteger'

configNotifId:

type: string

description: Notification Correlation ID assigned by the AF.

configNotifUri:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/Uri'

tempValidity:

\$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TemporalValidity'

coverageArea:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/SpatialValidityCond'

clkQltDetLvl:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/ClockQualityDetailLevel'

clkQltAcptCri:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/ClockQualityAcceptanceCriterion'

required:

- upNodeId

- reqPtpIns

- timeDom

- configNotifId

- configNotifUri

TimeSyncExposureSubsNotif:

description: Contains the notification of time synchronization capability.

type: object

properties:

subsNotifId:

type: string

description: Notification Correlation ID assigned by the AF.

eventNotifs:

type: array

items:

\$ref: '#/components/schemas/SubsEventNotification'

minItems: 1

description: >

Notifications about subscribed Individual Events.

required:

- subsNotifId

- eventNotifs

SubsEventNotification:

description: Notifications about subscribed Individual Events.

type: object

properties:

```
event:
  $ref: '#/components/schemas/SubscribedEvent'
timeSyncCapas:
  type: array
  items:
    $ref: '#/components/schemas/TimeSyncCapability'
  minItems: 1
  description: >
    Contains a list of time synchronization capabilities for the UE(s).
required:
  - event

TimeSyncExposureConfigNotif:
  description: Contains the notification of time synchronization service state.
  type: object
  properties:
    configNotifId:
      type: string
      description: Notification Correlation ID assigned by the AF.
    stateOfConfig:
      $ref: '#/components/schemas/StateOfConfiguration'
  required:
    - configNotifId
    - stateOfConfig

PtpCapabilitiesPerUe:
  description: Contains the supported PTP capabilities per UE.
  type: object
  properties:
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    ptpCaps:
      type: array
      items:
        $ref: '#/components/schemas/ReportedCapability'
      minItems: 1
      description: >
        Contains the reported PTP capabilities for the UE.
  required:
    - gpsi
    - ptpCaps

EventFilter:
  description: >
    Contains the filter conditions to match for notifying the event(s) of time
    synchronization capabilities.
  type: object
  properties:
    instanceTypes:
      type: array
      items:
        $ref: '#/components/schemas/InstanceType'
      minItems: 1
      description: >
        Indicates the PTP instance type(s).
    transProtocols:
      type: array
      items:
        $ref: '#/components/schemas/Protocol'
      minItems: 1
      description: >
        Indicates the transport protocol type(s).
    ptpProfiles:
      type: array
      items:
        type: string
      minItems: 1
      description: >
        Identifies the supported PTP profiles.

PtpInstance:
  description: Contains PTP instance configuration and activation requested by the AF.
  type: object
  properties:
    instanceType:
      $ref: '#/components/schemas/InstanceType'
    protocol:
      $ref: '#/components/schemas/Protocol'
```

```

    ptpProfile:
      type: string
      description: Identifies the PTP profile.
    portConfigs:
      type: array
      items:
        $ref: '#/components/schemas/ConfigForPort'
      minItems: 1
      description: >
        Contains the configurations for the PTP port(s) in the PTP instance.
    required:
      - instanceType
      - protocol
      - ptpProfile

ConfigForPort:
  description: Contains configuration for each port.
  type: object
  properties:
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    n6Ind:
      type: boolean
      enum:
        - true
    ptpEnable:
      type: boolean
      description: >
        This is used to set the portDS.portEnable. If omitted, the default value as described
        in the PTP Profile is used.
    logSyncInter:
      type: integer
      description: >
        Specifies the mean time interval between successive Sync messages.
    logSyncInterInd:
      type: boolean
      description: >
        When set to "false", the value of "logSyncInter" attribute is used to set the
        initialLogSyncInterval as described in IEEE Std 802.1AS [46]. When set to "true",
        the value of "logSyncInter" attribute is used to set the mgtSettableLogSyncInterval
        as described in IEEE Std 802.1AS [46].
    logAnnouInter:
      type: integer
      description: >
        Specifies the mean time interval between successive Announce messages.
    logAnnouInterInd:
      type: boolean
      description: >
        When set to "false", the value of "logAnnouInter" attribute is used to set the
        initialLogAnnounceInterval as described in IEEE 802.1AS [46]. When set to "true",
        the value of "logAnnouInter" attribute is used to set the
        mgtSettableLogAnnounceInterval as described in IEEE Std 802.1AS [46].
    oneOf:
      - required: [gpsi]
      - required: [n6Ind]

StateOfConfiguration:
  description: Contains the state of the time synchronization configuration.
  type: object
  properties:
    stateOfNwtt:
      type: boolean
      description: >
        When the PTP port state is Leader, Follower or Passive, it is included and set to true
        to indicate the state of configuration for NW-TT port is active; when PTP port state is
        in any other case, it is included and set to false to indicate the state of
        configuration for NW-TT port is inactive. Default value is false.
    clkQltIndOfNwtt:
      $ref: '#/components/schemas/AcceptanceCriteriaResultIndication'
    stateOfDsts:
      description: >
        Contains the PTP port states of the DS-TT(s).
      type: array
      items:
        $ref: '#/components/schemas/StateOfDstt'
      minItems: 1

StateOfDstt:

```

description: Contains the PTP port state of a DS-TT.  
type: object  
properties:  
 gpsi:  
 \$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'  
 state:  
 type: boolean  
 description: >  
 When the PTP port state is Leader, Follower or Passive, it is included and set to true to indicate the state of configuration for DS-TT port is active; when PTP port state is in any other case, it is included and set to false to indicate the state of configuration for DS port is inactive.  
 clkQltIndOfDstt:  
 \$ref: '##/components/schemas/AcceptanceCriteriaResultIndication'  
required:  
 - gpsi  
 - state

AvailReport:  
description: Contains the availability status for a UE/DS-TT.  
type: object  
properties:  
 avStatus:  
 \$ref: '##/components/schemas/AvailStatus'

Protocol:  
anyOf:  
 - type: string  
 enum:  
 - ETH  
 - IPV4  
 - IPV6  
 - type: string  
 description: >  
 This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.  
description: |  
 Identifies the supported protocol.  
 Possible values are:  
 - ETH: Indicates Ethernet as defined in IEEE Std 1588 [45] Annex E is supported.  
 - IPV4: Indicates IPv4 as defined in IEEE Std 1588 [45] Annex C is supported.  
 - IPV6: Indicates IPv6 as defined in IEEE Std 1588 [45] Annex D is supported.

GmCapable:  
anyOf:  
 - type: string  
 enum:  
 - GPTP  
 - PTP  
 - type: string  
 description: >  
 This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.  
description: |  
 Identifies the supported grandmaster.  
 Possible values are:  
 - GPTP: gPTP grandmaster is supported.  
 - PTP: PTP grandmaster is supported.

InstanceType:  
anyOf:  
 - type: string  
 enum:  
 - BOUNDARY\_CLOCK  
 - E2E\_TRANS\_CLOCK  
 - P2P\_TRANS\_CLOCK  
 - P2P\_RELAY\_INSTANCE  
 - type: string  
 description: >  
 This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.  
description: |  
 Identifies the supported PTP instance type.  
 Possible values are:  
 - BOUNDARY\_CLOCK: Indicates Boundary Clock as defined in IEEE Std 1588.  
 - E2E\_TRANS\_CLOCK: Indicates End-to-End Transparent Clock as defined in IEEE Std 1588.  
 - P2P\_TRANS\_CLOCK: Indicates Peer-to-Peer Transparent Clock as defined in IEEE Std 1588.  
 - P2P\_RELAY\_INSTANCE: Indicates PTP Relay instance as defined in IEEE Std 802.1AS.



**SubscribedEvent:****anyOf:**

- type: string

**enum:**

- AVAILABILITY\_FOR\_TIME\_SYNC\_SERVICE

- type: string

**description: >**

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

**description: |**

Identifies the supported event.

Possible values are:

- AVAILABILITY\_FOR\_TIME\_SYNC\_SERVICE: 5GS and/or UE availability and capability for time synchronization service.

**AsTimeResource:****anyOf:**

- type: string

**enum:**

- ATOMIC\_CLOCK

- GNSS

- TERRESTRIAL\_RADIO

- SERIAL\_TIME\_CODE

- PTP

- NTP

- HAND\_SET

- INTERNAL\_OSCILLATOR

- OTHER

- type: string

**description: >**

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

**description: |**

Identifies the supported 5G clock quality.

Possible values are:

- ATOMIC\_CLOCK: Indicates atomic clock is supported.

- GNSS: Indicates Global Navigation Satellite System is supported.

- TERRESTRIAL\_RADIO: Indicates terrestrial radio is supported.

- SERIAL\_TIME\_CODE: Indicates serial time code is supported.

- PTP: Indicates PTP is supported.

- NTP: Indicates NTP is supported.

- HAND\_SET: Indicates hand set is supported.

- INTERNAL\_OSCILLATOR: Indicates internal oscillator is supported.

- OTHER: Indicates other source of time is supported.

**AcceptanceCriteriaResultIndication:****anyOf:**

- type: string

**enum:**

- ACCEPTABLE

- NON\_ACCEPTABLE

- type: string

**description: >**

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

**description: |**

Identifies the supported acceptable / not acceptable indication.

Possible values are:

- ACCEPTABLE: PTP port in (g)PTP service meets the clock quality acceptance criteria.

- NON\_ACCEPTABLE: PTP port in (g)PTP service does not meet the clock quality acceptance criteria.

**AvailStatus:****anyOf:**

- type: string

**enum:**

- PDU\_SESSION\_TERMINATION

- type: string

**description: >**

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

**description: |**

Identifies the availability status.

Possible values are:

- PDU\_SESSION\_TERMINATION: The UE is not available for (g)PTP services because the PDU session is terminated.

```

ReportedCapability:
  allOf:
    - $ref: '#/components/schemas/EventFilter'
    - $ref: '#/components/schemas/AvailReport'
  description: >
    Extends the EventFilter data type to indicate the availability status of the
    UE/DS-TT.

```

## A.14 EcsAddressProvision API

openapi: 3.0.0

```

info:
  title: 3gpp-ecs-address-provision
  version: 1.2.0-alpha.1
  description: |
    API for ECS Address Provisioning.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/3gpp-ecs-address-provision/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:
  /{afId}/configurations:
    get:
      summary: Read all active configurations for a given AF
      operationId: ReadAllConfigurations
      tags:
        - ECS Address Provision Configurations (Collection)
      parameters:
        - name: afId
          in: path
          description: Identifier of the AF
          required: true
          schema:
            type: string
      responses:
        '200':
          description: OK (Successful get all of the active resources for the AF)
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/EcsAddressProvision'
                minItems: 0
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

post:

```

summary: Creates a new configuration resource
operationId: CreateNewConfiguration
tags:
  - ECS Address Provision Configurations (Collection)
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
requestBody:
  description: new resource creation
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/EcsAddressProvision'
responses:
  '201':
    description: Created (Successful creation)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/EcsAddressProvision'
    headers:
      Location:
        description: 'Contains the URI of the newly created resource'
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/ {afId} / configurations / {configurationId}:

```

get:
summary: Read an active resource for the AF and the configuration Id
operationId: ReadAnConfiguration
tags:
  - Individual ECS Address Provision Configuration
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
  - name: configurationId
    in: path

```

```

    description: Identifier of the configuration resource
    required: true
    schema:
      type: string
  responses:
    '200':
      description: OK (Successful get the active resource)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/EcsAddressProvision'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Fully updates/replaces an existing resource
  operationId: FullyUpdateAnConfiguration
  tags:
    - Individual ECS Address Provision Configuration
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: configurationId
      in: path
      description: Identifier of the configuration resource
      required: true
      schema:
        type: string
  requestBody:
    description: Parameters to update/replace the existing resource
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/EcsAddressProvision'
  responses:
    '200':
      description: OK (Successful update of the existing resource)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/EcsAddressProvision'
    '204':
      description: >
        Successful case. The resource has been successfully updated and no additional
        content is sent in the response message.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'

```

```

'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Deletes an already existing configuration resource

operationId: DeleteAnConfiguration

#### tags:

- Individual ECS Address Provision Configuration

#### parameters:

- name: afId
  - in: path
  - description: Identifier of the AF
  - required: true
  - schema:
    - type: string
- name: configurationId
  - in: path
  - description: Identifier of the configuration resource
  - required: true
  - schema:
    - type: string

#### responses:

```

'204':
  description: No Content (Successful deletion of the existing resource)
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### components:

##### securitySchemes:

##### oAuth2ClientCredentials:

type: oauth2

##### flows:

##### clientCredentials:

```

tokenUrl: '{tokenUrl}'
scopes: {}

```

#### schemas:

##### EcsAddressProvision:

description: Represents ECS address provision configuration.

type: object

##### properties:

##### self:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

ecsServerAddr:

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/EcsServerAddr'
  mtcProviderId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
  spatialValidityCond:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SpatialValidityCond'
  tgtUe:
    $ref: 'TS29522_AnalyticsExposure.yaml#/components/schemas/TargetUeId'
  plmnId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
  ecsAuthMethods:
    type: array
    items:
      $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/EcsAuthMethod'
    minItems: 1
  supportedPlmns:
    type: array
    items:
      $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/SupportedPlmn'
    minItems: 1
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - ecsServerAddr
    - suppFeat

```

---

## A.15 AMPolicyAuthorization API

```

openapi: 3.0.0
info:
  title: 3gpp-am-policyauthorization
  version: 1.2.0-alpha.3
  description: |
    API for AM policy authorization.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  externalDocs:
    description: >
      3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
    url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'
  security:
    - {}
    - OAuth2ClientCredentials: []
  servers:
    - url: '{apiRoot}/3gpp-am-policyauthorization/v1'
      variables:
        apiRoot:
          default: https://example.com
          description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.
  paths:
    /{afId}/app-am-contexts:
      post:
        summary: Creates a new Individual application AM Context resource
        operationId: PostAppAmContexts
        tags:
          - Application AM Contexts
        parameters:
          - name: afId
            in: path
            description: Identifier of the AF
            required: true
            schema:
              type: string
        requestBody:
          description: new resource creation
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AppAmContextExpData'
        responses:
          '201':
            description: Created (Successful creation)
            content:
              application/json:
                schema:

```

```

      $ref: '#/components/schemas/AppAmContextExpRespData'
    headers:
      Location:
        description: Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    amEventNotification:
      '{$request.body#/evSubscs/eventNotifUri}':
        post:
          requestBody:
            description: Notification of an event occurrence.
            required: true
            content:
              application/json:
                schema:
                  $ref: 'TS29534_Npcf_AMPolicyAuthorization.yaml#/components/schemas/AmEventsNotification'
  responses:
    '204':
      description: The receipt of the notification is acknowledged
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/app-am-contexts/{appAmContextId}:
  get:
    summary: read an existing Individual application AM context
    operationId: GetAppAmContext
    tags:
      - Individual Application AM Context
    parameters:

```

```

- name: afId
  in: path
  description: Identifier of the AF
  required: true
  schema:
    type: string
- name: appAmContextId
  in: path
  description: Identifier of the Individual application AM context
  required: true
  schema:
    type: string
responses:
  '200':
    description: OK (A representation of the resource is successfully returned)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AppAmContextExpData'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: partial modifies an existing Individual application AM context
  operationId: ModAppAmContext
  tags:
    - Individual Application AM Context
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: appAmContextId
      in: path
      description: Identifier of the application AM context resource
      required: true
      schema:
        type: string
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/AppAmContextExpUpdateData'
  responses:
    '200':
      description: >
        successful modification of the resource and a representation of that
        resource is returned. If a subscribed event is matched, the event
        notification is also included in the response.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AppAmContextExpRespData'
    '204':
      description: The successful modification

```



```

'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Deletes an existing Individual Application AM Context

operationId: DeleteAppAmContext

#### tags:

- Individual Application AM Context

#### parameters:

- name: afId
  - in: path
  - description: Identifier of the AF
  - required: true
  - schema:
    - type: string
- name: appAmContextId
  - in: path
  - description: string identifying the Individual application AM context resource
  - required: true
  - schema:
    - type: string

#### responses:

```

'204':
  description: The deletion is confirmed without returning additional data.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/ {afId} / app-am-contexts / {appAmContextId} / events-subscription:

#### put:

summary: creates or modifies an AM Policy Events Subscription sub-resource.

```

operationId: UpdateAmEventsSubsc
tags:
  - AM Policy Events Subscription
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
  - name: appAmContextId
    in: path
    description: string identifying the AM Policy Events Subscription subresource
    required: true
    schema:
      type: string
requestBody:
  description: >
    Creation or modification of an application AM Policy Events Subscription sub-resource.
  required: true
  content:
    application/json:
      schema:
        $ref: 'TS29534_Npcf_AMPolicyAuthorization.yaml#/components/schemas/AmEventsSubscData'
responses:
  '201':
    description: >
      The creation of the application AM Policy Events Subscription sub-resource
      is confirmed and its representation is returned. If an AM Event is matched,
      the response also includes the notification.
    content:
      application/json:
        schema:
          $ref: 'TS29534_Npcf_AMPolicyAuthorization.yaml#/components/schemas/AmEventsSubscRespData'
  '200':
    description: >
      The modification of the AM Policy Events Subscription subresource is confirmed
      and its representation is returned. If an AM Event is matched, the response also
      includes the notification.
    content:
      application/json:
        schema:
          $ref: 'TS29534_Npcf_AMPolicyAuthorization.yaml#/components/schemas/AmEventsSubscRespData'
  '204':
    description: >
      The modification of the AM Policy Events Subscription subresource is confirmed
      without returning additional data.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  amEventNotification:
    '{$request.body#/evSubscs/eventNotifUri}':
      post:
        requestBody:
          description: Contains the information for the notification of an event occurrence.
          required: true
          content:
            application/json:
              schema:
                $ref:
'TS29534_Npcf_AMPolicyAuthorization.yaml#/components/schemas/AmEventsNotification'
      responses:
        '204':
          description: The receipt of the notification is acknowledged.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
delete:
  summary: deletes the AM Policy Events Subscription sub-resource
  operationId: DeleteAmEventsSubsc
  tags:
    - AM Policy Events Subscription
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: appAmContextId
      in: path
      description: string identifying the Individual Application AM Context resource.
      required: true
      schema:
        type: string
  responses:
    '204':
      description: >
        The deletion of the of the AM Policy Events Subscription subresource
        is confirmed without returning additional data.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## components:

## securitySchemes:

## oAuth2ClientCredentials:

type: oAuth2

## flows:

## clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

## schemas:

## AppAmContextExpData:

description: Represents an Individual application AM context exposure resource.

type: object

## properties:

## self:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

## evSubscs:

\$ref: 'TS29534\_Npcf\_AMPolicyAuthorization.yaml#/components/schemas/AmEventsSubscData'

## gpsi:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

## highThruInd:

type: boolean

## covReqs:

type: array

## items:

\$ref: '#/components/schemas/GeographicalArea'

minItems: 1

nullable: true

## policyDuration:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSecRm'

## sliceReplReq:

\$ref: '#/components/schemas/SliceReplReq'

## suppFeat:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

## requestTestNotification:

type: boolean

## description: &gt;

Set to true by the AF to request the NEF to send a test notification as defined in clause 5.2.5.3 of 3GPP TS 29.122. Set to false or omitted otherwise.

## websocketNotifConfig:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsocketNotifConfig'

## required:

- gpsi

## anyOf:

- required: [highThruInd]

- required: [covReqs]

- required: [sliceReplReq]

## AppAmContextExpUpdateData:

## description: &gt;

Contains the modification(s) to be applied to the Individual application AM context exposure resource.

type: object

## properties:

## evSubscs:

\$ref: 'TS29534\_Npcf\_AMPolicyAuthorization.yaml#/components/schemas/AmEventsSubscDataRm'

## highThruInd:

type: boolean

## covReqs:

type: array

## items:

\$ref: '#/components/schemas/GeographicalArea'

minItems: 1

## policyDuration:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSecRm'

```
    sliceReplReq:
      $ref: '#/components/schemas/SliceReplReq'

GeographicalArea:
  description: Contains geographical area information (e.g.a civic address or shapes).
  type: object
  properties:
    civicAddress:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
    shapes:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'

AppAmContextExpRespData:
  description: >
    It represents a response to a modification or creation request of an Individual
    Application AM resource. It may contain the notification of the already met events
  anyOf:
    - $ref: 'TS29534_Npcf_AMPolicyAuthorization.yaml#/components/schemas/AppAmContextData'
    - $ref: 'TS29534_Npcf_AMPolicyAuthorization.yaml#/components/schemas/AmEventsNotification'

SliceReplReqInfo:
  description: >
    Represents the AF requested Network Slice Replacement requirements information.
  type: object
  properties:
    snssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    altSnssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    afServId:
      type: string
    altAfServId:
      type: string
  oneOf:
    - required: [snssai, altSnssai]
    - required: [afServId, altAfServId]

SliceReplReq:
  description: >
    Represents the requested Network Slice Replacement requirements.
  type: object
  properties:
    type:
      $ref: '#/components/schemas/SliceReplType'
    afSliceReplReq:
      $ref: '#/components/schemas/SliceReplReqInfo'
  required:
    - type

#
# ENUMERATIONS
#

SliceReplType:
  anyOf:
    - type: string
      enum:
        - INITIATE_AF_REQ_SLICE_REP
        - TERMINATE_AF_REQ_SLICE_REP
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration but
        is not used to encode content defined in the present version of this API.
  description: |
    Represents the type of the requested Network Slice Replacement.
    Possible values are:
    - INITIATE_AF_REQ_SLICE_REP: Indicates that the type of the requested Network Slice
      Replacement is the initiation of an AF requested Network Slice Replacement.
    - TERMINATE_AF_REQ_SLICE_REP: Indicates that the type of the requested Network Slice
      Replacement is the termination of a previously requested Network Slice Replacement from
      the AF.
```

## A.16 AMInfluence API

openapi: 3.0.0

info:

title: AMInfluence  
version: 1.2.0-alpha.3  
description: |  
AMInfluence API Service.  
© 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  
All rights reserved.

externalDocs:

description: >  
3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.  
url: [https://www.3gpp.org/ftp/Specs/archive/29\\_series/29.522/](https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/)

servers:

- url: '{apiRoot}/3gpp-am-influence/v1'  
variables:  
apiRoot:  
default: <https://example.com>  
description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

security:

- {}  
- oAuth2ClientCredentials: []

paths:

/{afId}/subscriptions:  
parameters:  
- name: afId  
in: path  
description: Identifier of the AF  
required: true  
schema:  
type: string  
get:  
summary: Read all of the active subscriptions for the AF.  
tags:  
- AM Influence Subscription  
responses:  
'200':  
description: OK (Successful get all of the active subscriptions for the AF).  
content:  
application/json:  
schema:  
type: array  
items:  
\$ref: '#/components/schemas/AmInfluSub'  
'307':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'  
'308':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'  
'400':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'  
'401':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'  
'403':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'  
'404':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'  
'406':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/406'  
'429':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'  
'500':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'  
'503':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'  
default:  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'  
post:  
summary: Create a new subscription to AM influence.  
operationId: CreateAMInfluenceSubscription  
tags:  
- AM Influence Subscription

```

requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/AmInfluSub'
responses:
  '201':
    description: Create a new Individual AM Influence Subscription resource.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AmInfluSub'
    headers:
      Location:
        description: >
          Contains the URI of the newly created resource, according to the structure
          {apiRoot}/3gpp-am-influence/v1/{afId}/subscriptions/{subscriptionId}.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  notificationDestination:
    '{$request.body#/notificationDestination}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/AmInfluEventNotif'
                minItems: 1
        responses:
          '204':
            description: No Content, Notification was succesfull
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':

```

```

        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  /{afId}/subscriptions/{subscriptionId}:
    parameters:
      - name: afId
        in: path
        description: Identifier of the AF.
        required: true
        schema:
          type: string
      - name: subscriptionId
        in: path
        description: Identifier of the subscription resource.
        required: true
        schema:
          type: string
    get:
      summary: Read an active subscription identified by the subscriptionId.
      tags:
        - Individual AM Influence Subscription
      responses:
        '200':
          description: OK (Successful get the active subscription)
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AmInfluSub'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    put:
      summary: Update/Replace an existing subscription resource.
      tags:
        - Individual AM Influence Subscription
      requestBody:
        description: Parameters to update/replace the existing subscription.
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AmInfluSub'
      responses:
        '200':
          description: OK (Successful update of the subscription)
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AmInfluSub'
        '204':
          description: No Content
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'

```



```

'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
patch:
  summary: Update/Replace an existing subscription resource.
  tags:
    - Individual AM Influence Subscription
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/AmInfluSubPatch'
  responses:
    '200':
      description: OK. The subscription was modified successfully.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AmInfluSub'
    '204':
      description: No Content
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
delete:
  summary: Delete an existing subscription.
  tags:
    - Individual AM Influence Subscription
  responses:
    '204':
      description: No Content (Successful deletion of the existing subscription)
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'

```

```

    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  components:
    securitySchemes:
      oAuth2ClientCredentials:
        type: oauth2
        flows:
          clientCredentials:
            tokenUrl: '{tokenUrl}'
            scopes: {}
    schemas:
      AmInfluSub:
        description: Represents an AM influence subscription.
        type: object
        properties:
          afTransId:
            type: string
          gpsi:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
          externalGroupId:
            $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
          anyUeInd:
            type: boolean
            description: >
              Identifies whether the AF request applies to any UE. This attribute shall
              set to "true" if applicable for any UE, otherwise, set to "false".
          roamUePlmnIds:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
            minItems: 1
            description: >
              Indicates a list of PLMNs representing the home PLMN for the inbound roaming
              UEs.
          dnnSnssaiInfos:
            type: array
            items:
              $ref: '#/components/schemas/DnnSnssaiInformation'
            minItems: 1
            description: Each of the element identifies a (DNN, S-NSSAI) combination.
          afAppIds:
            type: array
            items:
              type: string
            minItems: 1
            description: Each of the element identifies an application.
          highThruInd:
            type: boolean
          geoAreas:
            type: array
            items:
              $ref: 'TS29522_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'
            minItems: 1
            description: >
              Contains the geographical area(s) constituting the AF-requested service area
              coverage.
          policyDuration:
            $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
          sliceReplReqInfo:
            $ref: 'TS29522_AMPolicyAuthorization.yaml#/components/schemas/SliceReplReqInfo'
          self:
            $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
          subscribedEvents:
            type: array

```

```

    items:
      $ref: './components/schemas/AmInfluEvent'
    minItems: 1
    description: Indicates one or more AM influence related events.
  notificationDestination:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
  requestTestNotification:
    type: boolean
    description: >
      Set to true by the AF to request the NEF to send a test notification
      as defined in clause 5.2.5.3 of 3GPP TS 29.122. Set to false or omitted otherwise.
  websocketNotifConfig:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsocketNotifConfig'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - afTransId
anyOf:
  - required: [highThruInd]
  - required: [geoAreas]
  - required: [sliceReplReqInfo]
oneOf:
  - required: [gpsi]
  - required: [externalGroupId]
  - required: [anyUeInd]
  - required: [roamUePlmnIds]

AmInfluSubPatch:
  description: >
    Represents parameters to request the modification of an AM influence subscription resource.
  type: object
  properties:
    highThruInd:
      type: boolean
      nullable: true
    geoAreas:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
      minItems: 1
      description: >
        Contains the geographical area(s) constituting the AF-requested service area
        coverage.
      nullable: true
    policyDuration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSecRm'
    sliceReplReqInfo:
      $ref: './components/schemas/SliceReplReqInfoRm'
    dnnSnssaiInfos:
      type: array
      items:
        $ref: './components/schemas/DnnSnssaiInformation'
      minItems: 1
      nullable: true
      description: Each of the element identifies a (DNN, S-NSSAI) combination.
    afAppIds:
      type: array
      items:
        type: string
      minItems: 1
      nullable: true
      description: Each of the element identifies an application.
    subscribedEvents:
      type: array
      items:
        $ref: './components/schemas/AmInfluEvent'
      minItems: 1
      nullable: true
      description: Indicates one or more AM influence related events.
    notificationDestination:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LinkRm'

AmInfluEventNotif:
  description: Represents an AM influence event notification.
  type: object
  properties:
    afTransId:
      type: string

```

```

    event:
      $ref: '#/components/schemas/AmInfluEvent'
    gpsis:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      minItems: 1
    geoAreas:
      type: array
      items:
        $ref: 'TS29522_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'
      minItems: 1
      description: >
        Contains the geographical area(s) constituting the allowed service area coverage
        by the network.
    sliceReplOut:
      $ref: 'TS29534_Npcf_AMPolicyAuthorization.yaml#/components/schemas/SliceReplOutcomeInfo'
  required:
    - event
    - afTransId

DnnSnssaiInformation:
  description: Represents a (DNN, SNSSAI) combination.
  type: object
  properties:
    dnn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    snssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'

SliceReplReqInfoRm:
  description: >
    Represents the same as the SliceReplReqInfo data type but with the OpenAPI nullable property
    set to true.
  type: object
  properties:
    snssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    altSnssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    afServId:
      type: string
    altAfServId:
      type: string
  nullable: true
  oneOf:
    - required: [snssai, altSnssai]
    - required: [afServId, altAfServId]

# ENUMERATIONS DATA TYPES
#
AmInfluEvent:
  anyOf:
    - type: string
      enum:
        - SERVICE_AREA_COVRG_OUTCOME
        - SLICE_REPLACE_OUTCOME
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration but
        is not used to encode content defined in the present version of this API.
  description: |
    Represents the NEF notification event to the AF.
    Possible values are:
    - SERVICE_AREA_COVRG_OUTCOME: Indicates that the AM Influence event is the Service Area
      Coverage outcome.
    - SLICE_REPLACE_OUTCOME: Indicates the AM Influence event is the notification of the AF
      requested Network Slice Replacement outcome.

```

---

## A.17 MBSTMGI API

openapi: 3.0.0

info:

```
title: 3gpp-mbs-tmgi
version: 1.2.0-alpha.1
description: |
  API for the allocation, deallocation and management of TMGI(s) for MBS.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

security:
  - {}
  - OAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/3gpp-mbs-tmgi/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:
  /allocate:
    post:
      summary: Request the allocation of TMGI(s) for new MBS session(s) or the refresh of the expiry
time of already allocated TMGI(s).
      operationId: AllocateTmgi
      tags:
        - TMGI Allocation or Timer Expiry Refresh
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/TmgiAllocRequest'
      responses:
        '200':
          description: >
            OK. Successful case. The allocated TMGI(s) or a refreshed expiry time for the concerned
            already allocated TMGI(s) is/are returned to the requesting AF.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/TmgiAllocResponse'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          description: >
            The request is rejected by the NEF and more details (along with ProblemDetails) may be
            returned.
          content:
            application/problem+json:
              schema:
                $ref: '#/components/schemas/ProblemDetailsTmgiAlloc'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
callbacks:
  TmgiTimerExpiryNotification:
    '{$request.body#/notificationUri}':
      post:
        requestBody:
          description: >
            Represents the MBS TMGI(s) timer expiry notification information (e.g. list of
            TMGI(s) for which the timer has expired).
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ExpiryNotif'
        responses:
          '204':
            description: No content. The notification is successfully received.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/deallocate:
  post:
    summary: Request the deallocation of MBS TMGI(s).
    operationId: DeallocateTmgi
    tags:
      - MBS TMGI Deallocation
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/TmgiDeallocRequest'
    responses:
      '204':
        description: No Content. Successful case, the TMGI(s) are deallocated.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
```

```

'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## components:

## securitySchemes:

## oAuth2ClientCredentials:

type: oauth2

## flows:

## clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

## schemas:

## TmgiAllocRequest:

description: &gt;

Represents the full set of parameters to initiate an MBS TMGI(s) allocation request or the refresh of the expiry time of already allocated TMGI(s).

type: object

## properties:

## afId:

type: string

## tmgiParams:

\$ref: 'TS29532\_Nmb-smf-TMGI.yaml#/components/schemas/TmgiAllocate'

## notificationUri:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/Uri'

## mbsServiceArea:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/MbsServiceArea'

## extMbsServiceArea:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/ExternalMbsServiceArea'

## requestTestNotification:

type: boolean

## websocketNotifConfig:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsocketNotifConfig'

## suppFeat:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

## required:

- afId
- tmgiParams

## not:

required: [mbsServiceArea, extMbsServiceArea]

## TmgiAllocResponse:

description: &gt;

Represents MBS TMGI(s) allocation information or the refreshed expiry time for already allocated TMGI(s)

type: object

## properties:

## tmgiInfo:

\$ref: 'TS29532\_Nmb-smf-TMGI.yaml#/components/schemas/TmgiAllocated'

## suppFeat:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

## required:

- tmgiInfo

## TmgiDeallocRequest:

description: Represents information to request the deallocation of MBS TMGI(s).

type: object

## properties:

## afId:

type: string

## tmgis:

type: array

## items:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/Tmgi'

minItems: 1

## required:

- afId
- tmgis

## ExpiryNotif:

description: Represents MBS TMGI(s) timer expiry notification information.

type: object

## properties:

```

    tmgis:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Tmgi'
      minItems: 1
    required:
      - tmgis

ReducedMbsServArea:
  description: >
    Represents the reduced MBS Service Area information.
  type: object
  properties:
    reducedMbsServArea:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsServiceArea'
    reducedExtMbsServArea:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalMbsServiceArea'
    reducedMbsServAreas:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsServiceArea'
      minItems: 1
    reducedExtMbsServAreas:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalMbsServiceArea'
      minItems: 1
  oneOf:
    - required: [reducedMbsServArea]
    - required: [reducedExtMbsServArea]
  allOf:
    - not:
        required: [reducedMbsServArea, reducedExtMbsServAreas]
    - not:
        required: [reducedExtMbsServArea, reducedMbsServAreas]

ProblemDetailsTmgiAlloc:
  description: >
    Represents an extension to the ProblemDetails data structure with additional error
    information related to TMGI Allocation.
  allOf:
    - $ref: 'TS29122_CommonData.yaml#/components/schemas/ProblemDetails'
    - $ref: '##/components/schemas/ReducedMbsServArea'

```

---

## A.18 MBSSession API

openapi: 3.0.0

```

info:
  title: 3gpp-mbs-session
  version: 1.3.0-alpha.3
  description: |
    API for MBS Session Management.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

servers:
  - url: '{apiRoot}/3gpp-mbs-session/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

paths:
  /mbs-sessions:
    post:
      summary: Request the creation of a new MBS Session.

```



```

tags:
- MBS Sessions collection
operationId: CreateMBSsession
requestBody:
  description: Representation of the new MBS session to be created at the NEF.
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/MbsSessionCreateReq'
responses:
  '201':
    description: >
      Created. Successful creation of a new Individual MBS session resource.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MbsSessionCreateResp'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    description: >
      The request is rejected by the NEF and more details (along with ProblemDetails) may be
      returned.
    content:
      application/problem+json:
        schema:
          $ref: 'TS29522_MBSTMGII.yaml#/components/schemas/ProblemDetailsTmgiiAlloc'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/mbs-sessions/{mbsSessionRef}:
  parameters:
    - name: mbsSessionRef
      in: path
      description: Identifier of the Individual MBS Session resource.
      required: true
      schema:
        type: string

  patch:
    summary: Request the modification of an existing Individual MBS Session resource.
    operationId: ModifyIndMBSsession
    tags:
    - Individual MBS Session
    requestBody:
      required: true
      content:
        application/json-patch+json:
          schema:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/PatchItem'
            minItems: 1

```

```

responses:
  '200':
    description: >
      OK. The Individual MBS Session was successfully updated and MBS Session update related
      information shall be returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MbsSessionUpdateResp'
  '204':
    description: >
      No Content. The concerned Individual MBS Session resource was successfully modified.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

delete:
  summary: Request the Deletion of an existing Individual MBS Session resource.
  operationId: DeleteIndMBSSession
  tags:
    - Individual MBS Session
  responses:
    '204':
      description: >
        No Content. Successful deletion of the concerned Individual MBS Session resource.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

/mbs-sessions/subscriptions:
  get:
    summary: Retrieve all the active MBS Sessions subscriptions.
    operationId: ReadMBSSessionsSubscs
    tags:
      - MBS Session Subscriptions
    responses:
      '200':

```

```

description: >
  OK. All the active MBS Session Subscriptions resources managed by the NEF are returned.
content:
  application/json:
    schema:
      type: array
      items:
        $ref: '#/components/schemas/MbsSessionSubsc'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Request the creation of a new Individual MBS Session subscription resource.
  operationId: CreateMBSSessionsSubsc
  tags:
    - MBS Session Subscriptions
  requestBody:
    description: Request the creation of a new MBS Session subscription resource.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MbsSessionSubsc'
  responses:
    '201':
      description: >
        Created. Successful creation of a new Individual MBS Session subscription.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MbsSessionSubsc'
      headers:
        Location:
          description: Contains the URI of the newly created resource, according to the
            structure
            {apiRoot}/3gpp-mbs-session/v1/mbs-sessions/subscriptions/{subscriptionId}
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    MBSSessionStatusNotification:
      '{$request.body#/notificationUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/MbsSessionStatusNotif'
          responses:
            '204':
              description: No Content. Successful reception of the notification.
            '307':
              $ref: 'TS29122_CommonData.yaml#/components/responses/307'
            '308':
              $ref: 'TS29122_CommonData.yaml#/components/responses/308'
            '400':
              $ref: 'TS29122_CommonData.yaml#/components/responses/400'
            '401':
              $ref: 'TS29122_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29122_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29122_CommonData.yaml#/components/responses/404'
            '411':
              $ref: 'TS29122_CommonData.yaml#/components/responses/411'
            '413':
              $ref: 'TS29122_CommonData.yaml#/components/responses/413'
            '415':
              $ref: 'TS29122_CommonData.yaml#/components/responses/415'
            '429':
              $ref: 'TS29122_CommonData.yaml#/components/responses/429'
            '500':
              $ref: 'TS29122_CommonData.yaml#/components/responses/500'
            '503':
              $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/mbs-sessions/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: Identifier of the Individual MBS Session Subscription resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual MBS Session Subscription resource.
    operationId: ReadIndMBSSessionsSubsc
    tags:
      - Individual MBS Session subscription
    responses:
      '200':
        description: >
          OK. Successful retrieval of the targeted Individual MBS Session subscription resource.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MbsSessionSubsc'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':

```

```
$ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

**delete:**

summary: Request the deletion of an existing Individual MBS Session subscription resource.  
operationId: DeleteIndMBSSessionsSubsc

**tags:**

- Individual MBS Session Subscription

**responses:**

```
'204':
  description: >
    No Content. Successful deletion of the existing Individual MBS Session subscription
    resource.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

**/mbs-pp:****get:**

summary: Request to retrieve all the active MBS Parameters Provisioning resources at the NEF.  
operationId: GetMBSParamsProvisionings

**tags:**

- MBS Parameters Provisionings

**responses:**

```
'200':
  description: >
    OK. All the active MBS Parameters Provisioning resources managed by the NEF are
    returned.
  content:
    application/json:
      schema:
        type: array
        items:
          $ref: '#/components/schemas/MbsPpData'
        minItems: 1
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**post:**

```

summary: Request the creation of a new MBS Parameters Provisioning.
tags:
  - MBS Parameters Provisioning
operationId: CreateMBSParamsProvisioning
requestBody:
  description: Representation of the new MBS Parameters Provisioning to be created at the NEF.
  required: true
  content:
    application/json:
      schema:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/MbsPpData'
responses:
  '201':
    description: >
      Created. Successful creation of a new Individual MBS Parameters Provisioning resource.
    content:
      application/json:
        schema:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/MbsPpData'
    headers:
      Location:
        description: >
          Contains the URI of the newly created resource, according to the structure
          {apiRoot}/3gpp-mbs-session/v1/mbs-pp/{mbsPpId}
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**/mbs-pp/{mbsPpId}:**

```

parameters:
  - name: mbsPpId
    in: path
    description: >
      Represents the identifier of the Individual MBS Parameters Provisioning resource.
    required: true
    schema:
      type: string

```

**get:**

```

summary: Request to retrieve an existing Individual MBS Parameters Provisioning resource.
operationId: GetIndMBSParamsProvisioning
tags:
  - Individual MBS Parameters Provisioning
responses:
  '200':
    description: >
      OK. Successful retrieval of the requested Individual MBS Parameters Provisioning.
      resource.
    content:
      application/json:
        schema:

```

```

    $ref: '#/components/schemas/MbsPpData'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

summary: Request the update of an existing Individual MBS Parameters Provisioning resource.

tags:

- Individual MBS Parameters Provisioning

operationId: UpdateIndMBSPARAMSProvisioning

requestBody:

description: >

Represents the updated Individual MBS Parameters Provisioning resource representation.

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/MbsPpData'

responses:

'200':

description: >

OK. The Individual MBS Parameters Provisioning resource is successfully updated and a representation of the updated resource is returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/MbsPpData'

'204':

description: >

No Content. The Individual MBS Parameters Provisioning resource is successfully updated.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

patch:

summary: Request the modification of an existing Individual MBS Parameters Provisioning resource.

tags:

- Individual MBS Parameters Provisioning

operationId: ModifyIndMBSParamsProvisioning

requestBody:

description: >  
Contains the parameters to request the modification of the Individual Parameters Provisioning resource.

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/MbsPpDataPatch'

responses:

'200':

description: >  
OK. The Individual MBS Parameters Provisioning resource is successfully modified and a representation of the updated resource is returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/MbsPpData'

'204':

description: >  
No Content. The Individual MBS Parameters Provisioning resource is successfully modified.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Request the deletion of an existing Individual MBS Parameters Provisioning resource.

tags:

- Individual MBS Parameters Provisioning

operationId: DeleteIndMBSParamsProvisioning

responses:

'204':

description: >

No Content. The Individual MBS Parameters Provisioning resource is successfully deleted.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'



```
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

components:

```
securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}
```

schemas:

```
#
# STRUCTURED DATA TYPES
#
```

```
MbsSessionCreateReq:
  description: Represents the parameters to request MBS Session creation.
  type: object
  properties:
    afId:
      type: string
    mbsSession:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSession'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - afId
    - mbsSession
```

```
MbsSessionCreateRsp:
  description: Represents the parameters to be returned in an MBS Session creation response..
  type: object
  properties:
    mbsSession:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSession'
    eventList:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSessionEventReportList'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - mbsSession
```

```
MbsSessionSubsc:
  description: Represents an MBS Session Subscription.
  type: object
  properties:
    afId:
      type: string
    subscription:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSessionSubscription'
    subscriptionId:
      type: string
  required:
    - afId
    - subscription
```

```
MbsSessionStatusNotif:
  description: Represents an MBS Session Status notification.
  type: object
  properties:
    eventList:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSessionEventReportList'
  required:
    - eventList
```

```
MbsPpData:
  description: Represents MBS Parameters Provisioning data.
  type: object
  properties:
    afId:
      type: string
    mtcProviderId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
```

```
mbsSessAuthData:
  $ref: '#/components/schemas/MbsSessAuthData'
mbsSessAssistInfo:
  $ref: '#/components/schemas/MbsSessAssistInfo'
suppFeat:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
- afId
```

```
MbsSessAuthData:
  description: Represents the MBS Session Authorization data.
  type: object
  properties:
    extGroupId:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
    gpsiList:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      minProperties: 1
      description: >
        Represents the list of the GPSI(s) of the member UE(s) constituting the multicast MBS
        group. Any
        value of type can be used as a key of the map.
    mbsSessionIdList:
      $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/5MbsAuthorizationInfo'
  required:
  - extGroupId
  - mbsSessionIdList
```

```
MbsPpDataPatch:
  description: >
    Represents the requested modification to existing MBS Parameters Provisioning data.
  type: object
  properties:
    mbsSessAuthData:
      $ref: '#/components/schemas/MbsSessAuthData'
    mbsSessAssistInfo:
      $ref: '#/components/schemas/MbsSessAssistInfo'
```

```
MbsSessAssistInfo:
  description: >
    Represents the MBS Session Assistance information data set(s).
  type: object
  properties:
    mbsSessAssistData:
      type: array
      items:
        $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/MbsAssistanceInfo'
      minItems: 1
  required:
  - mbsSessAssistData
```

```
MbsSessionUpdateResp:
  description: >
    Represents the parameters to be returned in an MBS Session update response during
    partial success.
  type: object
  properties:
    reducedMbsServArea:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsServiceArea'
    reducedExtMbsServArea:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalMbsServiceArea'
  not:
    required: [reducedMbsServArea, reducedExtMbsServArea]
```

```
#
# SIMPLE DATA TYPES
#
```

```
#
# ENUMERATIONS
#
```

## A.19 EASDeployment API

openapi: 3.0.0

info:

title: 3gpp-eas-deployment  
version: 1.2.0-alpha.4  
description: |  
API for AF provisioned EAS Deployment.  
© 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  
All rights reserved.

externalDocs:

description: >  
3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.  
url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.522/'

security:

- {}  
- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-eas-deployment/v1'  
variables:  
apiRoot:  
default: https://example.com  
description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{afId}/eas-deployment-info:  
get:  
summary: Read all EAS Deployment information for a given AF  
operationId: ReadAllDeployment  
tags:  
- EAS Deployment Information (Collection)  
parameters:  
- name: afId  
in: path  
description: Identifier of the AF  
required: true  
schema:  
type: string  
responses:  
'200':  
description: OK (Successful get all of the EAS Deployment information for the AF)  
content:  
application/json:  
schema:  
type: array  
items:  
\$ref: '#/components/schemas/EasDeployInfo'  
minItems: 0  
'307':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'  
'308':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'  
'400':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'  
'401':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'  
'403':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'  
'404':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'  
'406':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/406'  
'429':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'  
'500':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'  
'503':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'  
default:  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Create a new Individual EAS Deployment information resource.

```

    operationId: CreateAnDeployment
    tags:
      - EAS Deployment Information (Collection)
    parameters:
      - name: afId
        in: path
        description: Identifier of the AF
        required: true
        schema:
          type: string
    requestBody:
      description: new resource creation
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/EasDeployInfo'
    responses:
      '201':
        description: Created (Successful creation)
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EasDeployInfo'
        headers:
          Location:
            description: 'Contains the URI of the newly created resource'
            required: true
            schema:
              type: string
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/eas-deployment-info/{easDeployInfoId}:
  get:
    summary: Read an active Individual EAS Deployment Information resource for the AF
    operationId: ReadAnDeployment
    tags:
      - Individual EAS Deployment Information
    parameters:
      - name: afId
        in: path
        description: Identifier of the AF
        required: true
        schema:
          type: string
      - name: easDeployInfoId
        in: path
        description: Identifier of an EAS Deployment Information.
        required: true
        schema:
          type: string
    responses:
      '200':
        description: OK (Successful get the active resource)
        content:
          application/json:
            schema:

```

```

    $ref: '#/components/schemas/EasDeployInfo'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

```

summary: Fully updates/replaces an existing resource
operationId: FullyUpdateAnDeployment
tags:
  - Individual EAS Deployment Information
parameters:
  - name: afId
    in: path
    description: Identifier of the AF
    required: true
    schema:
      type: string
  - name: easDeployInfoId
    in: path
    description: Identifier of the EAS Deployment information resource
    required: true
    schema:
      type: string
requestBody:
  description: Parameters to update/replace the existing resource
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/EasDeployInfo'
responses:
  '200':
    description: OK (Successful update of the existing resource)
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/EasDeployInfo'
  '204':
    description: >
      Successful case. The resource has been successfully updated and no additional content is
      sent in the response message.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'

```

```

'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Deletes an already existing EAS Deployment information resource  
operationId: DeleteAnDeployment

#### tags:

- Individual EAS Deployment Information

#### parameters:

- name: afId  
in: path  
description: Identifier of the AF  
required: true  
schema:  
  type: string
- name: easDeployInfoId  
in: path  
description: Identifier of the EAS Deployment information resource  
required: true  
schema:  
  type: string

#### responses:

```

'204':
  description: No Content (Successful deletion of the existing resource)
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### /remove-edis:

##### post:

summary: Remove EAS Deployment Information based on given criteria.  
operationId: DeleteEDIs

#### tags:

- EAS Deployment Information removal

#### requestBody:

description: Criteria to be used for deleting EAS Deployment Information that match them.

#### content:

```

application/json:
  schema:
    $ref: '##/components/schemas/EdiDeleteCriteria'
required: true

```

#### responses:

```

'204':
  description: >
    No Content. The EDIs matching the provided criteria have been successfully deleted.
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'

```

```

'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

## schemas:

```

EasDeployInfo:
  description: Represents EAS Deployment Information.
  type: object
  properties:
    self:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
    afServiceId:
      type: string
      description: >
        Contains a service on behalf of which the AF is issuing the request.
    fqdnPatternList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/FqdnPatternMatchingRule'
      minItems: 1
      description: >
        Contains the Supported FQDN pattern(s) for application(s) deployed in the Local
        part of the DN where each FQDN pattern is described by a FQDN Pattern Matching Rule.
    appId:
      type: string
      description: >
        Contains the application for which the EAS Deployment Information corresponds to.
    dnn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    snssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    externalGroupId:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
    dnaiInfos:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DnaiInformation'
      minProperties: 1
      description: >
        list of DNS server identifier (consisting of IP address and port) and/or IP address(s)
        of the EAS in the local DN for each DNAI. The key of map is the DNAI.
    targetAfId:
      type: string
      description: >
        Identifier of the AF that is responsible for the EAS associated with this EAS
        deployment information.
    n6DelayPerDnaiEas:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/N6DelayPerDnaiEas'
      minItems: 1
      description: >
        N6 delay measurement assistance information per DNAI and/or EAS.
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - fqdnPatternList

```

## DnaiInformation:

```

description: Represents DNAI information.

```

```
type: object
properties:
  dnai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
  dnsServIds:
    type: array
    items:
      $ref: '#/components/schemas/DnsServerIdentifier'
    minItems: 1
    description: >
      Contains the list of DNS server identifier for each DNAI.
  easIpAdrs:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
    minItems: 1
    description: >
      Contains the IP address(s) of the EASs in the local DN for each DNAI.
required:
- dnai
anyOf:
- required: [dnsServIds]
- required: [easIpAdrs]

DnsServerIdentifier:
description: Represents DNS server identifier (consisting of IP address and port).
type: object
properties:
  dnsServIpAddr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
  portNumber:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
required:
- dnsServIpAddr
- portNumber

EdiDeleteCriteria:
description: >
  Contains criteria to be used for deleting EAS Deployment Information entries that match
  them.
type: object
properties:
  afId:
    $ref: 'TS29522_AKMA.yaml#/components/schemas/AfId'
  dnnSnssai:
    $ref: 'TS29522_AMInfluence.yaml#/components/schemas/DnnSnssaiInformation'
anyOf:
- required: [afId]
- required: [dnnSnssai]

N6DelayPerDnaiEas:
description: Contains N6 delay measurement assistance information per DNAI and/or EAS.
type: object
properties:
  dnai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
  eas:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/EasServerAddress'
  n6DelayMeasureInfo:
    $ref: '#/components/schemas/N6DelayMeasurementInfo'
required:
- n6DelayMeasureInfo
anyOf:
- required: [dnai]
- required: [eas]

N6DelayMeasurementInfo:
description: Contains N6 delay measurement assistance information.
type: object
properties:
  measureEndpointAddr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
  measureEndpointPort:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  suppMeasProtocs:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DelayMeasurementProtocol'
```



```

    minItems: 1
    description: Contains the list of supported N6 delay measurement protocols.
  configParams:
    type: string
    description: >
      Contains protocol-specific configuration parameters.
      The contents and the format are up to the implementation.
  required:
    - measureEndpointAddr

```

---

## A.20 ASTI API

openapi: 3.0.0

```

info:
  title: 3gpp-asti
  version: 1.2.0-alpha.1
  description: |
    API for ASTI.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/3gpp-asti/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:
  /{afId}/configurations:
    get:
      summary: read all of the active configurations of 5G access stratum time distribution for the
AF
      operationId: ReadAllConfigurations
      tags:
        - ASTI Configurations
      parameters:
        - name: afId
          in: path
          description: Identifier of the AF
          required: true
          schema:
            type: string
      responses:
        '200':
          description: OK (Successful get all of the active configurations for the AF)
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/AccessTimeDistributionData'
                minItems: 0
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'

```

```

    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Creates a new configuration resource
  operationId: CreateNewConfiguration
  tags:
    - ASTI Configurations
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
  requestBody:
    description: new configuration creation
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AccessTimeDistributionData'
  responses:
    '201':
      description: Created (Successful creation)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AccessTimeDistributionData'
      headers:
        Location:
          description: 'Contains the URI of the newly created resource'
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

callbacks:
  astiNotification:
    '{$request.body#/astiNotifUri}':
      post:
        requestBody:
          description: Notification of an ASTI configuration change event.
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AstiConfigNotification'
        responses:
          '204':

```

```

    description: No Content, Notification was succesfull
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/ {afId} / configurations / retrieve:

post:

summary: Request the status of the 5G access stratum time distribution configuration for a list of UEs.

operationId: RetrieveStatusofConfiguration

tags:

- ASTI Configurations

parameters:

- name: afId

in: path

description: Identifier of the AF

required: true

schema:

type: string

requestBody:

description: Contains the list of GPSIs.

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/StatusRequestData'

responses:

'200':

description: Successful retrieval of the status of the 5G access stratum time distribution

content:

application/json:

schema:

\$ref: '#/components/schemas/StatusResponseData'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

```

/{afId}/configurations/{configId}:
get:
  summary: Reads an active configuration for the AF and the configuration Id
  operationId: ReadAnConfiguration
  tags:
    - Individual ASTI Configuration
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: configId
      in: path
      description: Identifier of the configuration resource
      required: true
      schema:
        type: string
  responses:
    '200':
      description: OK (Successful get the active configuration)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AccessTimeDistributionData'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Modifies an active configuration for the AF and the configuration Id
  operationId: FullyModifyAnConfiguration
  tags:
    - Individual ASTI Configuration
  parameters:
    - name: afId
      in: path
      description: Identifier of the AF
      required: true
      schema:
        type: string
    - name: configId
      in: path
      description: Identifier of the configuration resource
      required: true
      schema:
        type: string
  requestBody:
    description: Parameters to update/replace the existing configuration
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AccessTimeDistributionData'
  responses:
    '200':
      description: OK (Successful update of the configuration)

```

```

    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AccessTimeDistributionData'
    '204':
      description: No Content
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Deletes an already existing configuration

operationId: DeleteAnConfiguration

#### tags:

- Individual ASTI Configuration

#### parameters:

- name: afId
  - in: path
  - description: Identifier of the AF
  - required: true
  - schema:
    - type: string
- name: configId
  - in: path
  - description: Identifier of the configuration resource
  - required: true
  - schema:
    - type: string

#### responses:

```

    '204':
      description: No Content (Successful deletion of the existing configuration)
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

```
schemas:
```

```

  AccessTimeDistributionData:
    description: >
      Contains the parameters for the creation of 5G access stratum time distribution
configuration.
    type: object
    properties:
      gpsis:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        minItems: 1
      exterGroupId:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
      asTimeDisParam:
        $ref: 'TS29565_Ntsctsf_ASTI.yaml#/components/schemas/AfAsTimeDistributionParam'
      coverageArea:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SpatialValidityCond'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      astiNotifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      astiNotifId:
        type: string
        description: Notification correlation identifier.
      required:
        - asTimeDisParam
    oneOf:
      - required: [gpsis]
      - required: [exterGroupId]

```

```

  AstiConfigNotification:
    description: >
      Contains the report of a change in the 5G Access Stratum Time Distribution
parameters applied to the UE(s).
    type: object
    properties:
      astiNotifId:
        type: string
        description: >
          It is used to set the value of Notification Correlation ID in the
corresponding notification
      stateConfigs:
        type: array
        items:
          $ref: '#/components/schemas/AstiConfigStateNotification'
        minItems: 1
        description: >
          It contains the reported event(s) and event information.
      required:
        - astiNotifId
        - stateConfigs

```

```

  AstiConfigStateNotification:
    description: >
      Contains the report of a change in the 5G Access Stratum Time Distribution
parameters applied to a UE.
    type: object
    properties:
      gpsi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      event:
        $ref: 'TS29565_Ntsctsf_ASTI.yaml#/components/schemas/AstiEvent'
      required:
        - event
        - gpsi

```

```

  StatusRequestData:
    description: >

```

```

    Contains the parameters for retrieval of the status of the access stratum time distribution
    for a list of UEs.
  type: object
  properties:
    gpsis:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      minItems: 1
  required:
    - gpsis

StatusResponseData:
  description: >
    Contains the parameters for the status of the access stratum time distribution for a list of
    UEs.
  type: object
  properties:
    inactiveUes:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      minItems: 1
    activeUes:
      type: array
      items:
        $ref: '#/components/schemas/ActiveUe'
      minItems: 1

ActiveUe:
  description: >
    Contains the UE identifier whose status of the access stratum time distribution is active
    and the optional requested time synchronization error budget.
  type: object
  properties:
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    timeSyncErrBdgt:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'

```

---

## A.21 DataReporting API

```

openapi: 3.0.0
info:
  title: 3gpp-data-reporting
  version: 1.2.0-alpha.2
  description: |
    API for 3GPP Data Reporting.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/3gpp-data-reporting/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:
  /sessions:
    post:
      summary: Create a new Data Reporting Session.
      operationId: CreateDataRepSession
      tags:
        - Data Reporting Sessions
      requestBody:
        description: >

```

```

    Representation of the Data Reporting Session to be created in the NEF.
    required: true
    content:
      application/json:
        schema:
          $ref: 'TS26532_Ndcaf_DataReporting.yaml#/components/schemas/DataReportingSession'
  responses:
    '201':
      description: Created. Successful creation of a new Data Reporting Session.
      content:
        application/json:
          schema:
            $ref: 'TS26532_Ndcaf_DataReporting.yaml#/components/schemas/DataReportingSession'
      headers:
        Location:
          required: true
          schema:
            type: string
          description: >
            Contains the URI of the newly created resource, according to the structure
            {apiRoot}/3gpp-data-reporting/<apiVersion>/sessions/{sessionId}
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/sessions/{sessionId}:
  parameters:
    - name: sessionId
      in: path
      description: Identifier of the Data Reporting Session.
      required: true
      schema:
        type: string
  get:
    summary: Request the retrieval of an existing Individual Data Reporting Session resource.
    operationId: GetIndDataRepSession
    tags:
      - Individual Data Reporting Session
  responses:
    '200':
      description: >
        OK. The requested Individual Data Reporting Session resource is
        Successfully returned.
      content:
        application/json:
          schema:
            $ref: 'TS26532_Ndcaf_DataReporting.yaml#/components/schemas/DataReportingSession'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'

```



```
'411':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'  
'413':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'  
'415':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'  
'429':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'  
'500':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'  
'503':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'  
default:  
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

**put:**

```
summary: Request the update of an existing Individual Data Reporting Session resource.  
operationId: UpdateIndDataRepSession  
tags:  
  - Individual Data Reporting Session  
requestBody:  
  required: true  
  content:  
    application/json:  
      schema:  
        $ref: 'TS26532_Ndcaf_DataReporting.yaml#/components/schemas/DataReportingSession'  
responses:  
'200':  
  description: >  
    OK. The Individual Data Reporting Session resource was successfully  
    updated.  
  content:  
    application/json:  
      schema:  
        $ref: 'TS26532_Ndcaf_DataReporting.yaml#/components/schemas/DataReportingSession'  
'204':  
  description: >  
    No Content. The Individual Data Reporting Session resource was successfully  
    updated and no content is returned in the response body.  
'307':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'  
'308':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'  
'400':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'  
'401':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'  
'403':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'  
'404':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'  
'411':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'  
'413':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'  
'415':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'  
'429':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'  
'500':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'  
'503':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'  
default:  
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

**delete:**

```
summary: Deletes an already existing Data Reporting Session resource.  
operationId: DeleteIndDataRepSession  
tags:  
  - Individual Data Reporting Session  
responses:  
'204':  
  description: >  
    No Content. The concerned Individual Data Reporting Session resource was  
    successfully deleted.  
'307':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
```

```

'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/sessions/{sessionId}/report:

parameters:

```

- name: sessionId
  in: path
  description: Identifier of the Data Reporting Session.
  required: true
  schema:
    type: string

```

post:

summary: Report collected UE data.

operationId: ReportUEData

tags:

```
- Individual Data Reporting Session
```

requestBody:

required: true

content:

application/json:

schema:

\$ref: 'TS26532\_Ndcaf\_DataReporting.yaml#/components/schemas/DataReport'

responses:

'200':

description: OK. The UE data report was successfully received.

content:

application/json:

schema:

\$ref: 'TS26532\_Ndcaf\_DataReporting.yaml#/components/schemas/DataReportingSession'

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

```
tokenUrl: '{tokenUrl}'
scopes: {}
```

## A.22 DataReportingProvisioning API

openapi: 3.0.0

info:

```
title: 3gpp-data-reporting-provisioning
version: 1.2.0-alpha.2
description: |
  API for 3GPP Data Reporting and Provisioning.
  © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

externalDocs:

```
description: >
  3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'
```

security:

```
- {}
- OAuth2ClientCredentials: []
```

servers:

```
- url: '{apiRoot}/3gpp-data-reporting-provisioning/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.
```

paths:

```
/sessions:
  post:
    summary: Create a new Data Reporting Provisioning Session.
    operationId: CreateDataRepProvSession
    tags:
      - Data Reporting Provisioning Sessions
    requestBody:
      description: >
        Representation of the Data Reporting Provisioning Session to be created in the NEF.
      required: true
      content:
        application/json:
          schema:
            $ref:
  'TS26532_Ndcaf_DataReportingProvisioning.yaml#/components/schemas/DataReportingProvisioningSession'
```

responses:

```
'201':
  description: Created. Successful creation of a new Data Reporting Provisioning Session.
  content:
    application/json:
      schema:
        $ref:
  'TS26532_Ndcaf_DataReportingProvisioning.yaml#/components/schemas/DataReportingProvisioningSession'
```

headers:

```
Location:
  required: true
  schema:
    type: string
  description: >
    Contains the URI of the newly created resource, according to the structure
    {apiRoot}/3gpp-data-reporting-provisioning/<apiVersion>/sessions/{sessionId}
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/sessions/{sessionId}:
  parameters:
    - name: sessionId
      in: path
      description: Identifier of the Data Reporting Provisioning Session.
      required: true
      schema:
        type: string
  get:
    summary: Request the retrieval of an existing Individual Data Reporting Provisioning Session
    resource.
    operationId: GetIndDataRepProvSession
    tags:
      - Individual Data Reporting Provisioning Session
    responses:
      '200':
        description: >
          OK. The requested Individual Data Reporting Provisioning Session resource is
          Successfully returned.
        content:
          application/json:
            schema:
              $ref: 'TS26532_Ndcaf_DataReportingProvisioning.yaml#/components/schemas/DataReportingProvisioningSession'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  delete:
    summary: Deletes an already existing Individual Data Reporting Provisioning Session resource.
    operationId: DeleteIndDataRepProvSession
    tags:
      - Individual Data Reporting Provisioning Session
    responses:
      '204':
        description: >
          No Content. The concerned Individual Data Reporting Provisioning Session resource was
          successfully deleted.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/sessions/{sessionId}/configurations:
  parameters:
    - name: sessionId
      in: path
      description: Identifier of the Data Reporting Provisioning Session.
      required: true
      schema:
        type: string
  post:
    summary: Create a new Data Reporting Configuration resource.
    operationId: CreateDataRepConfig
    tags:
      - Data Reporting Configurations
    requestBody:
      description: >
        Representation of the Data Reporting Configuration to be created in the NEF.
      required: true
      content:
        application/json:
          schema:
            $ref:
'TS26532_Ndcaf_DataReportingProvisioning.yaml#/components/schemas/DataReportingConfiguration'
    responses:
      '201':
        description: Created. Successful creation of a new Data Reporting Configuration.
        content:
          application/json:
            schema:
              $ref:
'TS26532_Ndcaf_DataReportingProvisioning.yaml#/components/schemas/DataReportingConfiguration'
      headers:
        Location:
          required: true
          schema:
            type: string
          description: >
            Contains the URI of the newly created resource, according to the structure
            {apiRoot}/3gpp-data-reporting-
provisioning/<apiVersion>/sessions/{sessionId}/configurations/{configurationId}
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/sessions/{sessionId}/configurations/{configurationId}:
  parameters:
    - name: sessionId
      in: path
      description: Identifier of the Data Reporting Provisioning Session.
      required: true
      schema:
        type: string
    - name: configurationId
      in: path
      description: Identifier of the Data Reporting Configuration.
      required: true
      schema:
        type: string
  get:
    summary: Request the retrieval of an existing Individual Data Reporting Configuration resource.
    operationId: GetIndDataRepConfig
    tags:
      - Individual Data Reporting Configuration
    responses:
      '200':
        description: >
          OK. The requested Individual Data Reporting Configuration resource is successfully
          returned.
        content:
          application/json:
            schema:
              $ref: 'TS26532_Ndcaf_DataReportingProvisioning.yaml#/components/schemas/DataReportingConfiguration'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Request to update an existing Individual Data Reporting Configuration resource.
    operationId: UpdateIndDataRepConfig
    tags:
      - Individual Data Reporting Configuration
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: 'TS26532_Ndcaf_DataReportingProvisioning.yaml#/components/schemas/DataReportingConfiguration'
    responses:
      '200':
        description: >
          OK. The Individual Data Reporting Configuration resource was successfully updated.
        content:
          application/json:
            schema:

```

```

    $ref:
'TS26532_Ndcaf_DataReportingProvisioning.yaml#/components/schemas/DataReportingConfiguration'
  '204':
    description: >
      No Content. The Individual Data Reporting Configuration resource was successfully
      updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: Request to modify an existing Individual Data Reporting Configuration resource.
  operationId: ModifyIndDataRepConfig
  tags:
    - Individual Data Reporting Configuration
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref:
'TS26532_Ndcaf_DataReportingProvisioning.yaml#/components/schemas/DataReportingConfigurationPatch'
  responses:
    '200':
      description: >
        OK. The Individual Data Reporting Configuration resource was successfully modified.
      content:
        application/json:
          schema:
            $ref:
'TS26532_Ndcaf_DataReportingProvisioning.yaml#/components/schemas/DataReportingConfiguration'
  '204':
    description: >
      No Content. The Individual Data Reporting Configuration resource was successfully
      modified and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'

```

```

'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

```

summary: Deletes an already existing Data Reporting Configuration resource.
operationId: DeleteIndDataRepConfig
tags:
  - Individual Data Reporting Configuration
responses:
  '204':
    description: >
      No Content. The concerned Individual Data Reporting Configuration resource was
      successfully deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

---

## A.23 UEId API

openapi: 3.0.0

#### info:

```

title: 3gpp-ueid
version: 1.2.0-alpha.2
description: |
  API for UE ID service.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.

```

#### externalDocs:

```

description: 3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

#### security:

```

- {}
- oAuth2ClientCredentials: []

```

#### servers:

```

- url: '{apiRoot}/3gpp-ueid/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

#### paths:

```

/retrieve:
  post:

```



```
summary: Retrieve AF specific UE ID.
operationId: RetrieveUEId
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/UeIdReq'
responses:
  '200':
    description: The requested information was returned successfully.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/UeIdInfo'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/get-msisdn:
  post:
    summary: GET the MSISDN of the UE.
    operationId: GetMsisdn
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MsisdnReq'
    responses:
      '200':
        description: Successful case. The requested UE ID in the form of MSISDN is returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MsisdnInfo'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/verify-msisdn:
  post:
    summary: Request to verify whether the UE's MSISDN provided by the AF matches the UE ID in the
    form of MSISDN retrieved from the UDM.
    operationId: VerifyMsisdn
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MsisdnVerifReq'
    responses:
      '200':
        description: >
          OK. The MSISDN verification request is successfully received and processed, and the
          MSISDN verification outcome is returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MsisdnVerifResp'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/pp:
  parameters:
    - name: afId
      in: path
      description: Represents the identifier of the AF.
      required: true
      schema:
        type: string

get:
  summary: Request to retrieve all the active UE ID Mapping Information Provisionings at the NEF.
  operationId: GetUeIdMappingProvisionings
  tags:
    - UE ID Mapping Information Provisionings (Collection)
  responses:
    '200':
      description: >
        OK. All the Individual UE ID Mapping Information Provisioning resource(s) managed by the
        NEF are returned.
        If there are no existing Individual UE ID Mapping Information Provisioning resources at
        the NEF, an empty array is returned.
      content:
        application/json:

```

```

    schema:
      type: array
      items:
        $ref: '#/components/schemas/UeIdMappingInfo'
      minItems: 0
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

post:

summary: Request the creation of a new UE ID Mapping Information Provisioning.  
 operationId: CreateUeIdMappingProvisioning

tags:

- UE ID Mapping Information Provisioning (Collection)

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/UeIdMappingInfo'

responses:

'201':

description: >

Created. A representation of the created Individual UE ID Mapping Information Provisioning resource is returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/UeIdMappingInfo'

headers:

Location:

description: >

Contains the URI of the newly created resource.

required: true

schema:

type: string

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

```
/{afId}/pp/{ppId}:
  parameters:
    - name: afId
      in: path
      description: Represents the identifier of the AF.
      required: true
      schema:
        type: string
    - name: ppId
      in: path
      description: >
        Represents the identifier of the Individual UE ID Mapping Information Provisioning
        resource.
      required: true
      schema:
        type: string

  get:
    summary: Request to retrieve an existing Individual UE ID Mapping Information Provisioning
    resource.
    operationId: GetIndUeIdMappingProvisioning
    tags:
      - Individual UE ID Mapping Information Provisioning (Document)
    responses:
      '200':
        description: >
          OK. The requested Individual UE ID Mapping Information Provisioning resource is returned
          in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/UeIdMappingInfo'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Request the update of an existing Individual UE ID Mapping Information Provisioning
    resource.
    operationId: UpdateIndUeIdMappingProvisioning
    tags:
      - Individual UE ID Mapping Information Provisioning (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/UeIdMappingInfo'
    responses:
      '200':
        description: >
          OK. The Individual UE ID Mapping Information Provisioning resource is successfully
          updated and a representation of the updated resource is returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/UeIdMappingInfo'
      '204':
        description: >
```

No Content. The Individual UE ID Mapping Information Provisioning resource is successfully updated and no content is returned in the response body.

```
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

patch:

summary: Request the modification of an existing Individual UE ID Mapping Information Provisioning resource.

operationId: ModifyIndUeIdMappingProvisioning

tags:

- Individual UE ID Mapping Information Provisioning (Document)

requestBody:

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/UeIdMappingInfoPatch'

responses:

```
'200':
  description: >
    OK. The Individual UE ID Mapping Information Provisioning resource is successfully
    modified and a representation of the updated resource is returned in the response body.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/UeIdMappingInfo'
'204':
  description: >
    No Content. The Individual UE ID Mapping Information Provisioning resource is
    successfully modified and no content is returned in the response body.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
```

```
$ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: Request the deletion of an existing Individual UE ID Mapping Information Provisioning
resource.
  operationId: DeleteIndUeIdMappingProvisioning
  tags:
    - Individual UE ID Mapping Information Provisioning (Document)
  responses:
    '204':
      description: >
        No Content. The Individual UE ID Mapping Information Provisioning resource is
        successfully deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    UeIdReq:
      description: Represents the parameters to request the retrieval of AF specific UE ID.
      type: object
      properties:
        afId:
          type: string
        appPortId:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Port'
        dnn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
        ipDomain:
          type: string
        mtcProviderId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
        portNumber:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Port'
        snssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        ueIpAddr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
        ueMacAddr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - afId
      oneOf:
        - required: [ueIpAddr]
        - required: [ueMacAddr]

    UeIdInfo:
```

```
description: Represents UE ID information.
type: object
properties:
  externalId:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalId'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - externalId
```

```
MsisdnReq:
description: Represents the parameters to request the retrieval of MSISDN of the UE.
type: object
properties:
  afId:
    type: string
  appPortId:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Port'
  dnn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  ipDomain:
    type: string
  mtcProviderId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
  portNumber:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Port'
  snssai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  ueIpAddr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
  ueMacAddr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - afId
oneOf:
  - required: [ueIpAddr]
  - required: [ueMacAddr]
```

```
MsisdnInfo:
description: Represents MSISDN information.
type: object
properties:
  msisdn:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Msisdn'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - msisdn
```

```
MsisdnVerifReq:
description: Represents the MSISDN verification request.
type: object
properties:
  afId:
    type: string
  msisdn:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Msisdn'
  appPortId:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Port'
  dnn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  ipDomain:
    type: string
  mtcProviderId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
  portNumber:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Port'
  snssai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  ueIpAddr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
  ueMacAddr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
```

```

    - afId
    - msisdn
  oneOf:
    - required: [ueIpAddr]
    - required: [ueMacAddr]

  MsisdnVerifResp:
    description: Represents the MSISDN verification response.
    type: object
    properties:
      verifResult:
        type: boolean
        description: >
          Indicates the verification result on whether the UE's MSISDN provided by the AF matches
          the UE's MSISDN retrieved from the UDM or not.
          Set to true if the UE's MSISDN provided by the AF matches the UE's MSISDN retrieved
          from the UDM.
          Set to false if the UE's MSISDN provided by the AF does not match the UE's MSISDN
          retrieved from UDM.
    required:
      - verifResult

  UeIdMappingInfo:
    description: >
      Represents the UE ID Mapping Information Provisioning.
    type: object
    properties:
      rsUeIdMappingInfo:
        $ref: '#/components/schemas/RangSlUeIdMapInfo'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

  RangSlUeIdMapInfo:
    description: >
      Represents the Ranging/Sidelink UE ID mapping information between the Application Layer ID
      and the GPSI.
    type: object
    properties:
      appLayerId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationlayerId'
      gpsi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    required:
      - appLayerId
      - gpsi

  UeIdMappingInfoPatch:
    description: >
      Represents the requested modification to a UE ID Mapping Information Provisioning.
    type: object
    properties:
      rsUeIdMappingInfo:
        $ref: '#/components/schemas/RangSlUeIdMapInfo'

```

---

## A.24 MBSUserService API

openapi: 3.0.0

```

info:
  title: 3gpp-mbs-us
  version: 1.1.0
  description: |
    API for MBS User Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V18.6.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

servers:
  - url: '{apiRoot}/3gpp-mbs-us/v1'
    variables:
      apiRoot:

```



default: https://example.com  
 description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

## security:

- {}
- oAuth2ClientCredentials: []

## paths:

/mbs-user-services:

## get:

summary: Retrieve all the active MBS User Service resources managed by the NEF.  
 tags:  
 - MBS User Services  
 operationId: RetrieveMBSUserServices  
 responses:  
 '200':  
 description: >  
 OK. All the active MBS User Services managed by the NEF are returned.  
 content:  
 application/json:  
 schema:  
 type: array  
 items:  
 \$ref: 'TS29580\_Nmbfsf\_MBSUserService.yaml#/components/schemas/MBSUserService'  
 minItems: 0  
 '307':  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/307'  
 '308':  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/308'  
 '400':  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/400'  
 '401':  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/401'  
 '403':  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/403'  
 '404':  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/404'  
 '406':  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/406'  
 '429':  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/429'  
 '500':  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/500'  
 '503':  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/503'  
 default:  
 \$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

## post:

summary: Request the creation of a new Individual MBS User Service resource.  
 tags:  
 - MBS User Services  
 operationId: CreateMBSUserService  
 requestBody:  
 description: >  
 Contains the parameters to request the creation of a new MBS User Service at the NEF.  
 required: true  
 content:  
 application/json:  
 schema:  
 \$ref: 'TS29580\_Nmbfsf\_MBSUserService.yaml#/components/schemas/MBSUserService'  
 responses:  
 '201':  
 description: >  
 Created. A new MBS User Service is successfully created and a representation of the created Individual MBS User Service resource is returned.  
 content:  
 application/json:  
 schema:  
 \$ref: 'TS29580\_Nmbfsf\_MBSUserService.yaml#/components/schemas/MBSUserService'  
 headers:  
 Location:  
 description: >  
 Contains the URI of the newly created resource, according to the structure {apiRoot}/3gpp-mbs-us/v1/mbs-user-services/{mbsUserServId}  
 required: true  
 schema:  
 type: string

```

'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/mbs-user-services/{mbsUserServId}:

parameters:

```

- name: mbsUserServId
  in: path
  description: Identifier of the Individual MBS User Service resource.
  required: true
  schema:
    type: string

```

get:

summary: Retrieve an existing Individual MBS User Service resource.

tags:

- Individual MBS User Service

operationId: RetrieveIndivMBSUserService

responses:

```

'200':
  description: >
    OK. The requested Individual MBS User Service resource is successfully returned.
  content:
    application/json:
      schema:
        $ref: 'TS29580_Nmbfsf_MBSUserService.yaml#/components/schemas/MBSUserService'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

summary: Request the update of an existing Individual MBS User Service resource.

tags:

- Individual MBS User Service

operationId: UpdateIndivMBSUserService

requestBody:

description: >

Contains the updated representation of the Individual MBS User Service resource.

required: true

```

    content:
      application/json:
        schema:
          $ref: 'TS29580_Nmbfsf_MBSUserService.yaml#/components/schemas/MBSUserService'
  responses:
    '200':
      description: >
        OK. The concerned Individual MBS User Service resource is successfully updated and a
        representation of the updated resource is returned.
      content:
        application/json:
          schema:
            $ref: 'TS29580_Nmbfsf_MBSUserService.yaml#/components/schemas/MBSUserService'
    '204':
      description: >
        No Content. The concerned Individual MBS User Service resource is successfully updated.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: Request the modification of an existing Individual MBS User Service resource.
  tags:
    - Individual MBS User Service
  operationId: ModifyIndivMBSUserService
  requestBody:
    description: >
      Contains the parameters to request the modification of the Individual MBS User
      Service resource.
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: 'TS29580_Nmbfsf_MBSUserService.yaml#/components/schemas/MBSUserServicePatch'
  responses:
    '200':
      description: >
        OK. The concerned Individual MBS User Service resource is successfully modified and a
        representation of the updated resource is returned.
      content:
        application/json:
          schema:
            $ref: 'TS29580_Nmbfsf_MBSUserService.yaml#/components/schemas/MBSUserService'
    '204':
      description: >
        No Content. The concerned Individual MBS User Service resource is successfully modified.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Deletes an existing Individual MBS User Service resource.

#### tags:

- Individual MBS User Service

operationId: DeleteIndivMBSUserService

#### responses:

```

  '204':
    description: >
      No Content. The Individual MBS User Service resource is successfully deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### components:

```

  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

```

```

#
# STRUCTURED DATA TYPES
#

```

```

# SIMPLE DATA TYPES
#

```

```

#
# ENUMERATIONS
#

```

## A.25 MBSUserDataIngestSession API

openapi: 3.0.0

#### info:

title: 3gpp-mbs-ud-ingest

```
version: 1.2.0-alpha.2
description: |
  API for MBS User Data Ingest Session.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

```
externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'
```

```
servers:
  - url: '{apiRoot}/3gpp-mbs-ud-ingest/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122
```

```
security:
  - {}
  - oAuth2ClientCredentials: []
```

```
paths:
  /sessions:
    get:
      summary: Retrieve all the active MBS User Data Ingest Sessions managed by the NEF.
      tags:
        - MBS User Data Ingest Sessions (Collection)
      operationId: RetrieveMBSUserDataIngestSessions
      responses:
        '200':
          description: >
            OK. All the active MBS User Data Ingest Sessions managed by the NEF are returned.
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref:
                    'TS29580_Nmbssf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngSession'
              minItems: 0
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    post:
      summary: Request the creation of a new Individual MBS User Data Ingest Session resource.
      tags:
        - MBS User Data Ingest Sessions (Collection)
      operationId: CreateMBSUserDataIngestSession
      requestBody:
        description: >
          Contains the parameters to request the creation of a new MBS User Data Ingest Session
          at the NEF.
        required: true
        content:
          application/json:
            schema:
```

```

    $ref:
'TS29580_Nmbf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngestSession'
  responses:
    '201':
      description: >
        Created. A new MBS User Data Ingest Session is successfully created and a representation
        of the created Individual MBS User Data Ingest Session resource is returned.
      content:
        application/json:
          schema:
            $ref:
'TS29580_Nmbf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngestSession'
      headers:
        Location:
          description: >
            Contains the URI of the newly created resource, according to the structure
            {apiRoot}/3gpp-mbs-ud-ingest/v1/sessions/{sessionId}
          required: true
          schema:
            type: string
    '400':
      description: >
        The request is rejected by the NEF and more details (along with ProblemDetails) may be
        returned.
      content:
        application/problem+json:
          schema:
            $ref:
'TS29580_Nmbf_MBSUserDataIngestSession.yaml#/components/schemas/ProblemDetailsMBS'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      description: >
        The request is rejected by the NEF and more details (along with ProblemDetails) may be
        returned.
      content:
        application/problem+json:
          schema:
            $ref:
'TS29580_Nmbf_MBSUserDataIngestSession.yaml#/components/schemas/ProblemDetailsMBS'
    '404':
      description: >
        The request is rejected by the NEF and more details (along with ProblemDetails) may be
        returned.
      content:
        application/problem+json:
          schema:
            $ref:
'TS29580_Nmbf_MBSUserDataIngestSession.yaml#/components/schemas/ProblemDetailsMBS'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/sessions/{sessionId}:
  parameters:
    - name: sessionId
      in: path
      description: Identifier of the Individual MBS User Data Ingest Session resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual MBS User Data Ingest Session resource.
    tags:
      - Individual MBS User Data Ingest Session (Document)

```

```

operationId: RetrieveIndivMBSUserDataIngestSession
responses:
  '200':
    description: >
      OK. The requested Individual MBS User Data Ingest Session resource is successfully
      returned.
    content:
      application/json:
        schema:
          $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngSession'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Request the update of an existing Individual MBS User Data Ingest Session resource.
  tags:
    - Individual MBS User Data Ingest Session (Document)
  operationId: UpdateIndivMBSUserDataIngestSession
  requestBody:
    description: >
      Contains the updated representation of the Individual MBS User Data Ingest Session
      resource.
    required: true
    content:
      application/json:
        schema:
          $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngSession'
  responses:
    '200':
      description: >
        OK. The concerned Individual MBS User Data Ingest Session resource is successfully
        updated and a representation of the updated resource is returned.
      content:
        application/json:
          schema:
            $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngSession'
    '204':
      description: >
        No Content. The concerned Individual MBS User Data Ingest Session resource is
        successfully updated.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      description: >
        The request is rejected by the NEF and more details (along with ProblemDetails) may be
        returned.
      content:
        application/problem+json:
          schema:
            $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/ProblemDetailsMBS'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'

```

```

    '403':
      description: >
        The request is rejected by the NEF and more details (along with ProblemDetails) may be
        returned.
      content:
        application/problem+json:
          schema:
            $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/ProblemDetailsMBS'
    '404':
      description: >
        The request is rejected by the NEF and more details (along with ProblemDetails) may be
        returned.
      content:
        application/problem+json:
          schema:
            $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/ProblemDetailsMBS'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  patch:
    summary: Request the modification of an existing Individual MBS User Data Ingest Session
    resource.
    tags:
      - Individual MBS User Data Ingest Session (Document)
    operationId: ModifyIndivMBSUserDataIngestSession
    requestBody:
      description: >
        Contains the parameters to request the modification of the Individual MBS User Data Ingest
        Session resource.
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngSessionPatch'
    responses:
      '200':
        description: >
          OK. The concerned Individual MBS User Data Ingest Session resource is successfully
          modified and a representation of the updated resource is returned.
        content:
          application/json:
            schema:
              $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngSession'
      '204':
        description: >
          No Content. The concerned Individual MBS User Data Ingest Session resource is
          successfully modified.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        description: >
          The request is rejected by the NEF and more details (along with ProblemDetails) may be
          returned.
        content:
          application/problem+json:
            schema:
              $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/ProblemDetailsMBS'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'

```



```

'403':
  description: >
    The request is rejected by the NEF and more details (along with ProblemDetails) may be
    returned.
  content:
    application/problem+json:
      schema:
        $ref:
'TS29580_Nmbssf_MBSUserDataIngestSession.yaml#/components/schemas/ProblemDetailsMBS'
'404':
  description: >
    The request is rejected by the NEF and more details (along with ProblemDetails) may be
    returned.
  content:
    application/problem+json:
      schema:
        $ref:
'TS29580_Nmbssf_MBSUserDataIngestSession.yaml#/components/schemas/ProblemDetailsMBS'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Deletes an existing Individual MBS User Data Ingest Session resource.

#### tags:

- Individual MBS User Data Ingest Session (Document)

operationId: DeleteIndivMBSUserDataIngestSession

#### responses:

```

'204':
  description: >
    No Content. The Individual MBS User Data Ingest Session resource is successfully
    deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### /status-subscriptions:

##### get:

summary: Retrieve all the active MBS User Data Ingest Session Status Subscriptions resources managed by the NEF.

#### tags:

- MBS User Data Ingest Session Status Subscriptions (Collection)

operationId: RetrieveMBSUserDataIngStatSubscs

#### responses:

```

'200':
  description: >
    OK. All the active MBS User Data Ingest Session Status Subscriptions managed by the NEF
    are returned.
  content:

```

```

    application/json:
      schema:
        type: array
        items:
          $ref:
'TS29580_Nmbssf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngStatSubsc'
        minItems: 0
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Creates a new Individual MBS User Data Ingest Session Status Subscription resource.
  tags:
    - MBS User Data Ingest Session Status Subscriptions (Collection)
  operationId: CreateMBSUserDataIngStatSubsc
  requestBody:
    description: >
      Contains the parameters to request the creation of a new MBS User Data Ingest Session
      Status Subscription resource.
    required: true
    content:
      application/json:
        schema:
          $ref:
'TS29580_Nmbssf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngStatSubsc'
  responses:
    '201':
      description: >
        Created. Successful creation of a new Individual MBS User Data Ingest Session
        Status Subscription resource.
      content:
        application/json:
          schema:
            $ref:
'TS29580_Nmbssf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngStatSubsc'
  headers:
    Location:
      description: Contains the URI of the newly created resource.
      required: true
      schema:
        type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    mbsUserDataIngestSessionStatusNotif:
      '{$request.body#/notifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngStatNotif'
      responses:
        '204':
          description: No Content. Successful reception of the notification.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/status-subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Identifier of the Individual MBS User Data Ingest Session Status Subscription resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual MBS User Data Ingest Session Status Subscription
    resource.
    tags:
      - Individual MBS User Data Ingest Session Status Subscription (Document)
    operationId: RetrieveIndMBSUserDataIngStatSubsc
    responses:
      '200':
        description: >
          OK. Successful retrieval of the requested Individual MBS User Data Ingest Session
          Status Subscription resource.
        content:
          application/json:
            schema:
              $ref:
'TS29580_Nmbfsf_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngStatSubsc'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

summary: Request the update of an existing Individual MBS User Data Ingest Session Status Subscription resource.

tags:

- Individual MBS User Data Ingest Session Status Subscription (Document)

operationId: UpdateIndMBSUserDataIngStatSubsc

requestBody:

description: >

Contains the updated representation of the Individual MBS User Data Ingest Session Status Subscription resource.

required: true

content:

application/json:

schema:

\$ref:

'TS29580\_Nmbfsf\_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngStatSubsc'

responses:

'200':

description: >

OK. The concerned Individual MBS User Data Ingest Session Status Subscription resource is successfully updated and a representation of the updated resource is returned in the response body.

content:

application/json:

schema:

\$ref:

'TS29580\_Nmbfsf\_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngStatSubsc'

'204':

description: >

No Content. The concerned Individual MBS User Data Ingest Session Status Subscription resource is successfully updated and no content is returned in the response body.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

patch:

summary: Request the modification of an existing Individual MBS User Data Ingest Session Status Subscription resource.

tags:

- Individual MBS User Data Ingest Session Status Subscription (Document)

operationId: ModifyIndMBSUserDataIngStatSubsc

requestBody:

description: >

Contains the parameters to request the modification of the Individual MBS User Data Ingest Session Status Subscription resource.

required: true

content:

application/merge-patch+json:

schema:

\$ref:

'TS29580\_Nmbf\_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngStatSubscPatch'

responses:

'200':

description: >

OK. The concerned Individual MBS User Data Ingest Session Status Subscription resource is successfully modified and a representation of the updated resource is returned in the response body.

content:

application/json:

schema:

\$ref:

'TS29580\_Nmbf\_MBSUserDataIngestSession.yaml#/components/schemas/MBSUserDataIngStatSubsc'

'204':

description: >

No Content. The concerned Individual MBS User Data Ingest Session Status Subscription resource is successfully modified and no content is returned in the response body.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Deletes an existing Individual MBS User Data Ingest Session Status Subscription resource.

tags:

- Individual MBS User Data Ingest Session Status Subscription (Document)

operationId: DeleteIndMBSUserDataIngStatSubsc

responses:

'204':

description: >

No Content. Successful deletion of the existing Individual MBS User Data Ingest Session Status Subscription resource.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

```

    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

#
# STRUCTURED DATA TYPES
#

# SIMPLE DATA TYPES
#

#
# ENUMERATIONS
#

```

---

## A.26 MSEventExposure API

openapi: 3.0.0

```

info:
  title: 3gpp-ms-event-exposure
  version: 1.2.0-alpha.2
  description: |
    API for Media Streaming Event Exposure.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

servers:
  - url: '{apiRoot}/3gpp-ms-event-exposure/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

paths:
  /subscriptions:
    get:
      summary: Retrieve all the active Media Streaming Event Exposure Subscription resources managed
      by the NEF.
      tags:
        - Media Streaming Event Exposure Subscriptions (Collection)
      operationId: RetrieveMSEventExposureSubscs
      responses:
        '200':
          description: >
            OK. All the active Media Streaming Event Exposure Subscriptions managed by the NEF are
            returned.
          content:
            application/json:
              schema:

```

```

      type: array
      items:
        $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AfEventExposureSubsc'
      minItems: 0
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Request the creation of a new Individual Media Streaming Event Exposure Subscription
  resource.
  tags:
    - Media Streaming Event Exposure Subscriptions (Collection)
  operationId: CreateMSEventExposureSubsc
  requestBody:
    description: >
      Contains the parameters to request the creation of a new Media Streaming Event Exposure
      Subscriptionat the NEF.
    required: true
    content:
      application/json:
        schema:
          $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AfEventExposureSubsc'
  responses:
    '201':
      description: >
        Created. Successful creation of a new Individual Media Streaming Event Exposure
        Subscription resource.
      content:
        application/json:
          schema:
            $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AfEventExposureSubsc'
      headers:
        Location:
          description: Contains the URI of the newly created resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    msEventExposureNotif:
      '{$request.body#/notifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AfEventExposureNotif'
          responses:
            '204':
              description: No Content. Successful reception of the notification.
            '307':
              $ref: 'TS29122_CommonData.yaml#/components/responses/307'
            '308':
              $ref: 'TS29122_CommonData.yaml#/components/responses/308'
            '400':
              $ref: 'TS29122_CommonData.yaml#/components/responses/400'
            '401':
              $ref: 'TS29122_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29122_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29122_CommonData.yaml#/components/responses/404'
            '411':
              $ref: 'TS29122_CommonData.yaml#/components/responses/411'
            '413':
              $ref: 'TS29122_CommonData.yaml#/components/responses/413'
            '415':
              $ref: 'TS29122_CommonData.yaml#/components/responses/415'
            '429':
              $ref: 'TS29122_CommonData.yaml#/components/responses/429'
            '500':
              $ref: 'TS29122_CommonData.yaml#/components/responses/500'
            '503':
              $ref: 'TS29122_CommonData.yaml#/components/responses/503'
            default:
              $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Identifier of the Individual Media Streaming Event Exposure Subscription resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual Media Streaming Event Exposure Subscription resource.
    tags:
      - Individual Media Streaming Event Exposure Subscription (Document)
    operationId: RetrieveIndivMSEventExposureSubsc
    responses:
      '200':
        description: >
          OK. The requested Individual Media Streaming Event Exposure Subscription resource is
          successfully returned.
        content:
          application/json:
            schema:
              $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AfEventExposureSubsc'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'

```



```

'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

summary: Request the update of an existing Individual Media Streaming Event Exposure Subscription resource.

tags:

- Individual Media Streaming Event Exposure Subscription (Document)

operationId: UpdateIndivMSEventExposureSubsc

requestBody:

description: >

Contains the updated representation of the Individual Media Streaming Event Exposure Subscription resource.

required: true

content:

application/json:

schema:

\$ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/AfEventExposureSubsc'

responses:

'200':

description: >

OK. The concerned Individual Media Streaming Event Exposure Subscription resource is successfully updated and a representation of the updated resource is returned in the response body.

content:

application/json:

schema:

\$ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/AfEventExposureSubsc'

'204':

description: >

No Content. The concerned Individual Media Streaming Event Exposure Subscription resource was successfully updated and no content is returned in the response body.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Request the deletion of an existing Individual Media Streaming Event Exposure Subscription resource.

tags:

- Individual Media Streaming Event Exposure Subscription (Document)

operationId: DeleteIndivMSEventExposureSubsc

responses:

'204':

description: >

No Content. The Individual Media Streaming Event Exposure Subscription resource is

```
      successfully deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
```

```
#
# STRUCTURED DATA TYPES
#
```

```
# SIMPLE DATA TYPES
#
```

```
#
# ENUMERATIONS
#
```

---

## A.27 MBSGroupMsgDelivery API

openapi: 3.0.0

```
info:
  title: 3gpp-mbs-group-msg
  version: 1.1.0-alpha.2
  description: |
    API for MBS Group Message Delivery.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
```

```
externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'
```

```
security:
  - {}
  - oAuth2ClientCredentials: []
```

```
servers:
  - url: '{apiRoot}/3gpp-mbs-group-msg/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.
```

```
paths:
  /deliveries:
    get:
      summary: Retrieve all the active MBS Group Message Deliveries.
```

```

operationId: GetMbsGroupMsgDeliveries
tags:
  - MBS Group Message Deliveries (Collection)
responses:
  '200':
    description: >
      OK. All the active MBS Group Message Deliveries managed by the NEF are returned.
      If there are no active MBS Group Message Delivery(ies) is available at the NEF, an empty
      array shall be returned.
    content:
      application/json:
        schema:
          type: array
          items:
            $ref: '#/components/schemas/MbsGroupMsgDel'
          minItems: 0
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

post:
  summary: Request the creation of an MBS Group Message Delivery.
  operationId: CreateMbsGroupMsgDelivery
  tags:
    - MBS Group Message Deliveries (Collection)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MbsGroupMsgDel'
  responses:
    '201':
      description: >
        Created. Successful case. The requested MBS Group Message Delivery is successfully
        created.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MbsGroupMsgDel'
      headers:
        Location:
          description: Contains the URI of the newly created resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  MbsGroupMsgDelStatusNotif:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          description: >
            Represents the notification on the status of MBS Group Message Delivery.
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/MbsGroupMsgDelStatusNotif'
        responses:
          '204':
            description: >
              No content. The MBS Group Message Delivery Status notification is successfully
              received.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/deliveries/{delRef}:
  parameters:
    - name: delRef
      in: path
      description: >
        Contains the identifier of the Individual MBS Group Message Delivery resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual MBS Group Message Delivery resource.
    operationId: GetMbsGroupMsgDelivery
    tags:
      - Individual MBS Group Message Delivery (Document)
    responses:
      '200':
        description: >
          OK. The requested Individual MBS Group Message Delivery resource is successfully
          returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MbsGroupMsgDel'

```

```

'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

summary: Request the modification of an existing Individual MBS Group Message Delivery resource.

operationId: ModifyMbsGroupMsgDelivery

tags:

- Individual MBS Group Message Delivery (Document)

requestBody:

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/MbsGroupMsgDelPatch'

responses:

'200':

description: >

OK. The MBS Group Message Delivery is successfully modified and a representation of the updated resource is returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/MbsGroupMsgDel'

'204':

description: >

No Content. The MBS Group Message Delivery is successfully modified and no content is returned in the response body.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Request the deletion of an existing Individual MBS Group Message Delivery resource.

operationId: DeleteMbsGroupMsgDelivery

```

tags:
- Individual MBS Group Message Delivery (Document)
responses:
'204':
  description: >
    No Content. The Individual MBS Group Message Delivery resource is successfully deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

```

```
schemas:
```

#### # STRUCTURED DATA TYPES

```

MbsGroupMsgDel:
  description: Represents the MBS Group Message Delivery.
  type: object
  properties:
    afId:
      type: string
    extGroupId:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
    payload:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bytes'
    mbsServArea:
      $ref: '#/components/schemas/MbsServArea'
    startTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    endTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    delStatus:
      type: boolean
      description: >
        Indicates the status of Group Message Delivery.
        true indicates a successful delivery.
        false indicates a failed delivery.
    mbsUserServAnmt:
      $ref: 'TS26517_MBSUserServiceAnnouncement.yaml#/components/schemas/UserServiceDescription'
    servAreaWithoutMbs:
      $ref: '#/components/schemas/MbsServArea'
    nrRedCapUeInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NrRedCapUeInfo'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - extGroupId
    - payload
    - mbsServArea
    - startTime
    - endTime

```

- notifUri

MbsGroupMsgDelPatch:

description: Represents the requested modifications to an existing MBS Group Message Delivery.

type: object

properties:

payload:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/Bytes'

mbsServArea:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/MbsServArea'

startTime:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

endTime:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

notifUri:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/Uri'

nrRedCapUeInfo:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/NrRedCapUeInfo'

MbsGroupMsgDelStatusNotif:

description: Represents the status notification information for an MBS group message delivery.

type: object

properties:

delStatus:

type: boolean

description: >

Indicates the status of Group Message Delivery.

true indicates a successful delivery.

false indicates a failed delivery.

required:

- delStatus

# SIMPLE DATA TYPES

#

#

# ENUMERATIONS

#

# Data types describing alternative data types or combinations of data types

MbsServArea:

description: Represents an MBS Service Area.

oneOf:

- \$ref: 'TS29571\_CommonData.yaml#/components/schemas/MbsServiceArea'

- \$ref: 'TS29571\_CommonData.yaml#/components/schemas/ExternalMbsServiceArea'

## A.28 DNAI Mapping API

openapi: 3.0.0

info:

title: 3gpp-dnai-mapping

version: 1.0.0

description: |

API for DNAI Mapping.

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externalDocs:

description: >

3GPP TS 29.522 V18.6.0; 5G System; Network Exposure Function Northbound APIs.

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.522/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-dnai-mapping/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```
paths:
  /{afId}/subscriptions:
    parameters:
      - name: afId
        in: path
        description: Represents the identifier of the AF.
        required: true
        schema:
          type: string

    get:
      summary: Read all the active DNAI Mapping Subscriptions managed by the NEF.
      operationId: ReadDNAIMapSubscs
      tags:
        - DNAI Mapping Subscriptions (Collection)
      responses:
        '200':
          description: >
            OK. All the Individual DNAI Mapping Subscription resource(s) managed by the NEF are
            returned.
            If there are no active Individual DNAI Mapping Subscription resources at the NEF, an
            empty array is returned.
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/DnaiMapSub'
                minItems: 0
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    post:
      summary: Create a new DNAI Mapping Subscription.
      operationId: DNAIMapSubsc
      tags:
        - DNAI Mapping Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DnaiMapSub'
      responses:
        '201':
          description: >
            Created. A representation of the created Individual DNAI Mapping Subscription resource
            is returned in the response body.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DnaiMapSub'
          headers:
            Location:
              description: Contains the URI of the newly created resource.
              required: true
              schema:
                type: string
```



```

'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  DNAIMapInfoUpdateNotif:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DnaiMapUpdateNotif'
        responses:
          '204':
            description: >
              No Content. The notification is successfully received and acknowledged.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}:
parameters:
- name: afId
  in: path
  description: Represents the identifier of the AF.
  required: true
  schema:
    type: string
- name: subscriptionId
  in: path
  description: Represents the identifier of the Individual DNAI Mapping Subscription resource.
  required: true
  schema:
    type: string

```

```
get:
  summary: Retrieve an existing Individual DNAI Mapping Subscription resource.
  operationId: ReadIndDNAIMapSubsc
  tags:
    - Individual DNAI Mapping Subscription (Document)
  responses:
    '200':
      description: >
        OK. The requested Individual DNAI Mapping Subscription resource is successfully returned
        in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DnaiMapSub'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
delete:
  summary: Delete an existing Individual DNAI Mapping Subscription resource.
  operationId: DeleteIndDNAIMapSubsc
  tags:
    - Individual Dnai Mapping Subscription (Document)
  responses:
    '204':
      description: >
        No Content. The Individual DNAI Mapping Subscription resource is successfully
        deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
```

```
schemas:
```

```

DnaiMapSub:
  description: Represents a DNAI Mapping Subscription.
  type: object
  properties:
    easIpAdrrs:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
      minItems: 1
      description: >
        Contains the IP address(es) of the EAS(s) in the Local part of the DN or the IP address
        Range(s)(IPv4 subnetwork(s) and/or IPv6 prefix(es)) of the Local part of the DN where the
        EAS(s) is/are deployed.
    fqdns:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
      minItems: 1
      description: >
        Contains the FQDN(s) of the EAS(s) in the Local part of the DN where the EAS(s) is/are
        deployed.
    dnn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    snssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    eventReq:
      $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
    immReports:
      type: array
      items:
        $ref: '#/components/schemas/DnaiMapUpdateNotif'
      minItems: 1
      description: Contains the DNAI EAS mapping information.
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    notifCorrId:
      type: string
      description: Contains the updated notification correlation identifier.
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  oneOf:
    - required: [easIpAdrrs]
    - required: [fqdns]
  required:
    - notifUri
    - notifCorrId

DnaiMapUpdateNotif:
  description: Represents a DNAI Mapping Information Update Notification.
  type: object
  properties:
    dnaiEasAddrMap:
      type: array
      items:
        $ref: 'TS29519_Application_Data.yaml#/components/schemas/DnaiEasInfo'
      minItems: 1
      description: >
        Contains the mapping information between DNAI(s) and EAS address(es).
    mappingId:
      type: string
      description: Identifies the provided mapping information.
    notifCorrId:
      type: string
      description: Contains the notification correlation identifier.
  required:
    - mappingId
    - notifCorrId

```

---

## A.29 PDTQPolicyNegotiation API

openapi: 3.0.0

```

info:
  title: 3gpp-pdtq-policy-negotiation
  version: 1.1.0-alpha.1
  description: |

```

API for PDTQ Policy Negotiation.  
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```
externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

security:
- {}
- oAuth2ClientCredentials: []

servers:
- url: '{apiRoot}/3gpp-pdtq-policy-negotiation/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:
  /{afId}/subscriptions:
    parameters:
      - name: afId
        description: Represents the identifier of the AF.
        in: path
        required: true
        schema:
          type: string

    get:
      summary: Retrieve all the active PDTQ Policy Subscriptions managed by the NEF.
      operationId: GetPDTQPolicySubscs
      tags:
        - PDTQ Policy Subscriptions (Collection)
      responses:
        '200':
          description: >
            OK. All the Individual PDTQ Policy Subscription resource(s) managed by the NEF are
            returned.
            If there are no active Individual PDTQ Policy Subscription resources at the NEF, an
            empty array is returned.
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/Pdtq'
                minItems: 0
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    post:
      summary: Create a new PDTQ Policy Subscription.
      operationId: CreatePDTQPolicySubsc
      tags:
        - PDTQ Policy Subscriptions (Collection)
```

```

requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/Pdtq'
responses:
  '201':
    description: >
      Created. A representation of the created Individual PDTQ Policy Subscription resource is
      returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/Pdtq'
    headers:
      Location:
        description: Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  PDTQWarningNotification:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/PdtqNotification'
        responses:
          '204':
            description: >
              No Content. The notification is successfully received and acknowledged.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':

```

```
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}:
  parameters:
    - name: afId
      description: Represents the identifier of the AF.
      in: path
      required: true
      schema:
        type: string
    - name: subscriptionId
      description: >
        Represents the identifier of the Individual PDTQ Policy Subscription resource.
      in: path
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual PDTQ Policy Subscription resource at the NEF.
    operationId: GetIndPDTQPolicySubsc
    tags:
      - Individual PDTQ Policy Subscription (Document)
    responses:
      '200':
        description: >
          OK. The requested Individual PDTQ Policy Subscription resource is successfully
          returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/Pdtq'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  patch:
    summary: Request the modification of an existing Individual PDTQ Policy Subscription resource.
    operationId: ModifyIndPDTQPolicySubsc
    tags:
      - Individual PDTQ Policy Subscription (Document)
    requestBody:
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/PdtqPatch'
    responses:
      '200':
        description: >
          OK. The Individual PDTQ Policy Subscription resource is successfully modified and a
          representation of the updated resource is returned in the response body.
        content:
          application/json:
            schema:
```

```

    $ref: '#/components/schemas/Pdtq'
  '204':
    description: >
      No Content. The Individual PDTQ Policy Subscription resource is successfully updated
      and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Request the deletion of an existing Individual PDTQ Policy Subscription resource.  
 operationId: DeleteIndPDTQPolicy

#### tags:

- Individual PDTQ Policy Subscription (Document)

#### responses:

```

  '204':
    description: >
      No Content. The Individual PDTQ Policy Subscription resource is successfully deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### components:

##### securitySchemes:

```

  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

##### schemas:

```

  Pdtq:
    description: Represents a PDTQ Policy Subscription.
    type: object
    properties:

```

```

altQosParamSets:
  type: array
  items:
    $ref: 'TS29543_Npcf_PDTQPolicyControl.yaml#/components/schemas/AltQosParamSet'
  minItems: 1
  description: >
    Contains the alternative QoS requirements as a list of individual QoS parameters
    sets in a prioritized order.
altQosRefs:
  type: array
  items:
    type: string
  minItems: 1
  description: >
    Contains the alternative QoS requirements as a list of QoS References in a
    prioritized order.
appId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationId'
aspId:
  description: Contains the identifier of the application service provider.
  type: string
desTimeInts:
  type: array
  items:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  minItems: 1
  description: Contains the time interval(s).
locationArea5G:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
notifUri:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
numberOfUEs:
  type: integer
  description: Contains the number of UEs.
pdtqPolicies:
  type: array
  items:
    $ref: 'TS29543_Npcf_PDTQPolicyControl.yaml#/components/schemas/PdtqPolicy'
  minItems: 1
  description: Contains the PDTQ policies.
qosParamSet:
  $ref: 'TS29543_Npcf_PDTQPolicyControl.yaml#/components/schemas/QosParameterSet'
qosReference:
  type: string
  description: >
    Contains the requested QoS requirements expressed as a QoS Reference.
referenceId:
  $ref: 'TS29543_Npcf_PDTQPolicyControl.yaml#/components/schemas/PdtqReferenceId'
selectedPolicy:
  type: integer
  description: >
    Contains the identifier of the selected PDTQ policy.
    This attribute shall not be present during resource creation, it may be provided only in
    a subsequent resource update.
warnNotifEnabled:
  type: boolean
  description: >
    Indicates whether the PDTQ warning notification is enabled (true) or not (false).
    Default value is false when this attribute is omitted.
suppFeat:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - aspId
  - desTimeInts
  - numberOfUEs
oneOf:
  - required: [qosReference]
  - required: [qosParamSet]

PdtqPatch:
  description: Represents the requested modification to a PDTQ Policy Subscription.
  type: object
  properties:
    selectedPolicy:
      type: integer
      description: Contains the Identifier of the selected PDTQ policy.
    warnNotifEnabled:
      type: boolean

```



```

    description: >
      Indicates whether the PDTQ warning notification is enabled (true) or not (false).
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

PdtqNotification:
  description: Represents a PDTQ Warning Notification.
  type: object
  properties:
    pdtqRefId:
      $ref: 'TS29543_Npcf_PDTQPolicyControl.yaml#/components/schemas/PdtqReferenceId'
    candPolicies:
      type: array
      items:
        $ref: 'TS29543_Npcf_PDTQPolicyControl.yaml#/components/schemas/PdtqPolicy'
      minItems: 1
      description: >
        Contains a list of the candidate PDTQ policies from which the AF may select
        a new PDTQ policy due to network performance or DN performance degradation.
  required:
    - pdtqRefId
    - candPolicies

```

---

## A.30 MemberUESelectionAssistance API

openapi: 3.0.0

```

info:
  title: 3gpp-musa
  version: 1.1.0-alpha.2
  description: |
    API for Member UE Selection Assistance.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

servers:
  - url: '{apiRoot}/3gpp-musa/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

paths:
  /{afId}/subscriptions:
    parameters:
      - name: afId
        in: path
        description: Represents the identifier of the AF
        required: true
        schema:
          type: string

```

```

    get:
      summary: Retrieve all the active Member UE Selection Assistance Subscriptions managed by the
NEF.
      operationId: GetMemberUESelectAssistSubsc
      tags:
        - Member UE Selection Assistance Subscriptions (Collection)
      responses:
        '200':
          description: >
            OK. All the Individual Member UE Selection Assistance Subscription resource(s) managed
            by the NEF are returned.
            If there are no active Individual Member UE Selection Assistance Subscription resources
            at the NEF, an empty array is returned.
          content:
            application/json:

```

```

    schema:
      type: array
      items:
        $ref: '#/components/schemas/MemUeSelectAssistSubsc'
      minItems: 0
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Create a new Member UE Selection Assistance Subscription.
  operationId: CreateMemberUESelectAssist
  tags:
    - Member UE Selection Assistance Subscriptions (Collection)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MemUeSelectAssistSubsc'
  responses:
    '201':
      description: >
        Created. A representation of the created Individual Member UE Selection Assistance
        Subscription resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MemUeSelectAssistSubsc'
      headers:
        Location:
          description: >
            Contains the URI of the newly created resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:

```

```

MemberUESelectAssistNotif:
  '{$request.body#/notifUri}':
    post:
      requestBody:
        required: true
        content:
          application/json:
            schema:
              type: array
              items:
                $ref: '#/components/schemas/MemUeSeletAssistNotif'
              minItems: 1
      responses:
        '204':
          description: >
            No Content. The notification is successfully received and acknowledged.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

/{afId}/subscriptions/{subscriptionId}:
  parameters:
    - name: afId
      in: path
      description: Represents the identifier of the AF.
      required: true
      schema:
        type: string
    - name: subscriptionId
      in: path
      description: >
        Represents the identifier of the Individual Member UE Selection Assistance Subscription
        resource.
      required: true
      schema:
        type: string

```

```

get:
  summary: Retrieve an existing Individual Member UE Selection Assistance Subscription resource.
  operationId: GetIndMemberUESelectAssistSubsc
  tags:
    - Individual Member UE Selection Assistance Subscription (Document)
  responses:
    '200':
      description: >
        OK. The requested Individual Member UE Selection Assistance Subscription resource is
        successfully returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MemUeSelectAssistSubsc'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

```

  summary: Request the update of an existing Individual Member UE Selection Assistance
Subscription resource.
  operationId: UpdateIndMemberUESelectAssistSubsc
  tags:
    - Individual Member UE Selection Assistance Subscription (Document)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MemUeSelectAssistSubsc'
  responses:
    '200':
      description: >
        OK. The Individual Member UE Selection Assistance Subscription resource is successfully
        updated and a representation of the updated resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MemUeSelectAssistSubsc'
    '204':
      description: >
        No Content. The Individual Member UE Selection Assistance Subscription resource is
        successfully updated and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

```

  summary: Request the Modification of an existing Individual Member UE Selection Assistance
Subscription resource.
  operationId: ModifyIndMemberUESelectAssistSubsc
  tags:
    - Individual Member UE Selection Assistance Subscription (Document)

```

```
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/MemUeSelectAssistSubscPatch'
responses:
  '200':
    description: >
      OK. The Individual Member UE Selection Assistance Subscription resource is successfully
      modified and a representation of the updated resource is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MemUeSelectAssistSubsc'
  '204':
    description: >
      No Content. The Individual Member UE Selection Assistance Subscription resource is
      successfully modified and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

**delete:**

summary: Request the deletion of an existing Individual Member UE Selection Assistance Subscription resource.

operationId: DeleteIndMemberUESelectAssistSubsc

**tags:**

- Individual Member UE Selection Assistance Subscription (Document)

**responses:**

```
'204':
  description: >
    No Content. The Individual Member UE Selection Assistance Subscription resource is
    successfully deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

schemas:
  MemUeSelectAssistSubsc:
    description: Represents a Member UE Selection Assistance Subscription.
    type: object
    properties:
      afId:
        type: string
        description: Represents the identifier of the AF.
      tgtUeIds:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        minItems: 1
        description: >
          Contains the list of identifier(s) of the UEs for which Member UE Selection Assistance
          Reporting is requested.
      tgtUeIps:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
        minItems: 1
        description: >
          Contains the IP addresses of a list of UEs for Member UE Selection Assistance
          Reporting.
      notifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      notifId:
        type: string
        description: Contains the Notification Correlation ID assigned by the AF.
      expTime:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      qosFilters:
        type: array
        items:
          $ref: '#/components/schemas/QoSFilterCriteria'
        minItems: 1
        description: Contains the QoS filtering criteria for Member UE selection.
      accRatTypeFilters:
        type: array
        items:
          $ref: '#/components/schemas/AccessRatTypeFilterCriteria'
        minItems: 1
        description: >
          Contains the Access types and Rat types filtering criteria for Member UE selection.
      e2eTransTimeFilters:
        type: array
        items:
          $ref: '#/components/schemas/E2ETransTimeFilterCriteria'
        minItems: 1
        description: >
          Contains the End-to-end data volume transfer time filtering criteria for Member UE
          selection.
      ueLocFilters:
        type: array
        items:
          $ref: '#/components/schemas/UeLocFilterCriteria'
        minItems: 1
        description: Contains the UE location filtering criteria for Member UE selection.
      ueHisLocFilters:
        type: array
        items:
          $ref: '#/components/schemas/UeHisLocFilterCriteria'
        minItems: 1
        description: >
          Contains the UE historical location filtering criteria for Member UE selection.
      ueDirFilters:
        type: array
        items:
```

```

    $ref: '#/components/schemas/UeDirectionFilterCriteria'
  minItems: 1
  description: Contains the UE direction filtering criteria for Member UE selection.
  ueDistanceFilters:
    type: array
    items:
      $ref: '#/components/schemas/UeDistanceFilterCriteria'
  minItems: 1
  description: Contains the UE distance filtering criteria for Member UE selection.
  serviceExpFilters:
    type: array
    items:
      $ref: '#/components/schemas/ServiceExpFilterCriteria'
  minItems: 1
  description: Contains the Service Experience filtering criteria for Member UE selection.
  dnnFilters:
    type: array
    items:
      $ref: '#/components/schemas/DnnFilterCriteria'
  minItems: 1
  description: Contains the DNN filtering criteria for Member UE selection.
  memUpdatePeriod:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  maxUeNum:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  timeWin:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - notifUri
    - notifId
  oneOf:
    - required: [tgtUeIds]
    - required: [tgtUeIps]
  anyOf:
    - required: [qosFilters]
    - required: [accRatTypeFilters]
    - required: [e2eTransTimeFilters]
    - required: [ueLocFilters]
    - required: [ueHisLocFilters]
    - required: [ueDirFilters]
    - required: [ueDistanceFilters]
    - required: [serviceExpFilters]
    - required: [dnnFilters]

```

#### QoSFilterCriteria:

```

description: Represents the QoS filtering criteria for Member UE selection.
type: object
properties:
  event:
    $ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/SmfEvent'
  appId:
    type: string
    description: Contains the identifier(s) of the application.
  dnn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  snssai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  ulDelay:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  dlDelay:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  rtDelay:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

```

#### AccessRatTypeFilterCriteria:

```

description: Represents the the Access types and RAT types filtering criteria for Member UE
selection.
type: object
properties:
  events:
    type: array
    items:
      $ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/SmfEvent'
  minItems: 1
  description: >
    Contains the SMF event(s) which may be used to retrieve the Access Type and/or RAT Type

```

of the selected UE.

dnn:  
\$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

snssai:  
\$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

accTypes:  
type: array  
items:  
\$ref: 'TS29571\_CommonData.yaml#/components/schemas/AccessType'

minItems: 1  
description: Contains the Access Types of the selected UE.

ratTypes:  
type: array  
items:  
\$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

minItems: 1  
description: Contains the RAT Types of the selected UE.

**E2ETransTimeFilterCriteria:**

description: >  
Represents the End-to-end data volume transfer time filtering criteria for Member UE selection.

type: object

properties:

event:  
\$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NwdafEvent'

appId:  
type: string  
description: Contains the identifier of the application.

dnn:  
\$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

snssai:  
\$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

dataVolTransTime:  
\$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/DataVolumeTransferTime'

geoDistrInfos:  
type: array  
items:  
\$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/GeoDistributionInfo'

minItems: 1  
description: Indicates the geographical distribution of the UEs per location information.

locationArea:  
\$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

numDataTrans:  
\$ref: 'TS29571\_CommonData.yaml#/components/schemas/UInteger'

timeInterval:  
\$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSec'

**UeLocFilterCriteria:**

description: >  
Represents the UE location filtering criteria for Member UE selection.

type: object

properties:

event:  
\$ref: 'TS29518\_Namf\_EventExposure.yaml#/components/schemas/AmfEventType'

loc:  
\$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

**UeHisLocFilterCriteria:**

description: >  
Represents the UE historical location filtering criteria for Member UE selection.

type: object

properties:

event:  
\$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NwdafEvent'

loc:  
\$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

**UeDirectionFilterCriteria:**

description: >  
Represents the UE direction filtering criteria for Member UE selection.

type: object

properties:

event:  
\$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NwdafEvent'

directions:  
type: array  
items:



```

    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/Direction'
    minItems: 1
    description: Contains the moving directions of the UEs.

```

#### UeDistanceFilterCriteria:

```

description: >
  Represents the UE distance filtering criteria for Member UE selection.
type: object
properties:
  event:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NwdafEvent'
  distance:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'

```

#### ServiceExpFilterCriteria:

```

description: >
  Represents the Service Experience filtering criteria for Member UE selection.
type: object
properties:
  event:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NwdafEvent'
  dnn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  snssai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  appId:
    type: string
    description: Contains the Identifier(s) of the application.
  dnai:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
  loc:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  contribWeightThr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
  expTypes:
    type: array
    items:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/ServiceExperienceType'
    minItems: 1
    description: Contains the Service Experience Types.

```

#### DnnFilterCriteria:

```

description: >
  Represents the DNN filtering criteria for Member UE selection.
type: object
properties:
  event:
    $ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/SmfEvent'
  dnn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'

```

#### MemUeSeletAssistNotif:

```

description: Represents a Member UE Selection Assistance Notification.
type: object
properties:
  notifId:
    type: string
  candiUeInfos:
    type: array
    items:
      $ref: '#/components/schemas/CandiUeListInfo'
    minItems: 1
    description: >
      Contains the list of candidate UEs information for Member Selection Assistance Reporting.
  memUeSelectRpts:
    type: array
    items:
      $ref: '#/components/schemas/MemUeSeletReport'
    minItems: 1
    description: Contains the list of UEs for Member Selection Assistance Reporting.
required:
  - notifId
  - candiUeInfos

```

#### MemUeSeletReport:

```

description: Represents a the Member UE Selection report.
type: object

```

```
properties:
  criterionType:
    $ref: '#/components/schemas/FilterCriterionType'
  numForCriterion:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
required:
- criterionType
- numForCriterion

CandiUeListInfo:
description: Represents the list of candidate UEs information.
type: object
properties:
  candUeInfos:
    type: array
    items:
      $ref: '#/components/schemas/CandUeInfo'
    minItems: 1
  remdTimeWin:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
required:
- candUeInfos

CandUeInfo:
description: Represents the candidate UE information.
type: object
properties:
  candUeId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
  candUeIp:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
  qosFilter:
    $ref: '#/components/schemas/QoSFilterCriteria'
  accRatTypeFilter:
    $ref: '#/components/schemas/AccessRatTypeFilterCriteria'
  e2eTransTimeFilter:
    $ref: '#/components/schemas/E2ETransTimeFilterCriteria'
  ueLocFilter:
    $ref: '#/components/schemas/UeLocFilterCriteria'
  ueHisLocFilter:
    $ref: '#/components/schemas/UeHisLocFilterCriteria'
  ueDirFilter:
    $ref: '#/components/schemas/UeDirectionFilterCriteria'
  ueDistanceFilter:
    $ref: '#/components/schemas/UeDistanceFilterCriteria'
  serviceExpFilter:
    $ref: '#/components/schemas/ServiceExpFilterCriteria'
  dnnFilter:
    $ref: '#/components/schemas/DnnFilterCriteria'
oneOf:
- required: [candUeId]
- required: [candUeIp]

MemUeSelectAssistSubscPatch:
description: >
  Represents the requested modifications to aMember UE Selection Assistance Subscription.
type: object
properties:
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  notifId:
    type: string
  expTime:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  qosFilters:
    type: array
    items:
      $ref: '#/components/schemas/QoSFilterCriteria'
    minItems: 1
  description: Contains the updatedQoS filtering criteria for Member UE selection.
  accRatTypeFilters:
    type: array
    items:
      $ref: '#/components/schemas/AccessRatTypeFilterCriteria'
    minItems: 1
  description: >
    Contains the updated Access types and Rat types filtering criteria for Member UE
    selection.
```

```
e2eTransTimeFilters:
  type: array
  items:
    $ref: '#/components/schemas/E2ETransTimeFilterCriteria'
  minItems: 1
  description: >
    Contains the updated End-to-end data volume transfer time filtering criteria for
    Member UE selection.
ueLocFilters:
  type: array
  items:
    $ref: '#/components/schemas/UeLocFilterCriteria'
  minItems: 1
  description: >
    Contains the updated UE location filtering criteria for Member UE selection.
ueHisLocFilters:
  type: array
  items:
    $ref: '#/components/schemas/UeHisLocFilterCriteria'
  minItems: 1
  description: >
    Contains the updated UE historical location filtering criteria for Member UE
    selection.
ueDirFilters:
  type: array
  items:
    $ref: '#/components/schemas/UeDirectionFilterCriteria'
  minItems: 1
  description: >
    Contains the updated UE direction filtering criteria for Member UE selection.
ueDistanceFilters:
  type: array
  items:
    $ref: '#/components/schemas/UeDistanceFilterCriteria'
  minItems: 1
  description: >
    Contains the updated UE distance filtering criteria for Member UE selection.
serviceExpFilters:
  type: array
  items:
    $ref: '#/components/schemas/ServiceExpFilterCriteria'
  minItems: 1
  description: >
    Contains the updated Service Experience filtering criteria for Member UE selection.
dnnFilters:
  type: array
  items:
    $ref: '#/components/schemas/DnnFilterCriteria'
  minItems: 1
  description: >
    Contains the updated DNN filtering criteria for Member UE selection.
memUpdatePeriod:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSecRm'
maxUeNum:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UintegerRm'
timeWin:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
nullable: true

FilterCriterionType:
  anyOf:
  - type: string
    enum:
      - QOS
      - ACCESS_RAT_TYPE
      - E2E_DATA_VOLUME_TRANSFER_TIME
      - UE_LOCATION
      - UE_HISTORICAL_LOCATION
      - UE_DIRECTION
      - UE_DISTANCE
      - SERVICE_EXPERIENCE
      - DNN
  - type: string
    description: >
      This string provides forward-compatibility with future extensions to the enumeration and
      is not used to encode content defined in the present version of this API.
  description: |
    Represents the filter criterion event.
```

Possible values are:

- QoS: Indicates QoS criterion.
- ACCESS\_RAT\_TYPE: Indicates that the type of filter criterion is Access and Rat types criterion.
- E2E\_DATA\_VOLUME\_TRANSFER\_TIME: Indicates that the type of filter criterion is End-to-end data volume transfer time criterion.
- UE\_LOCATION: Indicates that the type of filter criterion is UE location criterion.
- UE\_HISTORICAL\_LOCATION: Indicates that the type of filter criterion is UE historical location criterion.
- UE\_DIRECTION: Indicates that the type of filter criterion is UE direction criterion.
- UE\_DISTANCE: Indicates that the type of filter criterion is UE distance criterion.
- SERVICE\_EXPERIENCE: Indicates that the type of filter criterion is Service Experience criterion.
- DNN: Indicates that the type of filter criterion is DNN criterion.

## A.31 GroupParametersProvisioning API

openapi: 3.0.0

info:

```
title: 3gpp-grp-pp
version: 1.1.0-alpha.1
description: |
  API for Group Parameters Provisioning.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

externalDocs:

```
description: >
  3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'
```

servers:

```
- url: '{apiRoot}/3gpp-grp-pp/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.
```

security:

```
- {}
- oAuth2ClientCredentials: []
```

paths:

```
/pp:
  get:
    summary: Request to retrieve all the active Group Parameters Provisioning resources at the NEF.
    operationId: GetGrpParamsProvisionings
    tags:
      - Group Parameters Provisionings (Collection)
    responses:
      '200':
        description: >
          OK. All the Individual Group Parameters Provisioning resources managed by the NEF are
          returned.
          If there are no existing Individual Group Parameters Provisioning resources managed at
          the NEF, an empty array is returned.
        content:
          application/json:
            schema:
              type: array
              items:
                $ref: '#/components/schemas/GrpPpData'
              minItems: 0
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
```

```

    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Request the creation of a new Group Parameters Provisioning.
  tags:
    - Group Parameters Provisioning (Collection)
  operationId: CreateGrpParamsProvisioning
  requestBody:
    description: >
      Representation of the new Group Parameters Provisioning to be created at the NEF.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/GrpPpData'
  responses:
    '201':
      description: >
        Created. A representation of the created Individual Group Parameters Provisioning
        resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/GrpPpData'
      headers:
        Location:
          description: >
            Contains the URI of the newly created resource, according to the structure
            {apiRoot}/3gpp-grp-pp/v1/pp/{ppId}
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/pp/{ppId}:
  parameters:
    - name: ppId
      in: path
      description: >
        Represents the identifier of the Individual Group Parameters Provisioning resource.
      required: true
      schema:
        type: string

get:
  summary: Request to retrieve an existing Individual Group Parameters Provisioning resource.
  operationId: GetIndGrpParamsProvisioning
  tags:

```

```

- Individual Group Parameters Provisioning (Document)
responses:
  '200':
    description: >
      OK. Successful retrieval of the requested Individual Group Parameters Provisioning.
      resource.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/GrpPpData'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Request the update of an existing Individual Group Parameters Provisioning resource.
  tags:
    - Individual Group Parameters Provisioning (Document)
  operationId: UpdateIndGrpParamsProvisioning
  requestBody:
    description: >
      Represents the updated Individual Group Parameters Provisioning resource representation.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/GrpPpData'
  responses:
    '200':
      description: >
        OK. The Individual Group Parameters Provisioning resource is successfully updated and a
        representation of the updated resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/GrpPpData'
    '204':
      description: >
        No Content. The Individual Group Parameters Provisioning resource is successfully
        updated and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

summary: Request the modification of an existing Individual Group Parameters Provisioning resource.

tags:

- Individual Group Parameters Provisioning (Document)

operationId: ModifyIndGrpParamsProvisioning

requestBody:

description: >

Contains the parameters to request the modification of the Individual Group Parameters Provisioning resource.

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/GrpPpDataPatch'

responses:

'200':

description: >

OK. The Individual Group Parameters Provisioning resource is successfully modified and a representation of the updated resource is returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/GrpPpData'

'204':

description: >

No Content. The Individual Group Parameters Provisioning resource is successfully modified and no content is returned in the response body.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Request the deletion of an existing Individual Group Parameters Provisioning resource.

tags:

- Individual Group Parameters Provisioning (Document)

operationId: DeleteIndGrpParamsProvisioning

responses:

'204':

description: >

No Content. The Individual Group Parameters Provisioning resource is successfully deleted.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## components:

## securitySchemes:

## oAuth2ClientCredentials:

type: oauth2

## flows:

## clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

## schemas:

#

# STRUCTURED DATA TYPES

#

## GrpPpData:

description: Represents the Group Parameters Provisioning data.

type: object

## properties:

## afId:

type: string

## mtcProviderId:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

## dnnSnssaiGrpData:

\$ref: '#/components/schemas/DnnSnssaiGrpData'

## suppFeat:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

## required:

- afId

## GrpPpDataPatch:

description: &gt;

Represents the requested modifications to an existing Group Parameters Provisioning data.

type: object

## properties:

## dnnSnssaiGrpData:

\$ref: '#/components/schemas/DnnSnssaiGrpData'

## DnnSnssaiGrpData:

description: Represents DNN and S-NSSAI specific Group Parameters data.

type: object

## properties:

## extGroupId:

\$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalGroupId'

## dnn:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

## snssai:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

## defQos:

\$ref: '#/components/schemas/AfReqDefaultQoS'

## ladnServArea:

\$ref: '#/components/schemas/LadnServArea'

## required:

- extGroupId

- dnn

- snssai

## anyOf:

- required: [ defQos ]

- required: [ ladnServArea ]

## AfReqDefaultQoS:

description: Represents the AF requested default QoS.

type: object

## properties:



```

5qi:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/5Qi'
arp:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Arp'
priorityLevel:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/5QIPriorityLevelRm'
required:
- 5qi
- arp

LadnServArea:
  description: Represents an LADN Service Area.
  type: object
  properties:
    geographicAreas:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
      minItems: 1
    civicAddresses:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
      minItems: 1
    tais:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Tai'
      minItems: 1
  oneOf:
    - required: [ geographicAreas ]
    - required: [ civicAddresses ]
    - required: [ tais ]

```

```

#
# SIMPLE DATA TYPES
#

```

```

#
# ENUMERATIONS
#

```

---

## A.32 SliceParamProvision API

openapi: 3.0.0

```

info:
  title: 3gpp-slice-pp
  version: 1.0.0
  description: |
    API for Network Slice Parameters Provisioning.
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    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V18.6.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

security:
- {}
- oAuth2ClientCredentials: []

```

```

servers:
- url: '{apiRoot}/3gpp-slice-pp/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

```

paths:
  /pp:
    get:
      summary: Request to retrieve all the active Slice Parameters Provisionings at the NEF.

```

```

operationId: GetSliceParamProvisionings
tags:
  - Slice Parameters Provisionings (Collection)
responses:
  '200':
    description: >
      OK. All the active Slice Parameters Provisioning resources managed by the
      NEF are returned.
    content:
      application/json:
        schema:
          type: array
          items:
            $ref: '#/components/schemas/SlicePpData'
          minItems: 0
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Request the creation of a new Slice Parameters Provisioning.
  tags:
    - Slice Parameters Provisionings (Collection)
  operationId: CreateSliceParamProvisioning
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/SlicePpData'
  responses:
    '201':
      description: >
        Created. Successful creation of a new Individual Slice Parameters Provisioning
        resource.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/SlicePpData'
    headers:
      Location:
        description: >
          Contains the URI of the newly created resource, according to the structure
          {apiRoot}/3gpp-slice-pp/v1/pp/{ppId}
        required: true
        schema:
          type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'

```

```
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/pp/{ppId}:
  parameters:
    - name: ppId
      in: path
      description: >
        Represents the identifier of the Individual Slice Parameters Provisioning resource.
      required: true
      schema:
        type: string

  get:
    summary: Request to retrieve an existing Individual Slice Parameters Provisioning resource.
    operationId: GetIndSliceParamProvisioning
    tags:
      - Individual Slice Parameters Provisioning (Document)
    responses:
      '200':
        description: >
          OK. The requested "Individual Slice Parameters Provisioning" resource is successfully
          returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SlicePpData'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Request to update an existing Individual Slice Parameters Provisioning resource.
    operationId: UpdateIndSliceParamProvisioning
    tags:
      - Individual Slice Parameters Provisioning (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/SlicePpData'
    responses:
      '200':
        description: >
          OK. The Individual Slice Parameters Provisioning resource is successfully updated
          and a representation of the updated resource is returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SlicePpData'
```

```

'204':
  description: >
    No Content. The Individual Slice Parameters Provisioning resource is successfully
    updated and no content is returned in the response body.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

summary: Request the modification of an existing Individual Slice Parameters Provisioning resource.

operationId: ModifyIndSliceParamProvisioning

tags:

- Individual Slice Parameters Provisioning (Document)

requestBody:

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/SlicePpDataPatch'

responses:

```

'200':
  description: >
    OK. The Individual Slice Parameters Provisioning resource is successfully modified
    and a representation of the updated resource is returned in the response body.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/SlicePpData'
'204':
  description: >
    No Content. The Individual Slice Parameters Provisioning resource is successfully
    modified and no content is returned in the response body.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'

```

```

'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## delete:

summary: Request the deletion of an existing Individual Slice Parameters Provisioning resource.  
 operationId: DeleteIndSliceParamProvisioning

## tags:

- Individual Slice Parameters Provisioning (Document)

## responses:

```

'204':
  description: >
    No Content. The Individual Slice Parameters Provisioning resource is successfully
    deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## components:

## securitySchemes:

```

oAuth2ClientCredentials:
  type: oauth2
  flows:
    clientCredentials:
      tokenUrl: '{tokenUrl}'
      scopes: {}

```

## schemas:

#

# STRUCTURED DATA TYPES

#

## SlicePpData:

description: Represents the Slice Parameters Provisioning data.

type: object

## properties:

## afId:

type: string

## mtcProviderId:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

## sliceUsgCtrlData:

type: object

## additionalProperties:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/SliceUsageControlInfo'

minProperties: 1

## description: &gt;

Contains the Network Slice Usage Control information to be provisioned.

The key of the map shall be the AF dedicated S-NSSAI (that is provided within the snssai attribute of the corresponding map value encoded via the SliceUsageControlInfo data structure) to which the Network Slice Usage Control information is related.

## suppFeat:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

## required:

- afId

## SlicePpDataPatch:

## description: &gt;

Represents the requested modifications to an existing Slice Parameters Provisioning data.

type: object

## properties:

```

sliceUsgCtrlData:
  type: object
  additionalProperties:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SliceUsageControlInfo'
  minProperties: 1
  description: >
    Contains the Network Slice Usage Control information to be provisioned.
    The key of the map shall be the AF dedicated S-NSSAI (that is provided within the snssai
    attribute of the corresponding map value encoded via the SliceUsageControlInfo data
    structure) to which the Network Slice Usage Control information is related.

```

```

#
# SIMPLE DATA TYPES
#
#
# ENUMERATIONS
#

```

---

## A.33 UEAddress API

openapi: 3.0.0

```

info:
  title: 3gpp-ue-address
  version: 1.1.0-alpha.4
  description: |
    API for UE Address service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: 3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

security:
  - {}
  - oauth2ClientCredentials: []

```

```

servers:
  - url: '{apiRoot}/3gpp-ue-address/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

```

paths:
  /retrieve:
    post:
      summary: Request to retrieve UE Address information.
      operationId: RetrieveUEAddress
      tags:
        - UE Address(es) Information Retrieval
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/UeAddressReq'
      responses:
        '200':
          description: >
            OK. The UE Address information request is successfully processed, and UE address
            information is returned in the response body.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/UeAddressInfo'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### /subscriptions:

##### get:

```

summary: Request to retrieve all the active UE Address Subscriptions.
operationId: GetUEAddrSubscs
tags:
  - UE Address Subscriptions (Collection)
parameters:
  - name: supp-feat
    in: query
    description: >
      Contains the list of supported features among the ones defined in clause 5.35.6.
    required: false
    schema:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
responses:
  '200':
    description: >
      OK. All the Individual UE Address Subscription resources managed by the NEF are
      returned.
      If there are no existing Individual UE Address Subscription resources managed at the
      NEF, an empty array is returned.
    content:
      application/json:
        schema:
          type: array
          items:
            $ref: '#/components/schemas/UeAddrSubsc'
          minItems: 0
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

##### post:

```

summary: Request the creation of a new UE Address Subscription at the NEF.
operationId: CreateUEAddrSubsc
tags:
  - UE Address Subscriptions (Collection)
requestBody:
  required: true

```

```

content:
  application/json:
    schema:
      $ref: '#/components/schemas/UeAddrSubsc'
responses:
  '201':
    description: >
      Created. A representation of the created Individual UE Address Subscription resource is
      returned in the response body
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/UeAddrSubsc'
    headers:
      Location:
        description: Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  notification:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/UeAddrNotif'
        responses:
          '204':
            description: >
              No Content. The UE Address Notification is successfully received and
              processed.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'

```



```
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

/subscriptions/{subscriptionId}:

parameters:

- name: subscriptionId
- in: path
- description: Represents the identifier of the Individual UE Address Subscription resource.
- required: true
- schema:
- type: string

get:

summary: Request to retrieve an existing Individual UE Address Subscription resource.

operationId: GetIndUEAddrSubsc

tags:

- Individual UE Address Subscription (Document)

responses:

'200':

description: >

OK. The requested Individual UE Address Subscription resource is returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/UeAddrSubsc'

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Request the deletion of an existing Individual UE Address Subscription resource.

operationId: DeleteIndUEAddrSubsc

tags:

- Individual UE Address Subscription (Document)

responses:

'204':

description: >

No Content. . The Individual UE Address Subscription resource is successfully deleted.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

```
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:

#
# STRUCTURED DATA TYPES
#

UeAddressReq:
  description: Represents the parameters to request the retrieval of UE Address information.
  type: object
  properties:
    afId:
      type: string
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - afId
    - gpsi

UeAddressInfo:
  description: Represents UE Address information.
  type: object
  properties:
    ueIpAddrs:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
      minItems: 1
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - ueIpAddrs

UeAddrSubsc:
  description: Represents the UE Address Subscription.
  type: object
  properties:
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    notifId:
      type: string
    afId:
      type: string
    ueAddrInfo:
      $ref: '##/components/schemas/UeAddrInfo'
    immRepInd:
      type: boolean
      description: >
        Indicates whether immediate reporting shall be included in the corresponding response
        if Available.
    immReport:
      $ref: 'TS29564_Nupf_EventExposure.yaml#/components/schemas/UeNatMappingInfo'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - notifUri
    - notifId
    - afId

UeAddrInfo:
  description: Represents the UE Public Address information.
  type: object
  properties:
    uePrivateIpAddr:
```

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
  ipDomain:
    type: string
  remoteIpv4Addr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
  remoteIpv6Addr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
  remotePortNumber:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint16'
  required:
    - uePrivateIpAddr
  oneOf:
    - required: [remoteIpv4Addr]
    - required: [remoteIpv6Addr]

UeAddrNotif:
  description: Represents the UE Address Notification.
  type: object
  properties:
    notifId:
      type: string
    uePubAddrInfo:
      $ref: 'TS29564_Nupf_EventExposure.yaml#/components/schemas/UeNatMappingInfo'
  required:
    - notifId
    - uePubAddrInfo

```

```
# SIMPLE DATA TYPES
```

```
#
```

```
#
```

```
# ENUMERATIONS
```

```
#
```

```
# Data types describing alternative data types or combinations of data types:
```

```
#
```

---

## A.34 ECSAddress API

```
openapi: 3.0.0
```

```

info:
  title: 3gpp-ecs-address
  version: 1.1.0-alpha.1
  description: |
    API for AF provisioned ECS Address Configuration Information.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

servers:
  - url: '{apiRoot}/3gpp-ecs-address/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

```

paths:
  /{afId}/configurations:
    parameters:
      - name: afId
        in: path
        description: Represents the identifier of the AF.
        required: true
        schema:

```

```

    type: string

get:
  summary: Retrieve all the active ECS Address Configuration Information Set(s).
  operationId: ReadEACIs
  tags:
    - ECS Address Configuration Information Sets (Collection)
  responses:
    '200':
      description: >
        OK. All the Individual ECS Address Configuration Information Set resource(s) managed by
        the NEF are returned.
        If there are no active Individual ECS Address Configuration Information Set resources at
        the NEF, an empty array is returned.
      content:
        application/json:
          schema:
            type: array
            items:
              $ref: '#/components/schemas/EcsAddrInfo'
            minItems: 0
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Create a new ECS Address Configuration Information Set.
  operationId: CreateEACI
  tags:
    - ECS Address Configuration Information Sets (Collection)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/EcsAddrInfo'
  responses:
    '201':
      description: >
        Created. A representation of the created Individual ECS Address Configuration
        Information Set resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/EcsAddrInfo'
      headers:
        Location:
          description: Contains the URI of the newly created resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'

```

```

'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/configurations/{configId}:
  parameters:
    - name: afId
      in: path
      description: Represents the identifier of the AF.
      required: true
      schema:
        type: string
    - name: configId
      in: path
      description: >
        Represents the identifier of the Individual ECS Address Configuration Information Set
        resource.
      required: true
      schema:
        type: string

get:
  summary: Retrieve an existing Individual ECS Address Configuration Information Set resource.
  operationId: ReadEACI
  tags:
    - Individual ECS Address Configuration Information Set (Document)
  responses:
    '200':
      description: >
        OK. The requested Individual ECS Address Configuration Information Set resource is
        successfully returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/EcsAddrInfo'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Update an existing Individual ECS Address Configuration Information Set resource.
  operationId: UpdateEACI
  tags:
    - Individual ECS Address Configuration Information Set (Document)
  requestBody:
    required: true
    content:
      application/json:

```

```

    schema:
      $ref: '#/components/schemas/EcsAddrInfo'
responses:
  '200':
    description: >
      OK. The Individual ECS Address Configuration Information Set resource is successfully
      updated and a representation of the updated resource is returned in the response
      body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/EcsAddrInfo'
  '204':
    description: >
      No Content. The Individual ECS Address Configuration Information Set resource is
      successfully updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: Request the modification of an existing Individual ECS Address Configuration
Information Set resource.
  operationId: ModifyEACI
  tags:
    - Individual Individual ECS Address Configuration Set (Document)
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/EcsAddrInfoPatch'
  responses:
    '200':
      description: >
        OK. The Individual ECS Address Configuration Information Set resource is successfully
        modified and a representation of the updated resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/EcsAddrInfo'
    '204':
      description: >
        No Content. The Individual ECS Address Configuration Information Set resource is
        successfully modified and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'

```

```

'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Delete an existing Individual ECS Address Configuration Information Set resource  
 operationId: DeleteEACI

#### tags:

- Individual ECS Address Configuration Information Set (Document)

#### responses:

```

'204':
  description: >
    No Content. The Individual ECS Address Configuration Information Set resource is
    successfully deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### /remove-ecsaddr:

#### post:

summary: Remove ECS Address Configuration information based on given criteria.  
 operationId: DeleteEACIs

#### tags:

- ECS Address Configuration Information Deletion Request

#### requestBody:

```

content:
  application/json:
    schema:
      $ref: '#/components/schemas/EcsAddrDeleteCriteria'
required: true

```

#### responses:

```

'204':
  description: >
    No Content. The request to remove ECS Address Configuration Information based on given
    criteria is successfully received and processed.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## components:

## securitySchemes:

## oAuth2ClientCredentials:

```
type: oauth2
```

## flows:

## clientCredentials:

```
tokenUrl: '{tokenUrl}'
```

```
scopes: {}
```

## schemas:

## EcsAddrInfo:

```
description: Represents an ECS Address Configuration Information Set.
```

```
type: object
```

## properties:

## self:

```
$ref: 'TS29122_CommonData.yaml#/components/schemas/Link'
```

## ecsServerAddr:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/EcsServerAddr'
```

## spatialValidityCond:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/SpatialValidityCond'
```

## dnn:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
```

## snssai:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
```

## ecsAuthMethods:

```
type: array
```

## items:

```
$ref: 'TS29503_Nudm_PP.yaml#/components/schemas/EcsAuthMethod'
```

```
minItems: 1
```

## supportedPlmns:

```
type: array
```

## items:

```
$ref: 'TS29503_Nudm_PP.yaml#/components/schemas/SupportedPlmn'
```

```
minItems: 1
```

## suppFeat:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
```

## required:

```
- ecsServerAddr
```

## EcsAddrDeleteCriteria:

```
description: >
```

```
Contains criteria to be used for deleting ECS Address Configuration information.
```

```
type: object
```

## properties:

## afIds:

```
type: array
```

## items:

```
type: string
```

```
minItems: 1
```

```
description: AF identifiers to be used as deletion criterion.
```

## dnn:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
```

## snssai:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
```

## ecsAddrInfo:

```
$ref: '#/components/schemas/EcsAddrInfo'
```

## suppFeat:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
```

## anyOf:

```
- required: [afIds]
```

```
- required: [dnn]
```

```
- required: [snssai]
```

```
- required: [ecsAddrInfo]
```



```

EcsAddrInfoPatch:
  description: >
    Represents the requested modifications to an ECS Address Configuration Information Set.
  type: object
  properties:
    ecsServerAddr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/EcsServerAddr'
    ecsAuthMethods:
      type: array
      items:
        $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/EcsAuthMethod'
      minItems: 1
    supportedPlmns:
      type: array
      items:
        $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/SupportedPlmn'
      minItems: 1
    spatialValidityCond:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SpatialValidityCond'

```

```

#
# SIMPLE DATA TYPES
#
#
# ENUMERATIONS
#

```

---

## A.35 RSLPPIParametersProvisioning API

openapi: 3.0.0

```

info:
  title: 3gpp-rslppi-pp
  version: 1.0.0
  description: |
    API for RSLPPI Parameters Provisioning.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V18.6.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

servers:
  - url: '{apiRoot}/3gpp-rslppi-pp/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

paths:
  /pp:
    get:
      summary: Request to retrieve all the active RSLPPI Parameters Provisioning resources at the
      NEF.
      operationId: GetRslppiParamsProvisionings
      tags:
        - RSLPPI Parameters Provisionings (Collection)
      responses:
        '200':
          description: >
            OK. All the Individual RSLPPI Parameters Provisioning resources managed by the NEF are
            returned.
            If there are no existing Individual RSLPPI Parameters Provisioning resources managed at
            the NEF, an empty array is returned.
          content:
            application/json:
              schema:

```

```

      type: array
      items:
        $ref: '#/components/schemas/RslppiPpData'
      minItems: 0
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

post:

```

summary: Request the creation of a new RSLPPI Parameters Provisioning.
tags:
  - RSLPPI Parameters Provisioning (Collection)
operationId: CreateRslppiParamsProvisioning
requestBody:
  description: >
    Representation of the new RSLPPI Parameters Provisioning to be created at the NEF.
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/RslppiPpData'
responses:
  '201':
    description: >
      Created. A representation of the created Individual RSLPPI Parameters Provisioning
      resource is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/RslppiPpData'
    headers:
      Location:
        description: >
          Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```
/pp/{ppId}:
  parameters:
    - name: ppId
      in: path
      description: >
        Represents the identifier of the Individual RSLPPI Parameters Provisioning resource.
      required: true
      schema:
        type: string

get:
  summary: Request to retrieve an existing Individual RSLPPI Parameters Provisioning resource.
  operationId: GetIndRslppiParamsProvisioning
  tags:
    - Individual RSLPPI Parameters Provisioning (Document)
  responses:
    '200':
      description: >
        OK. Successful retrieval of the requested Individual RSLPPI Parameters Provisioning resource.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/RslppiPpData'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Request the update of an existing Individual RSLPPI Parameters Provisioning resource.
  tags:
    - Individual RSLPPI Parameters Provisioning (Document)
  operationId: UpdateIndRslppiParamsProvisioning
  requestBody:
    description: >
      Represents the updated Individual RSLPPI Parameters Provisioning resource representation.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/RslppiPpData'
  responses:
    '200':
      description: >
        OK. The Individual RSLPPI Parameters Provisioning resource is successfully updated and a representation of the updated resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/RslppiPpData'
    '204':
      description: >
        No Content. The Individual RSLPPI Parameters Provisioning resource is successfully updated and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
```

```

'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

summary: Request the modification of an existing Individual RSLPPI Parameters Provisioning resource.

tags:

- Individual RSLPPI Parameters Provisioning (Document)

operationId: ModifyIndRslppiParamsProvisioning

requestBody:

description: >

Contains the parameters to request the modification of the Individual RSLPPI Parameters Provisioning resource.

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/RslppiPpDataPatch'

responses:

'200':

description: >

OK. The Individual RSLPPI Parameters Provisioning resource is successfully modified and A representation of the updated resource is returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/RslppiPpData'

'204':

description: >

No Content. The Individual RSLPPI Parameters Provisioning resource is successfully modified and no content is returned in the response body.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

```

delete:
  summary: Request the deletion of an existing Individual RSLPPI Parameters Provisioning
resource.
  tags:
    - Individual RSLPPI Parameters Provisioning (Document)
  operationId: DeleteIndRslppiParamsProvisioning
  responses:
    '204':
      description: >
        No Content. The Individual RSLPPI Parameters Provisioning resource is successfully
        deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    #
    # STRUCTURED DATA TYPES
    #
    RslppiPpData:
      description: Represents the RSLPPI Parameters Provisioning data.
      type: object
      properties:
        afId:
          type: string
        rslppiData:
          $ref: '#/components/schemas/RslppiData'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - afId

    RslppiPpDataPatch:
      description: >
        Represents the requested modifications to an existing RSLPPI Parameters Provisioning data.
      type: object
      properties:
        rslppiData:
          $ref: '#/components/schemas/RslppiData'

    RslppiData:
      description: Represents RSLPPI Parameters data.
      type: object
      properties:
        extGroupId:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        rslppi:
          $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/Rslppi'
      required:
        - rslppi

```

```

    oneOf:
      - required: [ extGroupId ]
      - required: [ gpsi ]

```

```

#
# SIMPLE DATA TYPES
#

```

```

#
# ENUMERATIONS
#

```

---

## A.36 AddressingParamProvision API

openapi: 3.0.0

```

info:
  title: 3gpp-addr-pp
  version: 1.0.0-alpha.2
  description: |
    API for Addressing Parameters Provisioning.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V19.2.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

servers:
  - url: '{apiRoot}/3gpp-addr-pp/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

paths:
  /pp:
    get:
      summary: Request to retrieve all the active Addressing Parameters Provisionings at the NEF.
      operationId: GetAddrParamsProvisionings
      tags:
        - Addressing Parameters Provisionings (Collection)
      responses:
        '200':
          description: >
            OK. All the Individual Addressing Parameters Provisioning resources managed by
            the NEF are returned.
            If there are no existing Individual Addressing Parameters Provisioning resources
            managed by the NEF, an empty array is returned.
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/AddrPpData'
                minItems: 0
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**post:**

summary: Request the creation of a new Addressing Parameters Provisioning.

**tags:**

- Addressing Parameters Provisionings (Collection)

operationId: CreateAddrParamsProvisioning

**requestBody:**

required: true

**content:**

application/json:

schema:

\$ref: '#/components/schemas/AddrPpData'

**responses:**

'201':

description: >

Created. A representation of the created Individual Addressing Parameters Provisioning resource is returned in the response body.

**content:**

application/json:

schema:

\$ref: '#/components/schemas/AddrPpData'

**headers:**

Location:

description: >

Contains the URI of the newly created resource.

required: true

schema:

type: string

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

**/pp/{ppId}:****parameters:**

- name: ppId

in: path

description: >

Represents the identifier of the Individual Addressing Parameters Provisioning resource.

required: true

schema:

type: string

**get:**

summary: Request to retrieve an existing Individual Addressing Parameters Provisioning resource.

operationId: GetIndAddrParamsProvisioning

**tags:**

- Individual Addressing Parameters Provisioning (Document)

**responses:**

```
'200':
  description: >
    OK. The requested Individual Group Parameters Provisioning resource is returned in the
    response body.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/AddrPpData'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Request the update of an existing Individual Addressing Parameters Provisioning
  resource.
  tags:
    - Individual Addressing Parameters Provisioning (Document)
  operationId: UpdateIndAddrParamsProvisioning
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AddrPpData'
  responses:
    '200':
      description: >
        OK. The Individual Addressing Parameters Provisioning resource is successfully
        updated and a representation of the updated resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AddrPpData'
    '204':
      description: >
        No Content. The Individual Addressing Parameters Provisioning resource is
        successfully updated and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
```



```

    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  patch:
    summary: Request the modification of an existing Individual Addressing Parameters Provisioning
    resource.
    tags:
      - Individual Addressing Parameters Provisioning (Document)
    operationId: ModifyIndAddrParamsProvisioning
    requestBody:
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/AddrPpDataPatch'
    responses:
      '200':
        description: >
          OK. The Individual Addressing Parameters Provisioning resource is successfully
          modified and a representation of the updated resource is returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AddrPpData'
      '204':
        description: >
          No Content. The Individual Addressing Parameters Provisioning resource is
          successfully modified and no content is returned in the response body.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  delete:
    summary: Request the deletion of an existing Individual Addressing Parameters Provisioning
    resource.
    tags:
      - Individual Addressing Parameters Provisioning (Document)
    operationId: DeleteIndAddrParamsProvisioning
    responses:
      '204':
        description: >
          No Content. The Individual Addressing Parameters Provisioning resource is
          successfully deleted.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'

```

```

'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

schemas:

```

#
# STRUCTURED DATA TYPES
#

```

```

AddrPpData:
  description: Represents the Addressing Parameters data.
  type: object
  properties:
    afId:
      type: string
    staticIpaddrParams:
      type: array
      items:
        $ref: '#/components/schemas/StaticIpAddrParams'
      minItems: 1
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - afId

```

```

StaticIpAddrParams:
  description: Represents the Static IP Address Parameters data.
  type: object
  properties:
    dnn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    snssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    staticIpAddresses:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
      minItems: 1
  required:
    - dnn
    - snssai
    - staticIpAddresses

```

```

AddrPpDataPatch:
  description: >
    Represents the requested modification to an existing Addressing Parameters Provisioning.
  type: object
  properties:
    staticIpaddrParams:
      type: array
      items:
        $ref: '#/components/schemas/StaticIpAddrParams'
      minItems: 1

```

```

#
# SIMPLE DATA TYPES
#

```

```

#
# ENUMERATIONS
#

```

---

## A.37 UAVFlightAssistance API

openapi: 3.0.0

info:

title: 3gpp-uav-fa  
version: 1.0.0-alpha.4  
description: |  
API for UAV Flight Assistance.  
© 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  
All rights reserved.

externalDocs:

description: >  
3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.  
url: [https://www.3gpp.org/ftp/Specs/archive/29\\_series/29.522/](https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/)

servers:

- url: '{apiRoot}/3gpp-uav-fa/v1'  
variables:  
apiRoot:  
default: https://example.com  
description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

security:

- {}  
- oAuth2ClientCredentials: []

paths:

{afId}/configurations:  
parameters:  
- name: afId  
in: path  
description: Represents the identifier of the AF.  
required: true  
schema:  
type: string

get:

summary: Request to retrieve all the active UAV Flight Assistance Configurations at the NEF.  
operationId: GetUavFlightAssistConfig

tags:

- UAV Flight Assistance Configurations (Collection)

responses:

'200':  
description: >  
OK. All the Individual UAV Flight Assistance Configuration resources managed by the NEF  
are returned.  
If there are no existing Individual UAV Flight Assistance Configuration resources  
managed at the NEF, an empty array is returned.

content:

application/json:  
schema:  
type: array  
items:  
\$ref: '#/components/schemas/UavFlightAssistance'  
minItems: 0

'307':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Request the creation of a new UAV Flight Assistance Configuration.
  operationId: CreateUavFlightAssistConfig
  tags:
    - UAV Flight Assistance Configurations (Collection)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/UavFlightAssistance'
  responses:
    '201':
      description: >
        Created. The UAV Flight Assistance Configuration is successfully created and a
        representation of the created Individual UAV Flight Assistance Configuration resource
        shall be returned.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/UavFlightAssistance'
      headers:
        Location:
          description: >
            Contains the URI of the created Individual UAV Flight Assistance Configuration
            resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

callbacks:
  UavFlightAssistNotif:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/UAVFlightAssistNotif'
        responses:
          '200':
            description: >
              OK. The notification is successfully received and acknowledged, and notification
              related information is returned in the response body.
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/UAVFlightAssistNotifResp'

```

```

'204':
  description: >
    No Content. The notification is successfully received and acknowledged.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```
/{afId}/configurations/{configurationId}:
```

```
parameters:
```

- name: afId
 description: Represents the identifier of the AF.
 in: path
 required: true
 schema:
 type: string
- name: configurationId
 description: >
 Represents the identifier of the Individual UAV Flight Assistance Configuration resource.
 in: path
 required: true
 schema:
 type: string

```
get:
```

```
summary: Request to retrieve an existing Individual UAV Flight Assistance Configuration resource.
```

```
operationId: GetIndUavFlightAssistConfig
```

```
tags:
```

- Individual UAV Flight Assistance Configuration (Document)

```
responses:
```

```

'200':
  description: >
    OK. The requested Individual UAV Flight Assistance Configuration resource is returned in
    the response body.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/UavFlightAssistance'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## put:

summary: Request to update an existing Individual UAV Flight Assistance Configuration.  
 operationId: UpdateIndUavFlightAssistConfig

## tags:

- Individual UAV Flight Assistance Configuration (Document)

## requestBody:

required: true

## content:

application/json:

## schema:

\$ref: '#/components/schemas/UavFlightAssistance'

## responses:

'200':

## description: &gt;

OK. The Individual UAV Flight Assistance Configuration resource is successfully updated and a representation of the updated resource is returned in the response body.

## content:

application/json:

## schema:

\$ref: '#/components/schemas/UavFlightAssistance'

'204':

## description: &gt;

No Content. The Individual UAV Flight Assistance Configuration resource is successfully updated and no content is returned in the response body.

'307':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

## default:

\$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

## patch:

summary: Request the modification of an existing Individual UAV Flight Assistance Configuration resource.

## tags:

- Individual Group Parameters Provisioning (Document)

operationId: ModifyIndUavFlightAssistConfig

## requestBody:

required: true

## content:

application/merge-patch+json:

## schema:

\$ref: '#/components/schemas/UavFlightAssistancePatch'

## responses:

'200':

## description: &gt;

OK. The Individual UAV Flight Assistance Configuration resource is successfully modified and a representation of the updated resource is returned in the response body.

## content:

application/json:

## schema:

\$ref: '#/components/schemas/UavFlightAssistance'

```

'204':
  description: >
    No Content. The Individual UAV Flight Assistance Configuration resource is successfully
    modified and no content is returned in the response body.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Request the deletion of an existing Individual UAV Flight Assistance Configuration.  
 operationId: DeleteIndUavFlightAssistConfig

#### tags:

- Individual UAV Flight Assistance Configuration (Document)

#### responses:

```

'204':
  description: >
    No Content. The Individual UAV Flight Assistance Configuration resource is successfully
    deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### / {afId} /retrieve:

##### parameters:

- name: afId  
 in: path  
 description: Represents the identifier of the AF.  
 required: true  
 schema:  
 type: string

##### post:

summary: Request to retrieve UAV flight information.  
 operationId: RetrieveUAVFlightInfo  
 tags:  
 - Retrieve (custom operation without associated resources)  
 requestBody:

```

    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/UAVFlightInfoReq'
  responses:
    '200':
      description: >
        OK. The UAV Flight information retrieval request is successfully processed, and the
        the requested UAV Flight information is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/UAVFlightInfoResp'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

#### schemas:

```

#
# STRUCTURED DATA TYPES
#

```

```

UavFlightAssistance:
  description: Represents the UAV Flight Assistance Configuration.
  type: object
  properties:
    uavId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    reqPurpose:
      $ref: '#/components/schemas/RequestPurpose'
    monitorMode:
      $ref: '#/components/schemas/MonitoringMode'
    environingUavs:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      minItems: 1
    preSetDistance:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LinearDistance'
    qosSustReq:
      $ref: 'TS29522_AnalyticsExposure.yaml#/components/schemas/AnalyticsEventFilter'
    notifUri:

```



```

    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  flightPath:
    $ref: '##/components/schemas/FlightPath'
  altitudeRep:
    type: array
    items:
      $ref: '##/components/schemas/AltitudeReport'
    minItems: 1
  altitudeRepReqs:
    $ref: '##/components/schemas/AltitudeRepReqs'
  stopAltRepInd:
    type: boolean
    enum:
      - true
    description: >
      Indicates whether to stop the altitude reporting for the UAV UE. Set to true indicates
      to stop the altitude reporting for the UAV UE.
      When present, this attribute shall be set to true. The presence of this attribute set to
      the value false is forbidden.
      This attribute may be present only in the PUT request.
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - uavId
    - reqPurpose
    - notifUri

FlightPath:
  description: Represents a flight path.
  type: object
  properties:
    pathSegInfo:
      type: array
      items:
        $ref: '##/components/schemas/FlightPathSegInfo'
      minItems: 1
  required:
    - pathSegInfo

FlightPathSegInfo:
  description: Represents a flight path segment.
  type: object
  properties:
    flightSeg:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    ussId:
      type: string
    candBdCrsPoints:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
      minItems: 1
    uavSpeed:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
    altitude:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/Altitude'
    timeSchedule:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    timeDuration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  required:
    - flightSeg
    - ussId
  not:
    required: [timeSchedule, timeDuration]

UAVFlightAssistNotif:
  description: Represents the UAV Flight Assistance Notification.
  type: object
  properties:
    subscriptionId:
      type: string
    uavStatus:
      $ref: '##/components/schemas/UavStatus'
    bdCrsPoint:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    altitude:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/Altitude'

```

```

altitudeRptInd:
  type: boolean
  enum:
    - true
  description: >
    Indicates whether the UAV altitude reporting is successful or not.
    true indicates the failure of UAV altitude reporting.
uavLocation:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
uavTrajectInd:
  type: boolean
  description: >
    Indicates whether the UAV is following the assigned path/trajectory.
    - "true" indicates that the UAV is following the assigned path/trajectory.
    - "false" indicates that UAV is not following the assign path/trajectory.
    - The default value is "false" when this attribute is omitted.
uavPresList:
  type: array
  items:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
  minItems: 1
rangSlUavData:
  type: array
  items:
    $ref: '#/components/schemas/RangSlUavData'
  minItems: 1
qosSustainInfoData:
  type: array
  items:
    $ref: 'TS29522_AnalyticsExposure.yaml#/components/schemas/QosSustainabilityExposure'
  minItems: 1
altitudeRepReqs:
  $ref: '#/components/schemas/AltitudeRepReqs'
required:
  - subscriptionId
  - uavStatus
not:
  required: [altitude, altitudeRptInd]

UAVFlightAssistNotifResp:
  description: Represents the response to a UAV Flight Assistance Notification.
  type: object
  properties:
    ussChgInd:
      type: boolean
      description: >
        This attribute is used to indicate whether the USS changeover was completed
        successfully.
        true indicates that USS changeover was successful.
        false indicates that USS changeover failed.
  required:
    - ussChgInd

UavFlightAssistancePatch:
  description: Represents the requested modifications to a UAV Flight Assistance Configuration.
  type: object
  properties:
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    flightPath:
      $ref: '#/components/schemas/FlightPath'
    altitudeRep:
      type: array
      items:
        $ref: '#/components/schemas/AltitudeReport'
      minItems: 1
    altitudeRepReqs:
      $ref: '#/components/schemas/AltitudeRepReqs'
    stopAltRepInd:
      type: boolean
      enum:
        - true
      description: >
        Indicates whether to stop the altitude reporting for the UAV UE. Set to true indicates
        to stop the altitude reporting for the UAV UE.
        When present, this attribute shall be set to true. The presence of this attribute set to
        the value false is forbidden.

```

```

AltitudeRepReqs:
  description: Represents the UAV's altitude reporting requirements.
  type: object
  properties:
    repThresholds:
      $ref: '#/components/schemas/AltThresholds'
    repPeriodicity:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    repEvents:
      type: array
      items:
        $ref: '#/components/schemas/AltitudeRepEvent'
      minItems: 1
  oneOf:
    - required: [repThresholds]
    - required: [repPeriodicity]
    - required: [repEvents]

AltitudeReport:
  description: Represents the UAV's altitude report.
  type: object
  properties:
    altitude:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/Altitude'
    event:
      $ref: '#/components/schemas/AltitudeRepEvent'
    timeStamp:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  required:
    - altitude

AltThresholds:
  description: Represents the UAV's altitude thresholds.
  type: object
  properties:
    lowerBound:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/Altitude'
    upperBound:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/Altitude'
  anyOf:
    - required: [lowerBound]
    - required: [upperBound]

RangSlUavData:
  description: Represents the Ranging and Slidelink UAV data.
  type: object
  properties:
    uavId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    presetDistInd:
      type: boolean
      description: >
        Indicates whether the Ranging/Sidelink distance to the target UAV is small than the
        preset distance value.
        - "true" indicates that the distance is smaller than the preset distance value.
        - "false" indicates that the distance is not smaller than the preset distance value.
        - The default value is "false" when this attribute is omitted.
    rangSlDistance:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LinearDistance'
  required:
    - uavId
  anyOf:
    - required: [presetDistInd]
    - required: [rangSlDistance]

UAVFlightInfoReq:
  description: Represents the UAV Flight information retrieval request.
  type: object
  properties:
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    retrievePurpose:
      $ref: '#/components/schemas/RetrievePurpose'
    targetUssList:
      type: array
      items:
        type: string
      minItems: 1

```

```

canFltPathsInfo:
  type: array
  items:
    $ref: '#/components/schemas/CandidateFlightPathInfo'
  minItems: 1
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - gpsi
  - retrievePurpose

```

```

CandidateFlightPathInfo:
  description: Represents the candidate flight path information.
  type: object
  properties:
    borderCrssPnt:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    accptDeviatDist:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    accptDeviatTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    canFlightPath:
      $ref: '#/components/schemas/FlightPath'

```

```

UAVFlightInfoResp:
  description: Represents the UAV Flight information retrieval response.
  type: object
  properties:
    retrievedResults:
      type: array
      items:
        $ref: '#/components/schemas/UAVFlightAssistNotif'
      minItems: 1
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - retrievedResults

```

#

# ENUMERATIONS

#

```

UavStatus:
  anyOf:
    - type: string
      enum:
        - LEAVING
        - ENTERING
        - DEVIATING
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration but
        is not used to encode content defined in the present version of this API.
  description: |
    Represents the status of the UAV.
    Possible values are:
    - LEAVING: Indicates that the UAV status is leaving an area which is part of the planned
      flight path.
    - ENTERING: Indicates that the UAV status is entering an area which is part of the planned
      flight path.
    - DEVIATING: Indicates that the UAV status is deviating from the planned flight path.

```

```

RequestPurpose:
  anyOf:
    - type: string
      enum:
        - USS_CHANGEOVER
        - IN_FLIGHT_MONITORING
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration and
        is not used to encode content defined in the present version of this API.
  description: |
    Represents the UAV Flight Assistance request purpose.
    Possible values are:
    - USS_CHANGEOVER: Indicates that the purpose of the request is pre-flight planning.
    - IN_FLIGHT_MONITORING: Indicates that the purpose of the request is in-flight monitoring.

```

```

AltitudeRepEvent:

```

```

anyOf:
- type: string
  enum:
    - TA_CHANGE
    - RAN_NODE_CHANGE
    - GEO_LOCATION_CHANGE
    - ANY_ALTITUDE_CHANGE
- type: string
  description: >
    This string provides forward-compatibility with future extensions to the enumeration but
    is not used to encode content defined in the present version of this API.
description: |
  Represents the UAV's altitude reporting event.
  Possible values are:
  - TA_CHANGE: Indicates that the UAV's altitude reporting trigger is the change of the UAV's
    serving TA.
  - RAN_NODE_CHANGE: Indicates that the UAV's altitude reporting trigger is the change of the
    UAV's serving RAN node.
  - GEO_LOCATION_CHANGE: Indicates that the UAV's altitude reporting trigger is the change of
    the UAV's geographical location.
  - ANY_ALTITUDE_CHANGE: Indicates that the UAV's altitude reporting trigger is any change of
    the UAV's altitude.

MonitoringMode:
anyOf:
- type: string
  enum:
    - UAV_LOCATION
    - FLIGHT_TRAJECTORY
    - FLIGHT_ENVIRONMENT
    - RANGING_SIDELINK_POSITION
    - QOS_SUSTAINABILITY_ANALYTICS
- type: string
  description: >
    This string provides forward-compatibility with future extensions to the enumeration but
    is not used to encode content defined in the present version of this API.
description: |
  Represents in UAV Flight Assistance monitoring mode.
  Possible values are:
  - UAV_LOCATION: Indicates that the monitoring mode is UAV location monitoring.
  - FLIGHT_TRAJECTORY: Indicates that the monitoring mode is flight trajectory
    monitoring.
  - FLIGHT_ENVIRONMENT: Indicates that the monitoring mode is flight environment
    monitoring.
  - RANGING_SIDELINK_POSITION: Indicates that the monitoring mode is
    Ranging/Sidelink positioning location monitoring.
  - QOS_SUSTAINABILITY_ANALYTICS: Indicates that the monitoring mode is QoS sustainability
    analytics monitoring.

RetrievePurpose:
anyOf:
- type: string
  enum:
    - USS_CHANGEOVER
    - PRE_FLIGHT_PLANNING
- type: string
  description: >
    This string provides forward-compatibility with future extensions to the enumeration and
    is not used to encode content defined in the present version of this API.
description: |
  Represents the purpose of the retrieved UAV flight information.
  Possible values are:
  - USS_CHANGEOVER: Indicates that the purpose of the UAV Flight information retrieval is
    USS changeover.
  - PRE_FLIGHT_PLANNING: Indicates that the purpose of the UAV Flight information retrieval
    is pre-flight planning.

```

---

## A.38 CagInfoParamProvision API

openapi: 3.0.0

```

info:
  title: 3gpp-caginfo-pp
  version: 1.0.0-alpha.3
  description: |

```

API for CAG Information Parameters Provisioning.  
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All rights reserved.

```
externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

security:
  - {}
  - OAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/3gpp-caginfo-pp/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:
  /pp:
    get:
      summary: Request to retrieve all the active CAG Information Parameters Provisionings at the
NEF.
      operationId: GetCagInfoParamProvisionings
      tags:
        - CAG Information Parameters Provisionings (Collection)
      responses:
        '200':
          description: >
            OK. All the active CAG Information Parameters Provisioning resources managed by the
            NEF are returned.
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/CagInfoPpData'
                minItems: 0
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    post:
      summary: Request the creation of a new CAG Information Parameters Provisioning.
      tags:
        - CAG Information Parameters Provisionings (Collection)
      operationId: CreateCagInfoParamProvisioning
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/CagInfoPpData'
      responses:
        '201':
          description: >
```

```

    Created. Successful creation of a new Individual CAG Information Parameters Provisioning
    resource and a representation of the created resource is returned in the response body.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/CagInfoPpData'
  headers:
    Location:
      description: >
        Contains the URI of the newly created resource.
      required: true
      schema:
        type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/pp/{ppId}:
  parameters:
    - name: ppId
      in: path
      description: >
        Represents the identifier of the Individual CAG Information Parameters Provisioning
        resource.
      required: true
      schema:
        type: string

get:
  summary: Retrieve an existing Individual CAG Information Parameters Provisioning resource.
  operationId: GetIndCagInfoParamProvisioning
  tags:
    - Individual CAG Information Parameters Provisioning (Document)
  responses:
    '200':
      description: >
        OK. The requested Individual CAG Information Parameters Provisioning resource is
        successfully returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/CagInfoPpData'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**put:**

```

summary: Update an existing Individual CAG Information Parameters Provisioning resource.
operationId: UpdateIndCagInfoParamProvisioning
tags:
  - Individual CAG Information Parameters Provisioning (Document)
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/CagInfoPpData'
responses:
  '200':
    description: >
      OK. The Individual CAG Information Parameters Provisioning resource is successfully
      updated and a representation of the updated resource is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/CagInfoPpData'
  '204':
    description: >
      No Content. The Individual CAG Information Parameters Provisioning resource is
      successfully updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**patch:**

```

summary: Modify an existing Individual CAG Information Parameters Provisioning resource.
operationId: ModifyIndCagInfoParamProvisioning
tags:
  - Individual CAG Information Parameters Provisioning (Document)
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/CagInfoPpDataPatch'
responses:
  '200':
    description: >
      OK. The Individual CAG Information Parameters Provisioning resource is successfully
      modified and a representation of the updated resource is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/CagInfoPpData'
  '204':

```



```

description: >
  No Content. The Individual CAG Information Parameters Provisioning resource is
  successfully modified and no content is returned in the response body.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Delete an existing Individual CAG Information Parameters Provisioning resource.  
 operationId: DeleteIndCagInfoParamProvisioning

#### tags:

- Individual CAG Information Parameters Provisioning (Document)

#### responses:

```

'204':
  description: >
    No Content. The Individual CAG Information Parameters Provisioning resource is
    successfully deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

#### schemas:

```

#
# STRUCTURED DATA TYPES
#
CagInfoPpData:
  description: Represents the CAG Information Parameters Provisioning.
  type: object
  properties:

```

```

    afId:
      type: string
    cagInfos:
      type: array
      items:
        $ref: '#/components/schemas/CagInformation'
      minItems: 1
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - afId

CagInfoPpDataPatch:
  description: >
    Represents the requested modifications to a CAG Information Parameters Provisioning.
  type: object
  properties:
    cagInfos:
      type: array
      items:
        $ref: '#/components/schemas/CagInformation'
      minItems: 1

CagInformation:
  description: Represents the CAG information.
  type: object
  properties:
    ueList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      minItems: 1
    cagProvInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/CagProvisionInformation'
  required:
    - ueList
    - cagProvInfo

#
# SIMPLE DATA TYPES
#

#
# ENUMERATIONS
#

```

---

## A.39 Void

## A.40 ImsSessionManagement API

openapi: 3.0.0

```

info:
  title: 3gpp-ims-sm
  version: 1.0.0-alpha.2
  description: |
    API for IMS Session Management.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/3gpp-ims-sm/v1'
    variables:

```

```
apiRoot:
  default: https://example.com
  description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.
```

```
paths:
  /ims-sessions:
    get:
      summary: Request to retrieve all the active IMS Sessions managed by the NEF.
      operationId: GetImsSessions
      tags:
        - IMS Sessions (Collection)
      responses:
        '200':
          description: >
            OK. All the active IMS Sessions resources managed by the NEF are returned.
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/ImsSession'
                minItems: 0
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
post:
  summary: Request to create a new IMS Session resource.
  tags:
    - IMS Session Creation (Collection)
  operationId: CreateImsSession
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ImsSession'
  responses:
    '201':
      description: >
        Created. Successful creation of a new Individual IMS Session resource.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ImsSession'
      headers:
        Location:
          description: >
            Contains the URI of the newly created resource, according to the structure
            {apiRoot}/3gpp-ims-sm/v1/ims-sessions/{sessionId}
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '409':
    $ref: 'TS29122_CommonData.yaml#/components/responses/409'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  ImsSessionNotif:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: 'TS29175_Nimsas_ImsSessionManagement.yaml#/components/schemas/ImsSessionEventNotification'
  responses:
    '204':
      description: >
        No Content. The IMS EE notification is successfully received and acknowledged.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/ims-sessions/{sessionId}:
  parameters:
    - name: sessionId
      in: path
      description: >
        Represents the identifier of the Individual IMS Session resource.
      required: true
      schema:
        type: string
  get:
    summary: Retrieve an existing Individual IMS Session resource.
    operationId: GetIndImsSession
    tags:
      - Individual IMS Session (Document)
    responses:
      '200':

```

```

description: >
  OK. The requested "Individual IMS Session" resource is successfully returned in the
  response body.
content:
  application/json:
    schema:
      $ref: '#/components/schemas/ImSession'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
summary: Update an existing Individual IMS Session resource.
operationId: UpdateIndImSession
tags:
  - Individual IMS Session (Document)
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/ImSession'
responses:
  '200':
    description: >
      OK. The Individual IMS Session resource is successfully updated and a representation
      of the updated resource is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ImSession'
  '204':
    description: >
      No Content. The Individual IMS Session Management resource is
      successfully updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '409':
    $ref: 'TS29122_CommonData.yaml#/components/responses/409'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'

```

```

    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: Delete an existing Individual IMS Session resource.
  operationId: DeleteIndImsSession
  tags:
    - Individual IMS Session (Document)
  responses:
    '204':
      description: >
        No Content. The Individual IMS Session resource is successfully deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '409':
      $ref: 'TS29122_CommonData.yaml#/components/responses/409'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
#
# STRUCTURED DATA TYPES
#
    ImsSession:
      description: Represents the IMS Session Information.
      type: object
      properties:
        afId:
          type: string
        imsSessionInfo:
          $ref: 'TS29175_Nimsas_ImsSessionManagement.yaml#/components/schemas/ImsSessionInfo'
        notifUri:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - afId
        - imsSessionInfo

#
# SIMPLE DATA TYPES
#

#
# ENUMERATIONS
#

```

## A.41 ImsEventExposure API

openapi: 3.0.0

info:

title: 3gpp-ims-ee  
version: 1.0.0-alpha.4  
description: |  
API for IMS Event Exposure Services.  
© 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  
All rights reserved.

externalDocs:

description: >  
3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.  
url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.522/'

servers:

- url: '{apiRoot}/3gpp-ims-ee/v1'  
variables:  
apiRoot:  
default: https://example.com  
description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

security:

- {}  
- oAuth2ClientCredentials: []

paths:

/{afId}/subscriptions:  
parameters:  
- name: afId  
in: path  
description: Represents the identifier of the AF.  
required: true  
schema:  
type: string

get:

summary: Retrieve all the active IMS EE Subscriptions managed by the NEF.  
operationId: GetImsEESubsc  
tags:  
- IMS EE Subscriptions (Collection)  
responses:  
'200':  
description: >  
OK. All the Individual IMS EE Subscription resource(s) managed by the NEF  
are returned.  
If there are no active Individual IMS EE Subscription resources at the NEF,  
an empty array is returned.  
content:  
application/json:  
schema:  
type: array  
items:  
\$ref: '#/components/schemas/ImsEESubsc'  
minItems: 0  
'307':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/307'  
'308':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/308'  
'400':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/400'  
'401':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/401'  
'403':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/403'  
'404':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/404'  
'406':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/406'  
'429':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/429'  
'500':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/500'  
'503':  
\$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

```
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Request the creation of a new IMS EE Subscription.
  operationId: CreateImseESubsc
  tags:
    - IMS EE Subscriptions (Collection)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/ImseESubsc'
  responses:
    '201':
      description: >
        Created. A representation of the created IMS EE Subscription resource is
        returned in the response body.
      content:
        application/json:
          schema:
            $ref: 'TS29122_CommonData.yaml#/components/schemas/ImseESubsc'
      headers:
        Location:
          description: >
            Contains the URI of the newly created resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    IMSEENotif:
      '{$request.body#/notifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: 'TS29122_CommonData.yaml#/components/schemas/ImseEENotif'
          responses:
            '204':
              description: >
                No Content. The IMS EE Notification is successfully received and acknowledged.
            '307':
              $ref: 'TS29122_CommonData.yaml#/components/responses/307'
            '308':
              $ref: 'TS29122_CommonData.yaml#/components/responses/308'
            '400':
              $ref: 'TS29122_CommonData.yaml#/components/responses/400'
            '401':
              $ref: 'TS29122_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29122_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29122_CommonData.yaml#/components/responses/404'
```



```
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

/afId/subscriptions/{subscriptionId}:

```
parameters:
  - name: afId
    in: path
    description: Represents the identifier of the AF.
    required: true
    schema:
      type: string
  - name: subscriptionId
    in: path
    description: >
      Represents the identifier of the Individual IMS EE Subscription.
      resource.
    required: true
    schema:
      type: string
```

get:

```
summary: Retrieve an existing Individual IMS EE Subscription resource.
operationId: GetIndImseESubsc
tags:
  - Individual IMS EE Subscription (Document)
responses:
  '200':
    description: >
      OK. The requested Individual IMS EE Subscription resource is successfully
      returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ImseESubsc'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

put:

```
summary: Request the update of an existing Individual IMS EE Subscription resource.
operationId: UpdateIndImseESubsc
tags:
  - Individual IMS EE Subscription (Document)
requestBody:
  required: true
  content:
```

```
    application/json:
      schema:
        $ref: '#/components/schemas/ImSEESubsc'
  responses:
    '200':
      description: >
        OK. The Individual IMS EE Subscription resource is successfully updated and
        a representation of the updated resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ImSEESubsc'
    '204':
      description: >
        No Content. The Individual IMS EE Subscription resource is successfully updated and
        no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  patch:
    summary: Request the modification of an existing Individual IMS EE Subscription resource.
    operationId: ModifyIndImSEESubsc
    tags:
      - Individual IMS EE Subscription (Document)
    requestBody:
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/ImSEESubscPatch'
    responses:
      '200':
        description: >
          OK. The Individual IMS EE Subscription resource is successfully modified and
          a representation of the updated resource is returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ImSEESubsc'
      '204':
        description: >
          No Content. The Individual IMS EE Subscription resource is successfully modified and
          no content is returned in the response body.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### delete:

summary: Request the deletion of an existing Individual IMS EE Subscription resource.  
 operationId: DeleteIndImseESubsc

#### tags:

- Individual IMS EE Subscription (Document)

#### responses:

```

  '204':
    description: >
      No Content. The Individual IMS EE Subscription resource is successfully deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

#### components:

##### securitySchemes:

##### oAuth2ClientCredentials:

type: oauth2

##### flows:

##### clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

#### schemas:

#

# STRUCTURED DATA TYPES

#

#### ImseESubsc:

description: Represents an IMS Event Exposure Subscription.

type: object

#### properties:

##### eventReqs:

type: array

##### items:

\$ref: '#/components/schemas/ImseEventRequirement'

minItems: 1

##### imsReptReq:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/ImseReportingOptions'

##### immReports:

type: array

##### items:

\$ref: '#/components/schemas/ImseEventReport'

minItems: 1

```
tgtUeIds:
  type: array
  items:
    $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'
  minItems: 1
anyUeInd:
  type: boolean
  enum:
    - true
  description: >
    Identifies whether the subscription is for any UE.
    true indicates that the subscription is for any UE.
    When present, this attribute shall be set to true. The presence of this attribute set to
    the value false is forbidden.
notifUri:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
supFeat:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - eventReqs
  - imsReptReq
  - notifUri
oneOf:
  - required: [tgtUeIds]
  - required: [anyUeInd]

ImsEESubscPatch:
  description: Represents the requested modifications to an IMS Event Exposure Subscription.
  type: object
  properties:
    eventReqs:
      type: array
      items:
        $ref: '#/components/schemas/ImsEventRequirement'
      minItems: 1
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

ImsEENotif:
  description: Represents an IMS Event Exposure Notification.
  type: object
  properties:
    subscriptionId:
      type: string
    sessionId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SessionId'
    reports:
      type: array
      items:
        $ref: '#/components/schemas/ImsEventReport'
      minItems: 1
    imsFailureCause:
      type: string
      description: Contains the failure cause provided from the IMS AS.
  required:
    - subscriptionId
    - reports

ImsEventRequirement:
  description: Represents the IMS Event Requirements.
  type: object
  properties:
    imsEventType:
      $ref: '#/components/schemas/ImsEventType'
    imsEventConfig:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ImsEventConfiguration'
  required:
    - imsEventType
    - imsEventConfig

ImsEventReport:
  description: Represents an IMS Event Report.
  type: object
  properties:
    imsEvent:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ImsEvent'
    timeStamp:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
```

```

    eventRptInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ImsEventReportInfo'
    required:
      - imsEvent
      - timeStamp

```

```

#
# SIMPLE DATA TYPES
#
#
# ENUMERATIONS DATA TYPES
#

```

```

ImsEventType:
  anyOf:
    - type: string
      enum:
        - SUBSCRIBER_SPECIFIC
        - NON_SUBSCRIBER_SPECIFIC
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration and
        is not used to encode content defined in the present version of this API.
      description: |
        Represents the IMS Event Type.
        Possible values are:
        - SUBSCRIBER_SPECIFIC: Indicates that the IMS Event type is Subscriber Specific for data
          channel.
        - NON_SUBSCRIBER_SPECIFIC: Indicates that the IMS Event type is Subscriber Specific for
          Data channel.

```

---

## A.42 ImsParamProvision API

openapi: 3.0.0

```

info:
  title: 3gpp-ims-pp
  version: 1.0.0-alpha.3
  description: |
    API for IMS Parameters Provisioning.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

servers:
  - url: '{apiRoot}/3gpp-ims-pp/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

```

```

paths:
  /pp:
    get:
      summary: Request to retrieve all the active IMS Parameters Provisionings at the NEF.
      operationId: GetImsParamProvisionings
      tags:
        - IMS Parameters Provisionings (Collection)
      responses:
        '200':
          description: >
            OK. All the active IMS Parameters Provisioning resources managed by the
            NEF are returned.
          content:

```

```

    application/json:
      schema:
        type: array
        items:
          $ref: '#/components/schemas/ImsPpData'
        minItems: 0
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Request the creation of a new IMS Parameters Provisioning.
  tags:
    - IMS Parameters Provisionings (Collection)
  operationId: CreateImsParamProvisioning
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ImsPpData'
  responses:
    '201':
      description: >
        Created. Successful creation of a new Individual IMS Parameters Provisioning
        resource.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ImsPpData'
      headers:
        Location:
          description: >
            Contains the URI of the newly created resource, according to the structure
            {apiRoot}/3gpp-ims-pp/v1/pp/{ppId}
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/pp/{ppId}:
  parameters:
    - name: ppId
      in: path
      description: >
        Represents the identifier of the Individual IMS Parameters Provisioning
        resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual IMS Parameters Provisioning resource.
    operationId: GetIndImsParamProvisioning
    tags:
      - Individual IMS Parameters Provisioning (Document)
    responses:
      '200':
        description: >
          OK. The requested "Individual IMS Parameters Provisioning" resource is
          successfully returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ImsPpData'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Update an existing Individual IMS Parameters Provisioning resource.
    operationId: UpdateIndImsParamProvisioning
    tags:
      - Individual IMS Parameters Provisioning (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ImsPpData'
    responses:
      '200':
        description: >
          OK. The Individual IMS Parameters Provisioning resource is successfully
          updated and a representation of the updated resource is returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ImsPpData'
      '204':
        description: >
          No Content. The Individual IMS Parameters Provisioning resource is
          successfully updated and no content is returned in the response body.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'

```

```

'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## delete:

summary: Delete an existing Individual IMS Parameters Provisioning resource.

operationId: DeleteIndImiParamProvisioning

## tags:

- Individual IMS Parameters Provisioning (Document)

## responses:

```

'204':
  description: >
    No Content. The Individual IMS Parameters Provisioning resource is
    successfully deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## components:

## securitySchemes:

## oAuth2ClientCredentials:

type: oAuth2

## flows:

## clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

## schemas:

#

# STRUCTURED DATA TYPES

#

## ImsPpData:

description: Represents the IMS Parameters Provisioning data.

type: object

## properties:

## afId:

type: string

## imsData:

\$ref: '#/components/schemas/ImsData'

## suppFeat:

\$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:



```

    - afId

ImsData:
  description: Represents the IMS parameters data for provisioning.
  type: object
  properties:
    tgtUeId:
      $ref: 'TS29562_Nhss_imsSDM.yaml#/components/schemas/ImsPublicId'
    rcdPropData:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RcdProperties'
  required:
    - tgtUeId

#
# SIMPLE DATA TYPES
#

#
# ENUMERATIONS
#

```

---

## A.43 AIoT API

```

openapi: 3.0.0

info:
  title: 3gpp-aiot
  version: 1.0.0-alpha.2
  description: |
    API for UE Address service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'
security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/3gpp-aiot/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:
  /request-inv:
    post:
      summary: Request to perform an AIoT Inventory operation.
      operationId: InventoryRequest
      tags:
        - AIoT Inventory Request (custom operation without associated resources)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/InventoryReq'
      responses:
        '200':
          description: >
            OK. The AIoT Inventory request is successfully received and processed, and
            AIoT Inventory related information is returned in the response body.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/InventoryResp'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'

```

```

'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  AIOtOperationsNotif:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AIOtNotif'
        responses:
          '204':
            description: >
              No Content. The AIoT Operations Notification is successfully received and
              acknowledged.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/request-cmd:
  post:
    summary: Request to perform an AIoT Command operation.
    operationId: CommandRequest
    tags:
      - AIoT Command Request (custom operation without associated resources)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/CommandReq'
    responses:
      '200':

```

```

description: >
  OK. The AIoT Command request is successfully received and processed, and
  AIoT Command related information is returned in the response body.
content:
  application/json:
    schema:
      $ref: '#/components/schemas/CommandResp'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  AIoTOperationsNotif:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AIoTNotif'
        responses:
          '204':
            description: >
              No Content. The AIoT Operations Notification is successfully received and
              acknowledged.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:

```

```
oAuth2ClientCredentials:
  type: oauth2
  flows:
    clientCredentials:
      tokenUrl: '{tokenUrl}'
      scopes: {}
```

```
schemas:
```

```
#
# STRUCTURED DATA TYPES
#
```

```
InventoryReq:
  description: Represents the AIoT Inventory request.
  type: object
  properties:
    afId:
      type: string
    targetArea:
      $ref: '#/components/schemas/ExtAIoTArea'
    targetDevices:
      $ref: 'TS29569_Naiotf_AIoT.yaml#/components/schemas/AIoTDevices'
    numDevices:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    timeInterval:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - afId
    - notifUri
  anyOf:
    - required: [targetArea]
    - required: [targetDevices]
```

```
InventoryResp:
  description: Represents the AIoT Inventory response.
  type: object
  properties:
    afTransId:
      type: string
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - afTransId
```

```
CommandReq:
  description: Represents the AIoT Command request.
  type: object
  properties:
    afId:
      type: string
    commandType:
      $ref: '#/components/schemas/CommandType'
    targetArea:
      $ref: '#/components/schemas/ExtAIoTArea'
    targetDevices:
      $ref: 'TS29569_Naiotf_AIoT.yaml#/components/schemas/AIoTDevices'
    numDevices:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    msgSize:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    offset:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    length:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    data:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - afId
    - commandType
```

```
- notifUri
anyOf:
- required: [targetArea]
- required: [targetDevices]

CommandResp:
description: Represents the AIoT Command response.
type: object
properties:
  afTransId:
    type: string
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
- afTransId

AIoTNotif:
description: Represents the AIoT Operations Notification.
type: object
properties:
  afTransId:
    type: string
  devicesRepData:
    type: array
    items:
      $ref: 'TS29569_Naiotf_AIoT.yaml#/components/schemas/DevicesRepInfo'
    minItems: 1
  lastRepInd:
    type: boolean
    default: false
  description: >
    Contains the Last Report Indication, i.e., indicates whether this is the last reporting
    from the AIOTF for the AIoT service operation identified by the transId attribute.
    true indicates that this is the last report.
    false indicates that this is not the last report.
    The default value is false when this attribute is omitted.
required:
- afTransId
anyOf:
- required: [devicesRepData]
- required: [lastRepInd]

ExtAIoTArea:
description: Represents the AIoT area.
type: object
properties:
  extAreaIds:
    type: array
    items:
      $ref: '#/components/schemas/ExtAiotAreaId'
    minItems: 1
  geographicAreas:
    type: array
    items:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
    minItems: 1
  civicAddresses:
    type: array
    items:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
    minItems: 1
oneOf:
- required: [extAreaIds]
- required: [geographicAreas]
- required: [civicAddresses]

#
# SIMPLE DATA TYPES
#

ExtAiotAreaId:
description: Represents the External AIoT Area identifier.
type: string

#
# ENUMERATIONS
#
```

```

CommandType:
  anyOf:
    - type: string
      enum:
        - READ
        - WRITE
        - PERMANENT_DISABLE
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration and
        is not used to encode content defined in the present version of this API.
  description: |
    Represents the type of AIoT Command.
    Possible values are:
    - READ: Indicates that the AIoT Command is Read (i.e., retrieve information).
    - WRITE: Indicates that the AIoT Command is Write (i.e., provision information).
    - PERMANENT_DISABLE: Indicates that the AIoT Command is Permanent Disable (i.e., disable
      the capability to transmit information).

#
# Data types describing alternative data types or combinations of data types
#

```

---

## A.44 VFLTraining API

openapi: 3.0.0

```

info:
  title: 3gpp-vfl-training
  version: 1.0.0-alpha.1
  description: |
    API for VFL Training.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

servers:
  - url: '{apiRoot}/3gpp-vfl-training/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

security:
  - {}
  - oAuth2ClientCredentials: []

paths:
  /{afId}/subscriptions:
    parameters:
      - name: afId
        in: path
        description: Represents the identifier of the AF
        required: true
        schema:
          type: string

    get:
      summary: Retrieve all the active VFL Training Subscriptions.
      operationId: GetVFLTrainingSubscriptions
      tags:
        - VFL Training Subscriptions (Collection)
      responses:
        '200':
          description: >
            OK. All the Individual VFL Training Subscription resource(s) managed
            by the NEF are returned.
            If there are no active Individual VFL Training Subscription resources
            at the NEF, an empty array is returned.
          content:

```

```

    application/json:
      schema:
        type: array
        items:
          $ref: '#/components/schemas/VflTrainingSubs'
        minItems: 0
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Create a new Individual VFL Training Subscription.
  operationId: CreateVFLTrainingSubscription
  tags:
    - VFL Training Subscriptions (Collection)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/VflTrainingSubs'
  responses:
    '201':
      description: >
        Created. A representation of the created Individual VFL Training Subscription
        resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/VflTrainingSubs'
      headers:
        Location:
          description: >
            Contains the URI of the newly created resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

callbacks:
  VFLTrainingNotification:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: 'TS29520_Nnwdaf_VFLTraining.yaml#/components/schemas/VflTrainingNotify'
        responses:
          '204':
            description: >
              No Content. The notification is successfully received and acknowledged.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subId}:
  parameters:
    - name: afId
      in: path
      description: Represents the identifier of the AF.
      required: true
      schema:
        type: string
    - name: subId
      in: path
      description: Represents the identifier of the Individual VFL Training Subscription resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual VFL Training Subscription resource.
    operationId: GetVFLTrainingSubscription
    tags:
      - Individual VFL Training Subscription (Document)
    responses:
      '200':
        description: >
          OK. The requested Individual VFL Training Subscription resource is
          successfully returned in the response body.
        content:
          application/json:
            schema:
              $ref: 'TS29520_Nnwdaf_VFLTraining.yaml#/components/schemas/VflTrainingSubs'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':

```



```

    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**put:**

summary: Request the update of an existing Individual VFL Training Subscription resource.  
 operationId: UpdateVFLTrainingSubscription

**tags:**

- Individual VFL Training Subscription (Document)

**requestBody:**

required: true

**content:**

```

  application/json:
    schema:
      $ref: '#/components/schemas/VflTrainingSubs'

```

**responses:**

```

  '200':
    description: >
      OK. The Individual VFL Training Subscription resource is successfully updated
      and a representation of the updated resource is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/VflTrainingSubs'
  '204':
    description: >
      No Content. The Individual VFL Training Subscription resource is successfully
      updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

**patch:**

summary: Request modification of an existing Individual VFL Training Subscription resource.  
 operationId: ModifyVFLTrainingSubscription

**tags:**

- Individual VFL Training Subscription (Document)

**requestBody:**

required: true

**content:**

```

  application/merge-patch+json:
    schema:
      $ref: '#/components/schemas/VflTrainingSubsPatch'

```

```
responses:
  '200':
    description: >
      OK. The Individual VFL Training Subscription resource is successfully modified
      and a representation of the updated resource is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/VflTrainingSubs'
  '204':
    description: >
      No Content. The Individual VFL Training Subscription resource is successfully
      modified and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: Request deletion of an existing Individual VFL Training Subscription resource.
  operationId: DeleteVFLTrainingSubscription
  tags:
    - Individual VFL Training Subscription (Document)
  responses:
    '204':
      description: >
        No Content. The Individual VFL Training Subscription resource is
        successfully deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
```

```

    scopes: {}

schemas:

  VflTrainingSubs:
    description: Represents VFL Training subscription.
    type: object
    properties:
      notifUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      notifCorrId:
        type: string
        description: Notification correlation identifier.
      vflTrainSubs:
        type: array
        items:
          $ref: 'TS29520_NnwdaF_VFLTraining.yaml#/components/schemas/VflTrainingSub'
        minItems: 1
      extNwdaFId:
        type: string
        description: >
          Contains the external identifier of the NWDAF that is being requested to act
          as VFL client.
      reportingReqs:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - notifUri
      - notifCorrId
      - vflTrainSubs
      - extNwdaFId

  VflTrainingSubsPatch:
    description: Represents contents for modifying a VFL Training subscription.
    type: object
    properties:
      vflTrainSubs:
        type: array
        items:
          $ref: 'TS29520_NnwdaF_VFLTraining.yaml#/components/schemas/VflTrainingSub'
        minItems: 1
      notifUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      notifCorrId:
        type: string
        description: Notification correlation identifier.
      reportingReqs:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'

```

---

## A.45 VFLInference API

openapi: 3.0.0

```

info:
  title: 3gpp-vfl-inference
  version: 1.0.0-alpha.1
  description: |
    API for VFL Inference.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/

```

```

servers:
  - url: '{apiRoot}/3gpp-vfl-inference/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

```

```

security:
  - {}

```

- oAuth2ClientCredentials:
- 3gpp-vfl-inference

```

paths:
  /{afId}/subscriptions:
    parameters:
      - name: afId
        in: path
        description: Represents the identifier of the AF.
        required: true
        schema:
          type: string

    post:
      summary: Create a new Individual VFL Inference Subscription resource.
      operationId: CreateVFLInferenceSubscription
      tags:
        - Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/VflInferSub'

      responses:
        '201':
          description: Create a new Individual VFL Inference Subscription resource.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/VflInferSub'
          headers:
            Location:
              description: >
                Contains the URI of the newly created resource, according to the
                structure
                {apiRoot}/3gpp-vfl-inference/v1/{afId}/subscriptions/{subscriptionId}.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

      callbacks:
        myNotification:
          '{$request.body#/notifUri}':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: 'TS29520_Nnwdaf_VFLInference.yaml#/components/schemas/VflInferNotif'

      responses:
        '204':
          description: No Content, Notification was successful
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'

```

```

    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}:
  parameters:
    - name: afId
      in: path
      description: Represents the identifier of the AF.
      required: true
      schema:
        type: string
    - name: subscriptionId
      in: path
      description: String identifying a VFL Inference Subscription.
      required: true
      schema:
        type: string
  put:
    summary: Update an existing Individual VFL Inference Subscription
    operationId: UpdateVFLInferenceSubscription
    tags:
      - Individual VFL Inference Subscription (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/VflInferSub'
    responses:
      '200':
        description: >
          The Individual VFL Inference Subscription resource was modified
          successfully and a representation of that resource is returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/VflInferSub'
      '204':
        description: >
          The Individual VFL Inference Subscription resource was modified
          successfully.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

```

summary: Partial update an existing Individual VFL Inference Subscription
operationId: PartialUpdateVFLInferenceSubscription
tags:
  - Individual VFL Inference Subscription (Document)
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/VflInferSubPatch'
responses:
  '200':
    description: >
      The Individual VFL Inference Subscription resource was partial
      modified successfully and a representation of that resource is returned.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/VflInferSub'
  '204':
    description: >
      The Individual VFL Inference Subscription resource was partial
      modified successfully.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

```

summary: Delete an existing Individual VFL Inference Subscription.
operationId: DeleteVFLInferenceSubscription
tags:
  - Individual VFL Inference Subscription (Document)
responses:
  '204':
    description: >
      No Content. The Individual VFL Inference Subscription matching the
      subscriptionId was deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

## components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{nrfApiRoot}/oauth2/token'
        scopes:
          3gpp-vfl-inference: Access to the VFLInference API

```

## schemas:

```

VflInferSub:
  description: Represents a VFL Inference subscription.
  type: object
  properties:
    notifCorreId:
      type: string
      description: >
        String identifying the Notification Correlation ID in the corresponding
        notification.
    notifUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    suppFeats:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    vflClientId:
      type: string
      description: String identifying the target VFL client.
    vflInferAnaSubs:
      type: array
      items:
        $ref: 'TS29520_Nnwdaf_VFLInference.yaml#/components/schemas/VflInferAnaSub'
      minItems: 1
      description: Represents inference subscription per analytics Id.
    vflInferReq:
      $ref: 'TS29520_Nnwdaf_VFLInference.yaml#/components/schemas/VflInferReq'
    vflInferResults:
      type: array
      items:
        $ref: 'TS29520_Nnwdaf_VFLInference.yaml#/components/schemas/VflInferResult'
      minItems: 1
      description: Represents intermediate VFL Inference result.
    vflReportInfo:
      $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
  required:
    - notifUri
    - notifCorreId
    - vflInferAnaSubs

```

## VflInferSubPatch:

```

  description: >
    Represents parameters to request the modification of a VFL Inference
    subscription.
  type: object
  properties:
    notifUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    notifCorreId:
      type: string
      description: >
        String identifying the Notification Correlation ID in the corresponding
        notification.
    vflInferReq:

```

```
$ref: 'TS29520_Nnwdafl_VFLInference.yaml#/components/schemas/VflInferReq'
vflReportInfo:
  $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
```

---

## A.46 VFLNFDISCOVERY API

openapi: 3.0.0

```
info:
  title: 3gpp-vfl-nf-discovery
  version: 1.0.0-alpha.2
  description: |
    API for VFL NF Discovery.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.522 V19.4.0; 5G System; Network Exposure Function Northbound APIs.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.522/'

servers:
  - url: '{apiRoot}/3gpp-vfl-nf-discovery/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

security:
  - {}
  - oAuth2ClientCredentials: []

paths:
  /discover-nwdafl:
    post:
      summary: Request of NWDAF(s) that are to act as VFL client(s).
      tags:
        - VFL NF discovery
      operationId: DiscoverNwdafl
      requestBody:
        description: Representation of the request of NWDAF that are to act as VFL client(s).
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/NwdaflDiscoveryRequest'
      responses:
        '200':
          description: >
            OK. Successful case. The external NWDAF ID is provisioned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/NwdaflDiscoveryResponse'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
```



```

    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/release-nwdaf:
  post:
    summary: Request to inform the external NWDaf ID(s) are not used anymore.
    operationId: ReleaseNwdaf
    tags:
      - VFL NF discovery release
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/NwdafReleaseRequest'
    responses:
      '204':
        description: No Content. Successful case.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    NwdafDiscoveryRequest:
      description: >
        Represents the parameters to request the NWDaf(s) that are to act as VFL client(s).
      type: object
      properties:
        analyticIds:
          type: array
          items:
            $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NwdafEvent'
          minItems: 1
        vflCapType:
          $ref: '#/components/schemas/VFLCapabilityType'
        vflInterInfo:
          type: string
          description: String representing the VFL Interoperability Information.
        reqFeatureIds:
          type: array
          items:
            type: string
          minItems: 1
        timePeriod:

```

```
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  serviceAreas:
    type: array
    items:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
    minItems: 1
  required:
    - analyticIds
    - vflCapType

NwdafDiscoveryResponse:
  description: >
    Represents the external NWDAF ID(s) to act as the VFL client(s).
  type: object
  properties:
    exNwdafIds:
      type: array
      items:
        type: string
        description: The current external NWDAF identifier.
      minItems: 1
  required:
    - exNwdafIds

NwdafReleaseRequest:
  description: >
    Represents the parameters to inform the external NWDAF ID(s) are not used anymore.
  type: object
  properties:
    exNwdafIds:
      type: array
      items:
        type: string
        description: The current external NWDAF identifier.
      minItems: 1
  required:
    - exNwdafIds

#
# SIMPLE DATA TYPES
#

#
# ENUMERATIONS
#

VFLCapabilityType:
  anyOf:
    - type: string
      enum:
        - VFL_CLIENT
    - type: string
      description: Represents the VFL capability type to be discovered.
  description: |
    Represents the VFL capability type to be discovered.
    Possible values are:
    - VFL_CLIENT: Represents the VFL capability type to be discovered is VFL client.
```

## Annex B (informative): Change history

| Change history |         |           |      |     |     |                                                                                                                                                                  |             |
|----------------|---------|-----------|------|-----|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Date           | Meeting | TDoc      | CR   | Rev | Cat | Subject/Comment                                                                                                                                                  | New version |
| 2018-03        | CT3#95  |           |      |     |     | TS Skeleton                                                                                                                                                      | 0.0.0       |
| 2018-03        | CT3#95  |           |      |     |     | Inclusion of C3-181332 and TS skeleton of Network Exposure Function Northbound APIs in C3-181362.                                                                | 0.1.0       |
| 2018-04        | CT3#96  |           |      |     |     | Inclusion of C3-182407, C3-182408, C3-182504, C3-182418, C3-182505, C3-182443, C3-182421, C3-182422, C3-182501 and editorial changes from Rapporteur.            | 0.2.0       |
| 2018-05        | CT3#97  |           |      |     |     | Inclusion of C3-183187, C3-183773, C3-183774, C3-183553, C3-183826, C3-183329, C3-183776, C3-183827, C3-183778, C3-183605 and editorial changes from Rapporteur. | 0.3.0       |
| 2018-06        | CT#80   |           |      |     |     | TS sent to plenary for approval                                                                                                                                  | 1.0.0       |
| 2018-06        | CT#80   |           |      |     |     | TS approved by plenary                                                                                                                                           | 15.0.0      |
| 2018-09        | CT#81   | CP-182015 | 0001 | 1   | F   | DNAI change notification type                                                                                                                                    | 15.1.0      |
| 2018-09        | CT#81   | CP-182015 | 0002 | -   | F   | Corrections on NEF Northbound interface                                                                                                                          | 15.1.0      |
| 2018-09        | CT#81   | CP-182015 | 0003 | 1   | F   | TrafficInfluence API OpenAPI schema                                                                                                                              | 15.1.0      |
| 2018-09        | CT#81   | CP-182015 | 0004 | 4   | F   | AF influence traffic routing cleanup                                                                                                                             | 15.1.0      |
| 2018-09        | CT#81   | CP-182031 | 0005 | 1   | F   | Definition of Changing the Chargeable Party procedures and API                                                                                                   | 15.1.0      |
| 2018-09        | CT#81   | CP-182031 | 0006 | 1   | F   | Definition of setting up an AS session with required QoS procedure and API                                                                                       | 15.1.0      |
| 2018-09        | CT#81   | CP-182015 | 0007 | 2   | F   | Resource structure update                                                                                                                                        | 15.1.0      |
| 2018-09        | CT#81   | CP-182015 | 0008 | -   | F   | Procedures for monitoring – Reference                                                                                                                            | 15.1.0      |
| 2018-09        | CT#81   | CP-182015 | 0009 | -   | F   | Ethernet packet filter for AF traffic influence API                                                                                                              | 15.1.0      |
| 2018-09        | CT#81   | CP-182015 | 0010 | 3   | F   | Removable attribute definition for AF traffic influence                                                                                                          | 15.1.0      |
| 2018-09        | CT#81   | CP-182015 | 0011 | -   | F   | Supported feature for AF traffic influence                                                                                                                       | 15.1.0      |
| 2018-09        | CT#81   | CP-182015 | 0012 | -   | F   | Version numbering change                                                                                                                                         | 15.1.0      |
| 2018-09        | CT#81   | CP-182015 | 0013 | -   | F   | Removal of externaldocs field                                                                                                                                    | 15.1.0      |
| 2018-09        | CT#81   | CP-182035 | 0014 | 1   | F   | PFD Management Service Operation                                                                                                                                 | 15.1.0      |
| 2018-12        | CT#82   | CP-183205 | 0015 | 2   | F   | ExternalDocs field                                                                                                                                               | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0016 | 3   | F   | Support of 5G location requirement                                                                                                                               | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0017 | 3   | F   | Error status codes for HTTP responses                                                                                                                            | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0019 | -   | F   | Default value for apiRoot                                                                                                                                        | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0021 | 4   | F   | Correct traffic route and Ethernet flow data type                                                                                                                | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0022 | 1   | F   | Event correction for AF influence traffic routing                                                                                                                | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0023 | 2   | F   | Correction to the AF influence on traffic steering control                                                                                                       | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0024 | 1   | F   | Supporting Ethernet UE in Chargeable Party and AF session with QoS                                                                                               | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0025 | 1   | F   | Add AF application ID for traffic influence                                                                                                                      | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0026 | 1   | F   | Add BSF interaction for Chargeable Party and Required QoS                                                                                                        | 15.2.0      |
| 2018-12        | CT#82   | CP-183109 | 0027 | 2   | F   | Security adaptation for Nnef northbound APIs with CAPIF                                                                                                          | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0028 | 2   | F   | Security field                                                                                                                                                   | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0029 | 1   | F   | Corrections on subscribed event                                                                                                                                  | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0030 | 1   | F   | Status code update for TrafficInfluence API                                                                                                                      | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0031 | 3   | F   | UE information during notification                                                                                                                               | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0032 | -   | F   | Location header                                                                                                                                                  | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0033 | 1   | F   | API Version Update                                                                                                                                               | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0034 | 1   | F   | Support of 5G SUPI-PEI association                                                                                                                               | 15.2.0      |
| 2018-12        | CT#82   | CP-183205 | 0035 | 1   | F   | Default value for appReloInd and minItem for tempValidities                                                                                                      | 15.2.0      |
| 2019-03        | CT#83   | CP-190116 | 0037 | 2   | F   | Event notification                                                                                                                                               | 15.3.0      |
| 2019-03        | CT#83   | CP-190116 | 0038 | 1   | F   | Correction on MacAddr48 and RouteToLocation data type reference in the OpenAPI file                                                                              | 15.3.0      |
| 2019-03        | CT#83   | CP-190116 | 0040 | 1   | F   | Correction on 5G feature                                                                                                                                         | 15.3.0      |
| 2019-03        | CT#83   | CP-190116 | 0041 | -   | F   | Open API version number update                                                                                                                                   | 15.3.0      |
| 2019-06        | CT#84   | CP-191080 | 0042 | 4   | F   | Resource structure and AF Identifier                                                                                                                             | 15.4.0      |
| 2019-06        | CT#84   | CP-191080 | 0048 | 2   | F   | UDM interaction for AF influence traffic                                                                                                                         | 15.4.0      |
| 2019-06        | CT#84   | CP-191080 | 0049 | 2   | F   | Correct condition for DNAI in UP path change                                                                                                                     | 15.4.0      |
| 2019-06        | CT#84   | CP-191080 | 0053 | 1   | F   | Precedence of OpenAPI file                                                                                                                                       | 15.4.0      |
| 2019-06        | CT#84   | CP-191080 | 0059 | 1   | F   | Copyright Note in YAML file                                                                                                                                      | 15.4.0      |
| 2019-06        | CT#84   | CP-191080 | 0060 | 2   | F   | API version Update                                                                                                                                               | 15.4.0      |
| 2019-06        | CT#84   | CP-191070 | 0043 | 2   | F   | Nnef_MSISDN-less_MO_SMS service                                                                                                                                  | 16.0.0      |
| 2019-06        | CT#84   | CP-191070 | 0044 | 2   | B   | Application function notification of downlink data delivery status                                                                                               | 16.0.0      |
| 2019-06        | CT#84   | CP-191070 | 0045 | 2   | B   | Availability after DDN failure notification for multiple Afs                                                                                                     | 16.0.0      |
| 2019-06        | CT#84   | CP-191090 | 0047 | 1   | F   | Support of external group Id                                                                                                                                     | 16.0.0      |
| 2019-06        | CT#84   | CP-191070 | 0050 | 2   | B   | Network parameter provisioning support                                                                                                                           | 16.0.0      |
| 2019-06        | CT#84   | CP-191070 | 0051 | 3   | F   | NIDD configuration and delivery in 5G                                                                                                                            | 16.0.0      |

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| 2019-06 | CT#84   | CP-191229 | 0054 | 5 | B | AF acknowledgement to be expected                                    | 16.0.0 |
| 2019-06 | CT#84   | CP-191071 | 0055 | 2 | B | UE IP address preservation indication                                | 16.0.0 |
| 2019-06 | CT#84   | CP-191104 | 0056 | 1 | B | PFD management notification                                          | 16.0.0 |
| 2019-06 | CT#84   | CP-191100 | 0057 | 1 | B | NEF stored exposure data                                             | 16.0.0 |
| 2019-06 | CT#84   | CP-191105 | 0058 | 1 | B | BDT Warning Notification Support                                     | 16.0.0 |
| 2019-06 | CT#84   | CP-191101 | 0061 | 1 | F | API version update                                                   | 16.0.0 |
| 2019-09 | CT#85   | CP-192137 | 0063 | 1 | F | Resolving EN in NIDD                                                 | 16.1.0 |
| 2019-09 | CT#85   | CP-192156 | 0064 | 1 | B | Support a set of MAC addresses in traffic filter                     | 16.1.0 |
| 2019-09 | CT#85   | CP-192165 | 0066 | 1 | B | Support parameter provisioning in RACS                               | 16.1.0 |
| 2019-09 | CT#85   | CP-192157 | 0067 | 2 | B | Accurate UE moving trajectory definition                             | 16.1.0 |
| 2019-09 | CT#85   | CP-192157 | 0069 | 2 | B | Procedures for Nnef_AnalyticsExposure Service                        | 16.1.0 |
| 2019-09 | CT#85   | CP-192157 | 0070 | 2 | B | API definition for Nnef_AnalyticsExposure Service                    | 16.1.0 |
| 2019-09 | CT#85   | CP-192170 | 0071 | 1 | B | Procedures for 5G LAN type service over northbound interface         | 16.1.0 |
| 2019-09 | CT#85   | CP-192170 | 0072 | 2 | B | API definition for 5G LAN type service over northbound interface     | 16.1.0 |
| 2019-09 | CT#85   | CP-192169 | 0073 | 3 | B | PFD management partial failure                                       | 16.1.0 |
| 2019-09 | CT#85   | CP-192157 | 0074 | 1 | B | Cancel the BDT warning notification                                  | 16.1.0 |
| 2019-09 | CT#85   | CP-192219 | 0075 | 2 | B | Notification of downlink data delivery status                        | 16.1.0 |
| 2019-09 | CT#85   | CP-192179 | 0076 | 2 | B | Applying BDT policy                                                  | 16.1.0 |
| 2019-09 | CT#85   | CP-192152 | 0077 | 2 | B | API definition for Nnef_IPTVconfiguration service                    | 16.1.0 |
| 2019-09 | CT#85   | CP-192137 | 0079 | - | B | Nnef_ECRestriction service                                           | 16.1.0 |
| 2019-09 | CT#85   | CP-192137 | 0080 | - | B | Differences between EPC and 5GC                                      | 16.1.0 |
| 2019-09 | CT#85   | CP-192158 | 0081 | 1 | F | Service consumer description Corrections                             | 16.1.0 |
| 2019-09 | CT#85   | CP-192138 | 0082 | 2 | B | AF acknowledgement of UP path event notification                     | 16.1.0 |
| 2019-09 | CT#85   | CP-192138 | 0083 | - | B | Successful AF acknowledgement without N6 traffic routing information | 16.1.0 |
| 2019-09 | CT#85   | CP-192173 | 0084 | - | F | OpenAPI version update TS 29.522 R-16                                | 16.1.0 |
| 2019-09 | CT#85   | CP-192251 | 0085 | 1 | B | Procedures for Nnef_IPTVconfiguration service                        | 16.1.0 |
| 2019-12 | CT#86   | CP-193179 | 0086 | 1 | B | Nnef_APISupportCapability Service                                    | 16.2.0 |
| 2019-12 | CT#86   | CP-193181 | 0087 | - | B | OpenAPI file update to support AF acknowledgement                    | 16.2.0 |
| 2019-12 | CT#86   | CP-193179 | 0088 | 1 | B | Scheduled communication type                                         | 16.2.0 |
| 2019-12 | CT#86   | CP-193181 | 0089 | 1 | B | Open issue for AddrPreservation feature                              | 16.2.0 |
| 2019-12 | CT#86   | CP-193222 | 0090 | 1 | B | Partial update for 5GLANParameterProvision API                       | 16.2.0 |
| 2019-12 | CT#86   | CP-193222 | 0091 | 2 | B | OpenAPI file for 5GLANParameterProvision API                         | 16.2.0 |
| 2019-12 | CT#86   | CP-193191 | 0092 | 3 | F | Clarify multicast access control                                     | 16.2.0 |
| 2019-12 | CT#86   | CP-193222 | 0093 | 1 | F | Clarify the procedure for 5GLAN parameter provisioning               | 16.2.0 |
| 2019-12 | CT#86   | CP-193223 | 0094 | - | F | Correct resource URI for xBDT                                        | 16.2.0 |
| 2019-12 | CT#86   | CP-193220 | 0096 | 4 | B | PFD partial failure notification                                     | 16.2.0 |
| 2019-12 | CT#86   | CP-193223 | 0097 | 1 | F | Correction to HTTP methods used to update BDT policy                 | 16.2.0 |
| 2019-12 | CT#86   | CP-193191 | 0099 | 1 | B | Partial update of IPTVConfiguration API                              | 16.2.0 |
| 2019-12 | CT#86   | CP-193191 | 0100 | 2 | B | OpenAPI file of IPTVConfiguration API                                | 16.2.0 |
| 2019-12 | CT#86   | CP-193198 | 0101 | 3 | B | AnalyticsEventNotif and AnalyticsExposureSubsc Data Types            | 16.2.0 |
| 2019-12 | CT#86   | CP-193198 | 0102 | - | B | Open issue for AnalyticsEvent data type                              | 16.2.0 |
| 2019-12 | CT#86   | CP-193198 | 0103 | 1 | B | Partial update of Nnef_AnalyticsExposure API                         | 16.2.0 |
| 2019-12 | CT#86   | CP-193198 | 0104 | 2 | B | Nnef_AnalyticsExposure_fetch service operation                       | 16.2.0 |
| 2019-12 | CT#86   | CP-193181 | 0105 | - | F | Correct the condition for AF relocation acknowledgement              | 16.2.0 |
| 2019-12 | CT#86   | CP-193199 | 0106 | - | F | UI structure for N33 APIs                                            | 16.2.0 |
| 2019-12 | CT#86   | CP-193198 | 0107 | - | B | OpenAPI file for AnalyticsExposure API                               | 16.2.0 |
| 2019-12 | CT#86   | CP-193222 | 0108 | 1 | D | Corrections on 5GLANParameterProvision API                           | 16.2.0 |
| 2019-12 | CT#86   | CP-193181 | 0109 | - | F | Definition of AfResultInfo in OpenAPI                                | 16.2.0 |
| 2019-12 | CT#86   | CP-193212 | 0110 | 1 | F | Update of API version and TS version in OpenAPI file                 | 16.2.0 |
| 2019-12 | CT#86   | CP-193188 | 0112 | 1 | A | make the storage of traffic influence request in the UDR mandatory   | 16.2.0 |
| 2019-12 | CT#86   | CP-193223 | 0113 | 1 | F | missing required in ApplyingBdtPolicy API file                       | 16.2.0 |
| 2019-12 | CT#86   | CP-193188 | 0115 | - | A | Correct cardinality in traffic influence                             | 16.2.0 |
| 2019-12 | CT#86   | CP-193198 | 0116 | 1 | F | openAPI correction for ExNotification                                | 16.2.0 |
| 2020-03 | CT#87-e | CP-200207 | 0118 | - | B | DNN Clarification                                                    | 16.3.0 |
| 2020-03 | CT#87-e | CP-200198 | 0119 | 1 | B | Update of the Availability after DDN Failure event                   | 16.3.0 |
| 2020-03 | CT#87-e | CP-200198 | 0120 | 1 | B | Update of the DDD status event                                       | 16.3.0 |
| 2020-03 | CT#87-e | CP-200212 | 0122 | 1 | B | Procedure of Nnef_ServiceParameter service                           | 16.3.0 |
| 2020-03 | CT#87-e | CP-200212 | 0123 | 1 | B | Resources and data types of Nnef_ServiceParameter service            | 16.3.0 |
| 2020-03 | CT#87-e | CP-200266 | 0124 | 3 | B | OpenAPI file of Nnef_ServiceParameter service                        | 16.3.0 |
| 2020-03 | CT#87-e | CP-200202 | 0125 | 1 | B | QoS Monitoring Report                                                | 16.3.0 |
| 2020-03 | CT#87-e | CP-200218 | 0126 | 1 | B | Indication of traffic correlation                                    | 16.3.0 |
| 2020-03 | CT#87-e | CP-200203 | 0127 | 1 | B | Clarification of IPTV configuration                                  | 16.3.0 |
| 2020-03 | CT#87-e | CP-200198 | 0128 | - | F | Correct TS number for NEF southbound NIDD service                    | 16.3.0 |
| 2020-03 | CT#87-e | CP-200198 | 0129 | - | B | Support PDU session status                                           | 16.3.0 |
| 2020-03 | CT#87-e | CP-200137 | 0130 | 2 | F | Correct UE mobility and communication                                | 16.3.0 |
| 2020-03 | CT#87-e | CP-200208 | 0131 | 1 | B | Support network performance analytics                                | 16.3.0 |
| 2020-03 | CT#87-e | CP-200208 | 0132 | 1 | B | Support BDT policy candidates in notification                        | 16.3.0 |
| 2020-03 | CT#87-e | CP-200212 | 0133 | 1 | B | Add alternative QoS requirements                                     | 16.3.0 |
| 2020-03 | CT#87-e | CP-200142 | 0134 | 2 | B | Support QoS sustainability analytics                                 | 16.3.0 |
| 2020-03 | CT#87-e | CP-200218 | 0135 | - | F | Definition of 5GLanParametersProvision                               | 16.3.0 |

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| 2020-03 | CT#87-e | CP-200203 | 0136 | - | F | Definition of IptvConfigData                                                     | 16.3.0 |
| 2020-03 | CT#87-e | CP-200219 | 0137 | - | F | Usage of the "bdtRefId" property                                                 | 16.3.0 |
| 2020-03 | CT#87-e | CP-200215 | 0138 | - | F | Miscellaneous errors                                                             | 16.3.0 |
| 2020-03 | CT#87-e | CP-200199 | 0140 | 3 | B | UE Location Privacy Setting in NEF                                               | 16.3.0 |
| 2020-03 | CT#87-e | CP-200237 | 0142 | 2 | B | AnalyticsExposure API, Analytics Event Filter associated with all events         | 16.3.0 |
| 2020-03 | CT#87-e | CP-200208 | 0143 | 1 | B | AnalyticsExposure API, support of abnormal behaviour                             | 16.3.0 |
| 2020-03 | CT#87-e | CP-200208 | 0144 | 1 | B | AnalyticsExposure API, support of data congestion                                | 16.3.0 |
| 2020-03 | CT#87-e | CP-200216 | 0145 | - | F | 29.522 Rel-16 Update of OpenAPI version and TS version in externalDocs field     | 16.3.0 |
| 2020-03 | CT#87-e | CP-200259 | 0146 | - | F | LpiParameterProvision API update for LPI parameters provisioning                 | 16.3.0 |
| 2020-06 | CT#88-e | CP-201243 | 0148 | 1 | F | Missing mapping in the overview                                                  | 16.4.0 |
| 2020-06 | CT#88-e | CP-201238 | 0149 | 2 | F | Wrong datatypes Datatime and Plmn                                                | 16.4.0 |
| 2020-06 | CT#88-e | CP-201234 | 0150 | - | F | Wrong datatype referred in analytics exposure procedure                          | 16.4.0 |
| 2020-06 | CT#88-e | CP-201228 | 0151 | 1 | B | Procedure of ACS Information Configuration                                       | 16.4.0 |
| 2020-06 | CT#88-e | CP-201228 | 0152 | 1 | B | Resources and data types of Nnef_ACSPParameterProvision service                  | 16.4.0 |
| 2020-06 | CT#88-e | CP-201339 | 0153 | 4 | B | OpenAPI file of Nnef_ACSPParameterProvision service                              | 16.4.0 |
| 2020-06 | CT#88-e | CP-201235 | 0159 | 1 | F | Loss of connectivity reason                                                      | 16.4.0 |
| 2020-06 | CT#88-e | CP-201235 | 0161 | 1 | F | Any UE clarification                                                             | 16.4.0 |
| 2020-06 | CT#88-e | CP-201252 | 0162 | 1 | F | Correction to 5GLanParameterProvision API                                        | 16.4.0 |
| 2020-06 | CT#88-e | CP-201228 | 0163 | 1 | F | Correction to IPTVConfiguration API                                              | 16.4.0 |
| 2020-06 | CT#88-e | CP-201253 | 0164 | 1 | F | Correction to ApplyingBdtPolicy API                                              | 16.4.0 |
| 2020-06 | CT#88-e | CP-201252 | 0165 | 1 | F | Open issue for 5GLanParametersProvisionPatch                                     | 16.4.0 |
| 2020-06 | CT#88-e | CP-201195 | 0167 | 6 | B | Supporting the Location Services in NEF in TS 29.522                             | 16.4.0 |
| 2020-06 | CT#88-e | CP-201235 | 0169 | 1 | A | Periodic reporting by Nnef                                                       | 16.4.0 |
| 2020-06 | CT#88-e | CP-201252 | 0170 | 3 | F | Clarify nullable attributes used in PATCH                                        | 16.4.0 |
| 2020-06 | CT#88-e | CP-201244 | 0171 | 1 | F | Storage of YAML files in ETSI Forge                                              | 16.4.0 |
| 2020-06 | CT#88-e | CP-201178 | 0172 | 2 | F | Confidence of analytics results for Nnef_AnalyticsExposure service               | 16.4.0 |
| 2020-06 | CT#88-e | CP-201238 | 0173 | - | B | Complete ServiceParameter API                                                    | 16.4.0 |
| 2020-06 | CT#88-e | CP-201276 | 0174 | 1 | F | Traffic descriptor for xBDT                                                      | 16.4.0 |
| 2020-06 | CT#88-e | CP-201213 | 0175 | 1 | F | Corrections related to URLLC                                                     | 16.4.0 |
| 2020-06 | CT#88-e | CP-201228 | 0177 | - | F | Clarify unmodifiable attribute in PUT                                            | 16.4.0 |
| 2020-06 | CT#88-e | CP-201234 | 0178 | 1 | F | Optional target UE                                                               | 16.4.0 |
| 2020-06 | CT#88-e | CP-201246 | 0179 | 1 | F | Move 5G specific procedure to TS 29.522                                          | 16.4.0 |
| 2020-06 | CT#88-e | CP-201210 | 0180 | 1 | F | Interaction with UDM for Enhanced Coverage Restriction Control                   | 16.4.0 |
| 2020-06 | CT#88-e | CP-201210 | 0181 | 1 | B | Support of Enhanced Coverage Mode control                                        | 16.4.0 |
| 2020-06 | CT#88-e | CP-201234 | 0182 | - | F | Support of immediate reporting for Nnef_AnalyticsExposure service                | 16.4.0 |
| 2020-06 | CT#88-e | CP-201246 | 0183 | 1 | F | Corrections to apiVersion                                                        | 16.4.0 |
| 2020-06 | CT#88-e | CP-201246 | 0184 | 1 | F | Corrections to error status code                                                 | 16.4.0 |
| 2020-06 | CT#88-e | CP-201274 | 0185 | 1 | B | AF provides AAA server address                                                   | 16.4.0 |
| 2020-06 | CT#88-e | CP-201246 | 0186 | 1 | F | Updates to IP address                                                            | 16.4.0 |
| 2020-06 | CT#88-e | CP-201234 | 0187 | 2 | F | Update to reporting information                                                  | 16.4.0 |
| 2020-06 | CT#88-e | CP-201234 | 0188 | 1 | F | Ratio of analytics results for Nnef_AnalyticsExposure service                    | 16.4.0 |
| 2020-06 | CT#88-e | CP-201234 | 0189 | - | F | Supported features definition for Nnef_AnalyticsExposure service                 | 16.4.0 |
| 2020-06 | CT#88-e | CP-201234 | 0190 | 1 | F | Corrections on target UE information for Nnef_AnalyticsExposure service          | 16.4.0 |
| 2020-06 | CT#88-e | CP-201246 | 0191 | 1 | F | Corrections on tags field for NEF Northbound APIs                                | 16.4.0 |
| 2020-06 | CT#88-e | CP-201234 | 0192 | 1 | F | Support of network performance for Nnef_AnalyticsExposure service                | 16.4.0 |
| 2020-06 | CT#88-e | CP-201234 | 0193 | 1 | F | Data type used in fetch the analytics                                            | 16.4.0 |
| 2020-06 | CT#88-e | CP-201235 | 0194 | 1 | F | Supported headers, Resource Data type and Operation Name                         | 16.4.0 |
| 2020-06 | CT#88-e | CP-201255 | 0195 | - | F | Update of OpenAPI version and TS version in externalDocs field                   | 16.4.0 |
| 2020-06 | CT#88-e | CP-201336 | 0196 | 1 | F | Remove the Abnormal_Behaviour applicability for ueMobilityInfos in AnalyticsData | 16.4.0 |
| 2020-09 | CT#89-e | CP-202077 | 0199 | - | F | Remove 5G procedures from TS 29.122                                              | 16.5.0 |
| 2020-09 | CT#89-e | CP-202048 | 0200 | - | F | Corrections on NiddConfigurationTrigger API                                      | 16.5.0 |
| 2020-09 | CT#89-e | CP-202048 | 0201 | - | F | Support PDU session status                                                       | 16.5.0 |
| 2020-09 | CT#89-e | CP-202059 | 0202 | - | F | Missed Location header table                                                     | 16.5.0 |
| 2020-09 | CT#89-e | CP-202066 | 0203 | - | F | Zero confidence                                                                  | 16.5.0 |
| 2020-09 | CT#89-e | CP-202059 | 0206 | - | F | URI of ACSPParameterProvision API                                                | 16.5.0 |
| 2020-09 | CT#89-e | CP-202069 | 0207 | - | F | Subscription creation                                                            | 16.5.0 |
| 2020-09 | CT#89-e | CP-202069 | 0208 | 1 | F | Resource correction                                                              | 16.5.0 |
| 2020-09 | CT#89-e | CP-202066 | 0209 | - | F | Validity period for analytics information                                        | 16.5.0 |
| 2020-09 | CT#89-e | CP-202081 | 0210 | - | F | 5G LAN Parameter Provisioning                                                    | 16.5.0 |
| 2020-09 | CT#89-e | CP-202066 | 0211 | - | F | Omitted event reporting information                                              | 16.5.0 |
| 2020-09 | CT#89-e | CP-202082 | 0212 | 1 | F | Reading all subscriptions in ApplyingBdtPolicy API                               | 16.5.0 |
| 2020-09 | CT#89-e | CP-202082 | 0213 | 1 | F | Resource URI corrections                                                         | 16.5.0 |
| 2020-09 | CT#89-e | CP-202066 | 0214 | 1 | F | Ratio and confidence for UE mobility                                             | 16.5.0 |
| 2020-09 | CT#89-e | CP-202066 | 0215 | - | F | Extra reporting requirement                                                      | 16.5.0 |
| 2020-09 | CT#89-e | CP-202066 | 0216 | - | F | Reading all subscriptions in AnalyticsExposure API                               | 16.5.0 |
| 2020-09 | CT#89-e | CP-202066 | 0217 | - | F | Applicabilities of snssai, dnn and locArea                                       | 16.5.0 |

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| 2020-09 | CT#89-e | CP-202084 | 0218 | - | F | 29.522 Rel-16 Update of OpenAPI version and TS version in externalDocs field                                                       | 16.5.0 |
| 2020-12 | CT#90-e | CP-203139 | 0219 | 1 | F | TS 29.522 Essential Corrections and alignments                                                                                     | 16.6.0 |
| 2020-12 | CT#90-e | CP-203109 | 0220 | 1 | F | Essential corrections and alignments                                                                                               | 16.6.0 |
| 2020-12 | CT#90-e | CP-203132 | 0221 | - | F | Correction to Alternative QoS Parameter                                                                                            | 16.6.0 |
| 2020-12 | CT#90-e | CP-203139 | 0222 | - | F | Storage of YAML files in 3GPP Forge                                                                                                | 16.6.0 |
| 2020-12 | CT#90-e | CP-203111 | 0223 | - | F | array QosMonitoringReport                                                                                                          | 16.6.0 |
| 2020-12 | CT#90-e | CP-203139 | 0224 | 1 | F | Callback URI correction                                                                                                            | 16.6.0 |
| 2020-12 | CT#90-e | CP-203108 | 0227 | - | F | Difference between 4G and 5G for ECRControl API                                                                                    | 16.6.0 |
| 2020-12 | CT#90-e | CP-203108 | 0228 | - | F | PDU session status                                                                                                                 | 16.6.0 |
| 2020-12 | CT#90-e | CP-203118 | 0231 | 1 | A | Solve IP address overlapping for AF traffic influence                                                                              | 16.6.0 |
| 2020-12 | CT#90-e | CP-203129 | 0232 | 1 | F | Corrections to Subscription Request in AnalyticsExposure API                                                                       | 16.6.0 |
| 2020-12 | CT#90-e | CP-203129 | 0233 | 1 | F | Correction to appld exposed in AnalyticsExposure API                                                                               | 16.6.0 |
| 2020-12 | CT#90-e | CP-203152 | 0236 | - | F | Update of OpenAPI version and TS version in externalDocs field                                                                     | 16.6.0 |
| 2020-12 | CT#90-e | CP-203124 | 0225 | 1 | B | Procedures of Nnef_AKMA service                                                                                                    | 17.0.0 |
| 2020-12 | CT#90-e | CP-203124 | 0226 | 1 | B | API definition of Nnef_AKMA service                                                                                                | 17.0.0 |
| 2020-12 | CT#90-e | CP-203130 | 0234 | 1 | F | Corrections to location area usage                                                                                                 | 17.0.0 |
| 2021-03 | CT#91-e | CP-210202 | 0238 | - | A | Correct presence condition in ACS provisioning procedure                                                                           | 17.1.0 |
| 2021-03 | CT#91-e | CP-210210 | 0240 | 1 | A | Correct AlternativeQoS 5G description                                                                                              | 17.1.0 |
| 2021-03 | CT#91-e | CP-210210 | 0242 | 1 | A | Correct service parameter provisioning procedure                                                                                   | 17.1.0 |
| 2021-03 | CT#91-e | CP-210210 | 0244 | 1 | A | Correction to alternative QoS paramter report                                                                                      | 17.1.0 |
| 2021-03 | CT#91-e | CP-210210 | 0246 | 2 | A | Disable UE notifications at changes related to Alternative QoS Profiles                                                            | 17.1.0 |
| 2021-03 | CT#91-e | CP-210192 | 0248 | 1 | A | QoS monitoring report during the PDU session termination                                                                           | 17.1.0 |
| 2021-03 | CT#91-e | CP-210192 | 0250 | 1 | A | Change of notification URI                                                                                                         | 17.1.0 |
| 2021-03 | CT#91-e | CP-210203 | 0251 | 2 | B | Support Redirection for AKMA API                                                                                                   | 17.1.0 |
| 2021-03 | CT#91-e | CP-210203 | 0252 | - | B | Missed 204 No Content for AKMA API                                                                                                 | 17.1.0 |
| 2021-03 | CT#91-e | CP-210207 | 0254 | 1 | A | Last known location report                                                                                                         | 17.1.0 |
| 2021-03 | CT#91-e | CP-210226 | 0255 | 1 | F | API design style                                                                                                                   | 17.1.0 |
| 2021-03 | CT#91-e | CP-210207 | 0257 | - | A | Default value of accuary                                                                                                           | 17.1.0 |
| 2021-03 | CT#91-e | CP-210208 | 0259 | 3 | A | Support redirection for TrafficInfluence API                                                                                       | 17.1.0 |
| 2021-03 | CT#91-e | CP-210207 | 0261 | - | A | Monitoring expire time                                                                                                             | 17.1.0 |
| 2021-03 | CT#91-e | CP-210218 | 0262 | - | F | Adding "description" field for map data types                                                                                      | 17.1.0 |
| 2021-03 | CT#91-e | CP-210219 | 0263 | 1 | F | OpenAPI reference                                                                                                                  | 17.1.0 |
| 2021-03 | CT#91-e | CP-210237 | 0265 | 1 | A | Correction to mtcProviderId in 5GLANParameterProvision API                                                                         | 17.1.0 |
| 2021-03 | CT#91-e | CP-210190 | 0267 | 1 | A | Correction to mtcProviderId in LpiParameterProvision API                                                                           | 17.1.0 |
| 2021-03 | CT#91-e | CP-210203 | 0268 | 1 | F | Correction to Afd in AKMA API                                                                                                      | 17.1.0 |
| 2021-03 | CT#91-e | CP-210203 | 0269 | 1 | F | Correction to AKId in AKMA API                                                                                                     | 17.1.0 |
| 2021-03 | CT#91-e | CP-210227 | 0275 | 1 | F | Correction to Traffic Influence procedure                                                                                          | 17.1.0 |
| 2021-03 | CT#91-e | CP-210206 | 0277 | 1 | A | Failure events for AnalyticsExposure API                                                                                           | 17.1.0 |
| 2021-03 | CT#91-e | CP-210227 | 0278 | 1 | B | Update procedure of TrafficInfluence API                                                                                           | 17.1.0 |
| 2021-03 | CT#91-e | CP-210208 | 0280 | 1 | A | Support redirection for 5GLANParameterProvision API                                                                                | 17.1.0 |
| 2021-03 | CT#91-e | CP-210208 | 0282 | 1 | A | Support redirection for ACSParameterProvision API                                                                                  | 17.1.0 |
| 2021-03 | CT#91-e | CP-210209 | 0284 | 1 | A | Support redirection for AnalyticsExposure API                                                                                      | 17.1.0 |
| 2021-03 | CT#91-e | CP-210209 | 0286 | 1 | A | Support redirection for ApplyingBdtPolicy API                                                                                      | 17.1.0 |
| 2021-03 | CT#91-e | CP-210209 | 0288 | 1 | A | Support redirection for IPTVConfiguration API                                                                                      | 17.1.0 |
| 2021-03 | CT#91-e | CP-210209 | 0290 | 1 | A | Support redirection for LpiParameterProvision API                                                                                  | 17.1.0 |
| 2021-03 | CT#91-e | CP-210209 | 0292 | 1 | A | Support redirection for MoLcsNotify API                                                                                            | 17.1.0 |
| 2021-03 | CT#91-e | CP-210209 | 0294 | 1 | A | Support redirection for NiddConfigurationTrigger API                                                                               | 17.1.0 |
| 2021-03 | CT#91-e | CP-210209 | 0296 | 1 | A | Support redirection for ServiceParameter API                                                                                       | 17.1.0 |
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| 2022-09 | CT#97-e | CP-222114 | 0725 | 1 | F | Operation identifiers for TimeSyncExposure API and ASTI API                                                         | 17.7.0 |
| 2022-09 | CT#97-e | CP-222096 | 0726 | - | F | Operation identifiers for AKMA API                                                                                  | 17.7.0 |
| 2022-09 | CT#97-e | CP-222097 | 0727 | - | F | Operation identifiers for UEId API                                                                                  | 17.7.0 |
| 2022-09 | CT#97-e | CP-222099 | 0728 | 1 | F | Operation identifiers for EcsAddressProvision API and EASDeployment API                                             | 17.7.0 |
| 2022-09 | CT#97-e | CP-222118 | 0729 | 1 | F | Operation identifiers for NEF northbound APIs                                                                       | 17.7.0 |
| 2022-09 | CT#97-e | CP-222102 | 0730 | - | F | Add restriction for exposing information to an untrusted AF                                                         | 17.7.0 |
| 2022-09 | CT#97-e | CP-222121 | 0731 | - | F | Update of info and externalDocs fields                                                                              | 17.7.0 |
| 2022-09 | CT#97-e | CP-222096 | 0732 | - | B | Support the anonymous user access                                                                                   | 17.7.0 |
| 2022-12 | CT#98-e | CP-223161 | 0734 | 1 | A | Correction of the minimum items in the GET response of LpiParametersProvision                                       | 17.8.0 |
| 2022-12 | CT#98-e | CP-223172 | 0736 | - | F | Analytics exposure restrictions                                                                                     | 17.8.0 |
| 2022-12 | CT#98-e | CP-223181 | 0737 | 1 | F | Corrections of the TSCTSF usage determination in AF session with QoS                                                | 17.8.0 |
| 2022-12 | CT#98-e | CP-223175 | 0740 | 1 | A | Corrections in ServiceParameter API                                                                                 | 17.8.0 |
| 2022-12 | CT#98-e | CP-223184 | 0742 | 1 | F | Corrections in TimeSyncExposure API                                                                                 | 17.8.0 |
| 2022-12 | CT#98-e | CP-223197 | 0743 | 1 | F | Corrections in AMPolicyAuthorization API                                                                            | 17.8.0 |
| 2022-12 | CT#98-e | CP-223184 | 0745 | 1 | F | Corrections in procedure for NEF north bound interfaces                                                             | 17.8.0 |
| 2022-12 | CT#98-e | CP-223167 | 0747 | 1 | F | Data type Cardinality corrections for GET response in MBSSession API                                                | 17.8.0 |
| 2022-12 | CT#98-e | CP-223166 | 0748 | - | F | Data type Cardinality corrections for GET response in MBSUserDataIngestSession API                                  | 17.8.0 |

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| 2022-12 | CT#98-e | CP-223166 | 0749 | - | F | Data type Cardinality corrections for GET response in MBSUserService Service API                     | 17.8.0 |
| 2022-12 | CT#98-e | CP-223179 | 0750 | - | F | Data type Cardinality corrections for GET response in MSEventExposure API                            | 17.8.0 |
| 2022-12 | CT#98-e | CP-223166 | 0751 | - | F | Corrections on MBS FSA IDs for broadcast MBS session creation                                        | 17.8.0 |
| 2022-12 | CT#98-e | CP-223171 | 0753 | - | F | Correction to the EASDeployment API                                                                  | 17.8.0 |
| 2022-12 | CT#98-e | CP-223167 | 0754 | 1 | F | Updates to NEF Northbound APIs Overview and Introduction                                             | 17.8.0 |
| 2022-12 | CT#98-e | CP-223196 | 0757 | 1 | F | Correction related to applicability of traffic correlation indicator                                 | 17.8.0 |
| 2022-12 | CT#98-e | CP-223172 | 0758 | - | F | Corrections to data types in AnalyticsExposure API                                                   | 17.8.0 |
| 2022-12 | CT#98-e | CP-223181 | 0759 | 1 | F | Corrections on Time Synchronization Capabilities subscription procedure                              | 17.8.0 |
| 2022-12 | CT#98-e | CP-223168 | 0760 | 1 | F | Correction for AKMA Application Key Request                                                          | 17.8.0 |
| 2022-12 | CT#98-e | CP-223167 | 0761 | 1 | F | Corrections for MBSSession service                                                                   | 17.8.0 |
| 2022-12 | CT#98-e | CP-223173 | 0762 | 1 | F | Add clarifications for some information included in the analytics to the consumer                    | 17.8.0 |
| 2022-12 | CT#98-e | CP-223197 | 0763 | 1 | F | Corrections for Nnef_AMPolicyAuthorization service                                                   | 17.8.0 |
| 2022-12 | CT#98-e | CP-223240 | 0767 | 1 | F | Update of info and externalDocs fields                                                               | 17.8.0 |
| 2022-12 | CT#98-e | CP-223176 | 0735 | 1 | B | User consent enhancements for analytics exposure                                                     | 18.0.0 |
| 2022-12 | CT#98-e | CP-223176 | 0746 | 1 | B | Analytics exposure subscription termination request                                                  | 18.0.0 |
| 2022-12 | CT#98-e | CP-223185 | 0752 | 1 | F | Enumeration definitions in the OpenAPI files                                                         | 18.0.0 |
| 2022-12 | CT#98-e | CP-223198 | 0755 | - | F | Updates on Nnef_SMService impacts                                                                    | 18.0.0 |
| 2022-12 | CT#98-e | CP-223198 | 0756 | - | F | Updates on service operations mapping in Nnef_MBSTMGi service                                        | 18.0.0 |
| 2022-12 | CT#98-e | CP-223199 | 0764 | 1 | F | Corrections on AF specific UE ID retrieval                                                           | 18.0.0 |
| 2022-12 | CT#98-e | CP-223241 | 0768 | 1 | F | Update of info and externalDocs fields                                                               | 18.0.0 |
| 2023-03 | CT#99   | CP-230131 | 0770 | 1 | A | Adding MBS service area to the TngiAllocRequest                                                      | 18.1.0 |
| 2023-03 | CT#99   | CP-230154 | 0773 | - | A | Packet delay budget attribute name correction                                                        | 18.1.0 |
| 2023-03 | CT#99   | CP-230179 | 0774 | 1 | B | Adding PER to AF Session with QoS API                                                                | 18.1.0 |
| 2023-03 | CT#99   | CP-230179 | 0775 | 1 | B | PER for Alternative QoS                                                                              | 18.1.0 |
| 2023-03 | CT#99   | CP-230179 | 0776 | 1 | B | Spatial Validity Condition for Time Synchronization Exposure Configuration                           | 18.1.0 |
| 2023-03 | CT#99   | CP-230179 | 0777 | 1 | B | Spatial Validity Condition for ASTI                                                                  | 18.1.0 |
| 2023-03 | CT#99   | CP-230172 | 0778 | 1 | B | Unavailability Period feature for Monitoring Event API                                               | 18.1.0 |
| 2023-03 | CT#99   | CP-230147 | 0779 | 1 | B | PFD Determination Analytics for NEF                                                                  | 18.1.0 |
| 2023-03 | CT#99   | CP-230156 | 0780 | - | F | Correction of MbsSessionCreateRsp data type for MBSSession API                                       | 18.1.0 |
| 2023-03 | CT#99   | CP-230156 | 0786 | 1 | B | Update procedures for Flow Description Information with ToSTC                                        | 18.1.0 |
| 2023-03 | CT#99   | CP-230176 | 0788 | 1 | F | Correct the data type of the DELETE method of Individual MBS session                                 | 18.1.0 |
| 2023-03 | CT#99   | CP-230176 | 0789 | 1 | F | Correct the broadcast delivery status of MBS session                                                 | 18.1.0 |
| 2023-03 | CT#99   | CP-230138 | 0791 | 1 | A | Resolve editor notes on user consent during AF specific UE ID retrieval                              | 18.1.0 |
| 2023-03 | CT#99   | CP-230176 | 0792 | 1 | F | Correct the procedure description for the EasDeployInfo                                              | 18.1.0 |
| 2023-03 | CT#99   | CP-230157 | 0793 | 1 | F | Missing definitions                                                                                  | 18.1.0 |
| 2023-03 | CT#99   | CP-230149 | 0794 | 1 | F | DNNS and SNSSAIS analytics exposure in NEF                                                           | 18.1.0 |
| 2023-03 | CT#99   | CP-230149 | 0795 | 1 | F | NetworkAreaInfo exposure removal for untrusted AF                                                    | 18.1.0 |
| 2023-03 | CT#99   | CP-230149 | 0796 | 1 | F | Corrections on error handling in AnalyticsExposure API                                               | 18.1.0 |
| 2023-03 | CT#99   | CP-230157 | 0797 | 1 | B | Updates procedure of immediate reporting                                                             | 18.1.0 |
| 2023-03 | CT#99   | CP-230156 | 0798 | 1 | F | Correction of the description fields in enumerations                                                 | 18.1.0 |
| 2023-03 | CT#99   | CP-230145 | 0800 | - | A | misspelled attribute anyUeInd                                                                        | 18.1.0 |
| 2023-03 | CT#99   | CP-230140 | 0802 | - | A | incorrect attribute name                                                                             | 18.1.0 |
| 2023-03 | CT#99   | CP-230149 | 0806 | 1 | F | non-existent eventId                                                                                 | 18.1.0 |
| 2023-03 | CT#99   | CP-230170 | 0810 | 1 | B | Support for AF influence on Service Function Chaining                                                | 18.1.0 |
| 2023-03 | CT#99   | CP-230137 | 0811 | 1 | B | Support for AF traffic influence for common EAS, DNAI selection                                      | 18.1.0 |
| 2023-03 | CT#99   | CP-230173 | 0813 | 1 | A | Correction on handling of Packet Delay Failure report Threshold                                      | 18.1.0 |
| 2023-03 | CT#99   | CP-230174 | 0815 | - | F | Generalization of QoS monitoring control description                                                 | 18.1.0 |
| 2023-03 | CT#99   | CP-230137 | 0816 | 1 | B | Introducing selection of more granular set of UEs                                                    | 18.1.0 |
| 2023-03 | CT#99   | CP-230182 | 0817 | 1 | B | Support of Nnef_AFSessionWithQoS_Create service update for Multi-Modal service XR and Media Services | 18.1.0 |
| 2023-03 | CT#99   | CP-230279 | 0819 | 2 | B | MBS group delivery procedures                                                                        | 18.1.0 |
| 2023-03 | CT#99   | CP-230132 | 0820 | 1 | B | MBS Group Message Delivery API Definitions                                                           | 18.1.0 |
| 2023-03 | CT#99   | CP-230280 | 0821 | 2 | B | OpenAPI definition for Group message delivery API                                                    | 18.1.0 |
| 2023-03 | CT#99   | CP-230175 | 0822 | - | B | Specification of application errors for QoS requests                                                 | 18.1.0 |
| 2023-03 | CT#99   | CP-230175 | 0823 | - | B | Indication of Alternative Service Requirements not supported                                         | 18.1.0 |
| 2023-03 | CT#99   | CP-230154 | 0825 | 1 | A | Correction to TSCTSF invocation                                                                      | 18.1.0 |
| 2023-03 | CT#99   | CP-230154 | 0830 | - | A | Removal of the remaining ENs in the definition of the Nnef_TimeSyncExposure API                      | 18.1.0 |
| 2023-03 | CT#99   | CP-230179 | 0831 | 1 | B | Enhancement of Time Sensitive Communication                                                          | 18.1.0 |
| 2023-03 | CT#99   | CP-230153 | 0832 | - | B | Support of Group Member List Change event                                                            | 18.1.0 |
| 2023-03 | CT#99   | CP-230137 | 0833 | 1 | B | Support of common DNAI selection by AF                                                               | 18.1.0 |
| 2023-03 | CT#99   | CP-230145 | 0835 | 1 | A | Clarification for historical analytics exposure                                                      | 18.1.0 |
| 2023-03 | CT#99   | CP-230156 | 0838 | - | F | Description about N5 session on MonitoringEvent API                                                  | 18.1.0 |
| 2023-03 | CT#99   | CP-230155 | 0840 | - | A | Missing features for AsSessionWithQoS API                                                            | 18.1.0 |

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| 2023-03 | CT#99  | CP-230156 | 0842 | - | F | Description field of LpiParameterProvision API                                           | 18.1.0 |
| 2023-03 | CT#99  | CP-230156 | 0843 | - | F | Description field of ServiceParameter API                                                | 18.1.0 |
| 2023-03 | CT#99  | CP-230156 | 0845 | - | F | Description field of MSeventExposure API                                                 | 18.1.0 |
| 2023-03 | CT#99  | CP-230154 | 0847 | 1 | A | Correction of the procedure when the NEF reject the AF update request                    | 18.1.0 |
| 2023-03 | CT#99  | CP-230161 | 0849 | - | F | Update of info and externalDocs fields                                                   | 18.1.0 |
| 2023-06 | CT#100 | CP-231127 | 0781 | 2 | B | Updates for DN performance of Group UEs in AnalyticsExposure API                         | 18.2.0 |
| 2023-06 | CT#100 | CP-231127 | 0782 | 2 | B | Update for UE Mobility support FL in AnalyticsExposure API                               | 18.2.0 |
| 2023-06 | CT#100 | CP-231148 | 0818 | 3 | B | Procedure for multicast MBS Session MBS Assistance information provisioning              | 18.2.0 |
| 2023-06 | CT#100 | CP-231124 | 0836 | 2 | B | Support NWDAF assisted URSPs in Service Experience                                       | 18.2.0 |
| 2023-06 | CT#100 | CP-231125 | 0837 | 1 | B | Support use case context in analytics exposure                                           | 18.2.0 |
| 2023-06 | CT#100 | CP-231127 | 0850 | 1 | B | Introduction of Nnef_PDTQPolicyNegotiation API                                           | 18.2.0 |
| 2023-06 | CT#100 | CP-231135 | 0851 | 1 | B | Prioritization of candidate DNAIs                                                        | 18.2.0 |
| 2023-06 | CT#100 | CP-231135 | 0852 | 1 | B | Adding target AF ID to the EAS deployment information                                    | 18.2.0 |
| 2023-06 | CT#100 | CP-231125 | 0853 | 1 | B | Event muting enhancements for Analytics exposure                                         | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0854 | 1 | F | Adding missing feature to the list of 5G features                                        | 18.2.0 |
| 2023-06 | CT#100 | CP-231130 | 0855 | 2 | B | Nnef_AFsessionWithQoS service enhancements to support multi-modal services               | 18.2.0 |
| 2023-06 | CT#100 | CP-231133 | 0856 | - | B | Update of the Reused APIs table                                                          | 18.2.0 |
| 2023-06 | CT#100 | CP-231143 | 0857 | 1 | B | Network determined BAT offset and periodicity adaption                                   | 18.2.0 |
| 2023-06 | CT#100 | CP-231326 | 0858 | 4 | B | Support for network timing synchronization status and reporting                          | 18.2.0 |
| 2023-06 | CT#100 | CP-231148 | 0859 | - | B | Support of Associated Session Id                                                         | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0864 | - | F | Correction of time synchronization error budget                                          | 18.2.0 |
| 2023-06 | CT#100 | CP-231148 | 0865 | 1 | B | Update MBSGroupMsgDelivery API                                                           | 18.2.0 |
| 2023-06 | CT#100 | CP-231182 | 0866 | 2 | B | Addition of PIN ID in TrafficDescriptorComponents                                        | 18.2.0 |
| 2023-06 | CT#100 | CP-231129 | 0867 | 1 | B | Introduction to PDU set QoS handling in Nnef_AFsessionWithQoS Service API                | 18.2.0 |
| 2023-06 | CT#100 | CP-231130 | 0868 | 2 | B | Support of ECN marking for L4S                                                           | 18.2.0 |
| 2023-06 | CT#100 | CP-231149 | 0869 | 2 | B | Definition of the service description clauses of the new ParametersProvisioning API      | 18.2.0 |
| 2023-06 | CT#100 | CP-231149 | 0870 | 2 | B | Definition of the API resources clauses of the new ParametersProvisioning API            | 18.2.0 |
| 2023-06 | CT#100 | CP-231149 | 0871 | 2 | B | Definition of the data model clauses of the new ParametersProvisioning API               | 18.2.0 |
| 2023-06 | CT#100 | CP-231149 | 0872 | 2 | B | Definition of the other API parts of the new ParametersProvisioning API                  | 18.2.0 |
| 2023-06 | CT#100 | CP-231148 | 0874 | 1 | B | Updates to the Nnef_MBSUserService API to support MBS group message delivery             | 18.2.0 |
| 2023-06 | CT#100 | CP-231148 | 0875 | 1 | B | Updates to the Nnef_MBSUserDataIngestSession API to support MBS group message delivery   | 18.2.0 |
| 2023-06 | CT#100 | CP-231152 | 0876 | - | B | Updates to the multiple NSACFs case for network slice status reporting                   | 18.2.0 |
| 2023-06 | CT#100 | CP-231131 | 0877 | 1 | F | Adding missing maxItems for array data type                                              | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0878 | 1 | D | Update of 4.1                                                                            | 18.2.0 |
| 2023-06 | CT#100 | CP-231158 | 0880 | 1 | B | Correction to AF influence on Service Function Chaining                                  | 18.2.0 |
| 2023-06 | CT#100 | CP-231135 | 0881 | - | B | Complete common DNAI and EAS selection                                                   | 18.2.0 |
| 2023-06 | CT#100 | CP-231137 | 0883 | 1 | B | Support of ordering criterion for UE communication                                       | 18.2.0 |
| 2023-06 | CT#100 | CP-231137 | 0884 | 1 | B | Support of ordering criterion for user data congestion                                   | 18.2.0 |
| 2023-06 | CT#100 | CP-231137 | 0885 | - | B | Support of preferred granularity of location for AnalyticsExposure service               | 18.2.0 |
| 2023-06 | CT#100 | CP-231137 | 0886 | 1 | B | Support of ordering criterion for UE mobility                                            | 18.2.0 |
| 2023-06 | CT#100 | CP-231135 | 0888 | 2 | B | DNAI Mapping service and procedures                                                      | 18.2.0 |
| 2023-06 | CT#100 | CP-231135 | 0893 | 2 | B | API Resource definition for DNAIMapping service                                          | 18.2.0 |
| 2023-06 | CT#100 | CP-231135 | 0895 | 2 | B | Data model for DNAI Mapping service                                                      | 18.2.0 |
| 2023-06 | CT#100 | CP-231317 | 0897 | 4 | B | OpenAPI definition for Nnef_DNAIMapping service                                          | 18.2.0 |
| 2023-06 | CT#100 | CP-231135 | 0898 | 1 | B | Support of common EAS re-discovery initiated by SMF                                      | 18.2.0 |
| 2023-06 | CT#100 | CP-231149 | 0899 | 1 | B | Support of 5G VN group communication indication                                          | 18.2.0 |
| 2023-06 | CT#100 | CP-231129 | 0903 | 3 | B | Support of Uplink Downlink transmission coordination to meet RT latency requirement      | 18.2.0 |
| 2023-06 | CT#100 | CP-231129 | 0904 | 1 | B | Update Nnef_AFsessionWithQoS_Create service for support of new QoS monitoring parameters | 18.2.0 |
| 2023-06 | CT#100 | CP-231148 | 0906 | 1 | B | MBS Group Message Delivery service description                                           | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0909 | - | F | Corrections on the feature name                                                          | 18.2.0 |
| 2023-06 | CT#100 | CP-231127 | 0910 | 1 | B | Enhancements to Network Performance Analytics                                            | 18.2.0 |
| 2023-06 | CT#100 | CP-231128 | 0911 | 3 | B | MemberUESelectionAssistance API, API definition                                          | 18.2.0 |
| 2023-06 | CT#100 | CP-231128 | 0912 | 3 | B | MemberUESelectionAssistance API, overview and procedures                                 | 18.2.0 |
| 2023-06 | CT#100 | CP-231156 | 0913 | 1 | B | Service parameter provisioning for A2X communication                                     | 18.2.0 |
| 2023-06 | CT#100 | CP-231128 | 0914 | 1 | B | OpenAPI specification for PDTQPolicyNegotiation API                                      | 18.2.0 |
| 2023-06 | CT#100 | CP-231154 | 0916 | - | A | Wrong attribute name in EAS deployment                                                   | 18.2.0 |
| 2023-06 | CT#100 | CP-231172 | 0920 | 1 | A | Monitoring procedure corrections                                                         | 18.2.0 |

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| 2023-06 | CT#100 | CP-231138 | 0921 | 1 | F | Correction of location area description in Analytics Exposure notifications                              | 18.2.0 |
| 2023-06 | CT#100 | CP-231134 | 0923 | 1 | F | Adding time domain to AF Session with QoS procedure                                                      | 18.2.0 |
| 2023-06 | CT#100 | CP-231140 | 0924 | 2 | F | Incomplete NEF functionality description                                                                 | 18.2.0 |
| 2023-06 | CT#100 | CP-231138 | 0926 | 1 | F | AnalyticsExposure resources update for an Error case                                                     | 18.2.0 |
| 2023-06 | CT#100 | CP-231162 | 0927 | 1 | B | Adding Monitoring event for application traffic detection.                                               | 18.2.0 |
| 2023-06 | CT#100 | CP-231171 | 0928 | 1 | B | Adding list of PLMN ID(s) for inbound roaming UEs in AM Influence API                                    | 18.2.0 |
| 2023-06 | CT#100 | CP-231315 | 0930 | 2 | A | Update MBS service area to the TmgiAllocRequest                                                          | 18.2.0 |
| 2023-06 | CT#100 | CP-231184 | 0931 | 1 | B | Service parameter provisioning for 5G ProSe UE-to-UE relay                                               | 18.2.0 |
| 2023-06 | CT#100 | CP-231128 | 0932 | 1 | B | Analytics Data handling for End-to-end data volume transfer time analytics                               | 18.2.0 |
| 2023-06 | CT#100 | CP-231128 | 0933 | 1 | B | End-to-end data volume transfer time analytics subscription exposure                                     | 18.2.0 |
| 2023-06 | CT#100 | CP-231130 | 0934 | 1 | B | Support of Protocol Description                                                                          | 18.2.0 |
| 2023-06 | CT#100 | CP-231128 | 0935 | 1 | B | MemberUESelectionAssistance API, OpenAPI definition                                                      | 18.2.0 |
| 2023-06 | CT#100 | CP-231129 | 0939 | 1 | B | Support of periodicity measurement and reporting for power saving                                        | 18.2.0 |
| 2023-06 | CT#100 | CP-231148 | 0940 | - | F | Correction of data type for MBS group message delivery update                                            | 18.2.0 |
| 2023-06 | CT#100 | CP-231128 | 0942 | - | B | Support Application Specific Expected UE Behaviour parameters                                            | 18.2.0 |
| 2023-06 | CT#100 | CP-231125 | 0944 | 1 | B | Updates for UE mobility analytics in AnalyticsExposure API                                               | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0945 | - | F | Correction on N5 session description in MonitoringEvent API                                              | 18.2.0 |
| 2023-06 | CT#100 | CP-231140 | 0946 | 1 | B | Updates to immediate reporting in MonitoringEvent API                                                    | 18.2.0 |
| 2023-06 | CT#100 | CP-231134 | 0947 | 1 | F | Corrections to procedures for BDT                                                                        | 18.2.0 |
| 2023-06 | CT#100 | CP-231134 | 0948 | 1 | B | Updates to BDT on ASP Id                                                                                 | 18.2.0 |
| 2023-06 | CT#100 | CP-231143 | 0949 | 1 | F | AF adjustment for BAT offset and adjusted periodicity on the UL direction                                | 18.2.0 |
| 2023-06 | CT#100 | CP-231167 | 0952 | 1 | A | Reporting format for one-time reporting                                                                  | 18.2.0 |
| 2023-06 | CT#100 | CP-231130 | 0954 | 1 | B | Support of Packet Delay Variation monitoring and reporting                                               | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0958 | 1 | F | Addition of missing description fields                                                                   | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0959 | 1 | D | Correct the remaining occurrences of subclause                                                           | 18.2.0 |
| 2023-06 | CT#100 | CP-231133 | 0961 | - | F | Clarifying the UNKNOWN_MBS_SERVICE_AREA application error                                                | 18.2.0 |
| 2023-06 | CT#100 | CP-231133 | 0962 | - | F | Correcting some MBS PP related description fields                                                        | 18.2.0 |
| 2023-06 | CT#100 | CP-231134 | 0963 | 2 | F | Correcting the AM Influence Subscriptions resource name                                                  | 18.2.0 |
| 2023-06 | CT#100 | CP-231141 | 0964 | - | F | Update of info and externalDocs fields                                                                   | 18.2.0 |
| 2023-09 | CT#101 | CP-232090 | 0936 | 2 | B | Adding maximum group data rate in 5G VN group data                                                       | 18.3.0 |
| 2023-09 | CT#101 | CP-232086 | 0955 | 2 | F | Correction to Nnef_AKMA API support for anonymous get user                                               | 18.3.0 |
| 2023-09 | CT#101 | CP-232265 | 0966 | 3 | B | Completing the definition of the GroupParametersProvisioning API                                         | 18.3.0 |
| 2023-09 | CT#101 | CP-232268 | 0967 | 3 | B | Supporting simultaneous 5G VN group creation and parameters provisioning                                 | 18.3.0 |
| 2023-09 | CT#101 | CP-232096 | 0968 | 1 | B | Removing the ENs related to the NEF acting as an MBS AF for MBS Group Message Delivery                   | 18.3.0 |
| 2023-09 | CT#101 | CP-232096 | 0969 | 1 | B | Support of MBS User Service Announcement for group message delivery                                      | 18.3.0 |
| 2023-09 | CT#101 | CP-232096 | 0970 | 1 | B | Adding the missing 5MBS2 feature to the Nnef_MBSUserDataIngestSession API                                | 18.3.0 |
| 2023-09 | CT#101 | CP-232096 | 0971 | 1 | F | Corrections to the definition of MBS Group Message Delivery                                              | 18.3.0 |
| 2023-09 | CT#101 | CP-232101 | 0974 | 1 | B | Adding TNAP IDs to Service Parameter provisioning                                                        | 18.3.0 |
| 2023-09 | CT#101 | CP-232257 | 0975 | - | F | Data model corrections for DNAMapping and ECSAddressProvisioning APIs                                    | 18.3.0 |
| 2023-09 | CT#101 | CP-232122 | 0978 | - | A | Misalignment for the HTTP errors supported by the ASTI API                                               | 18.3.0 |
| 2023-09 | CT#101 | CP-232086 | 0979 | 1 | F | Applicability of new AFSessionWithQoS errors                                                             | 18.3.0 |
| 2023-09 | CT#101 | CP-232095 | 0980 | - | F | Correction of the consumers of the DNAMapping API                                                        | 18.3.0 |
| 2023-09 | CT#101 | CP-232081 | 0981 | 1 | B | Movement Behaviour analytics for AnalyticsExposure API                                                   | 18.3.0 |
| 2023-09 | CT#101 | CP-232257 | 0982 | 1 | B | Update to support Event Reporting on DNAMapping service                                                  | 18.3.0 |
| 2023-09 | CT#101 | CP-232087 | 0983 | 1 | B | AF QoS Timing info addition                                                                              | 18.3.0 |
| 2023-09 | CT#101 | CP-232087 | 0984 | 1 | B | Procedure update for Nnef_AFSessionWithQoS                                                               | 18.3.0 |
| 2023-09 | CT#101 | CP-232090 | 0987 | 1 | F | Correction to typos in Group Parameters Provisionings                                                    | 18.3.0 |
| 2023-09 | CT#101 | CP-232256 | 0988 | 3 | B | Data model for timing synchronization status and reporting                                               | 18.3.0 |
| 2023-09 | CT#101 | CP-232091 | 0990 | - | F | Addition of the missing clauses for the concerned APIs                                                   | 18.3.0 |
| 2023-09 | CT#101 | CP-232091 | 0991 | - | F | Missing presence conditions in the main body                                                             | 18.3.0 |
| 2023-09 | CT#101 | CP-232090 | 0992 | - | B | Procedures supporting AF request QoS for target UE                                                       | 18.3.0 |
| 2023-09 | CT#101 | CP-232112 | 0996 | - | A | Corrections to external Group ID in ServiceParameter API                                                 | 18.3.0 |
| 2023-09 | CT#101 | CP-232096 | 0997 | - | F | Removing the EN related to Associated Session ID                                                         | 18.3.0 |
| 2023-09 | CT#101 | CP-232093 | 1000 | - | B | Network Slice Usage Control parameter provisioning description update.                                   | 18.3.0 |
| 2023-09 | CT#101 | CP-232161 | 1001 | 2 | B | Network Slice Usage Control parameter provisioning OpenAPI update.                                       | 18.3.0 |
| 2023-09 | CT#101 | CP-232093 | 1002 | 1 | B | Network Slice Usage Control parameter provisioning resources and data model                              | 18.3.0 |
| 2023-09 | CT#101 | CP-232113 | 1003 | 1 | B | Network slice admission control notification update for UE with at least one PDU session/PDN connection. | 18.3.0 |

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| 2023-09 | CT#101 | CP-232091 | 1004 | 1 | F | Update the missing ProblemDetails and SupportedFeatures in the re-used data types in the data model. | 18.3.0 |
| 2023-09 | CT#101 | CP-232108 | 1006 | - | B | Support PIN feature                                                                                  | 18.3.0 |
| 2023-09 | CT#101 | CP-232104 | 1007 | - | F | EN resolution for A2xParamsPc5 data type                                                             | 18.3.0 |
| 2023-09 | CT#101 | CP-232091 | 1008 | 2 | F | Corrections in ServiceParameter API                                                                  | 18.3.0 |
| 2023-09 | CT#101 | CP-232102 | 1009 | 1 | D | Correction on SFC abbreviation                                                                       | 18.3.0 |
| 2023-09 | CT#101 | CP-232087 | 1010 | 1 | B | Add the description fields for the attributes in the Notification data type                          | 18.3.0 |
| 2023-09 | CT#101 | CP-232081 | 1011 | 1 | B | Enhancements of the QoS sustainability analytics                                                     | 18.3.0 |
| 2023-09 | CT#101 | CP-232081 | 1012 | 1 | B | Support for stopping and resuming the consumption of the analytics                                   | 18.3.0 |
| 2023-09 | CT#101 | CP-232081 | 1013 | 1 | B | Support of spatial granularity size and temporal granularity size of the analytics report            | 18.3.0 |
| 2023-09 | CT#101 | CP-232097 | 1014 | - | B | Support of providing target period subsets for network performance analytics                         | 18.3.0 |
| 2023-09 | CT#101 | CP-232095 | 1016 | 1 | B | Update UEId API to support Port Number                                                               | 18.3.0 |
| 2023-09 | CT#101 | CP-232087 | 1017 | - | B | PDTQPolicyNegotiation API: support of Application Identifier parameter and ENs removal               | 18.3.0 |
| 2023-09 | CT#101 | CP-232257 | 1018 | 1 | B | Impacts in AF influence on traffic procedures due to HR-SBO scenarios                                | 18.3.0 |
| 2023-09 | CT#101 | CP-232123 | 1020 | - | A | Incorrect description of anyUeInd attribute                                                          | 18.3.0 |
| 2023-09 | CT#101 | CP-232087 | 1022 | - | F | Corrections to PDTQ negotiation                                                                      | 18.3.0 |
| 2023-09 | CT#101 | CP-232086 | 1023 | 1 | F | Clarification of the priority of ASP Identifier for BDT                                              | 18.3.0 |
| 2023-09 | CT#101 | CP-232086 | 1024 | - | F | Clarification for nullable attribute of boolean type                                                 | 18.3.0 |
| 2023-09 | CT#101 | CP-232090 | 1026 | - | F | Clarifying the boolean values meaning for the 5G VN group communication indication                   | 18.3.0 |
| 2023-09 | CT#101 | CP-232091 | 1027 | 1 | F | Corrections on the Application AM Contexts procedure                                                 | 18.3.0 |
| 2023-09 | CT#101 | CP-232184 | 1028 | 2 | B | Common EAS/DNAI determination for a set of UEs                                                       | 18.3.0 |
| 2023-09 | CT#101 | CP-232092 | 1029 | 1 | B | Encoding of VPLMN specific URSP                                                                      | 18.3.0 |
| 2023-09 | CT#101 | CP-232119 | 1030 | 1 | B | Correction and completion to ServiceParameterData                                                    | 18.3.0 |
| 2023-09 | CT#101 | CP-232084 | 1032 | 1 | B | Subscription to Data Rate monitoring                                                                 | 18.3.0 |
| 2023-09 | CT#101 | CP-232158 | 1033 | 1 | B | Support of the congestion information measurement and reporting                                      | 18.3.0 |
| 2023-09 | CT#101 | CP-232158 | 1034 | 1 | B | Support of the Packet Delay Variation monitoring                                                     | 18.3.0 |
| 2023-09 | CT#101 | CP-232158 | 1035 | 1 | B | Support of the round-trip delay measurements for multiple QoS flows                                  | 18.3.0 |
| 2023-09 | CT#101 | CP-232103 | 1036 | 4 | B | Add ParmForRangingSI                                                                                 | 18.3.0 |
| 2023-09 | CT#101 | CP-232177 | 1037 | 3 | B | Location exposure for Ranging_SL                                                                     | 18.3.0 |
| 2023-09 | CT#101 | CP-232158 | 1038 | 1 | B | Support of the End of Data Burst Indication                                                          | 18.3.0 |
| 2023-09 | CT#101 | CP-232085 | 1040 | - | F | Update of info and externalDocs fields                                                               | 18.3.0 |
| 2023-12 | CT#102 | CP-233250 | 0972 | 2 | B | Additional multiple NSACFs related updates to network slice status reporting                         | 18.4.0 |
| 2023-12 | CT#102 | CP-233262 | 0973 | 2 | B | Support of user plane positioning                                                                    | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 1042 | 2 | B | Support of the filtering criteria of Member UE selection                                             | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 1043 | 1 | B | Support of reporting the number of UEs that do not meet each criteria                                | 18.4.0 |
| 2023-12 | CT#102 | CP-233239 | 1044 | 1 | F | Corrections on DNAI Mapping                                                                          | 18.4.0 |
| 2023-12 | CT#102 | CP-233225 | 1045 | 2 | B | Support of analytics accuracy information                                                            | 18.4.0 |
| 2023-12 | CT#102 | CP-233203 | 1046 | 2 | B | Introduction of new features for PDU set handle and RT latency                                       | 18.4.0 |
| 2023-12 | CT#102 | CP-233234 | 1047 | 1 | B | Support of subscription to flow level QoS monitoring                                                 | 18.4.0 |
| 2023-12 | CT#102 | CP-233224 | 1048 | - | B | Relative Proximity analytics for AnalyticsExposure API                                               | 18.4.0 |
| 2023-12 | CT#102 | CP-233245 | 1049 | 4 | B | Support the change of the PDU Session Type for a 5G VN group                                         | 18.4.0 |
| 2023-12 | CT#102 | CP-233245 | 1050 | 2 | F | Updating the GMEC related features descriptions                                                      | 18.4.0 |
| 2023-12 | CT#102 | CP-233264 | 1051 | 2 | B | Complete the definition of the NEF's new MBSGroupMsgDelivery API                                     | 18.4.0 |
| 2023-12 | CT#102 | CP-233264 | 1052 | 3 | B | Complete the definition of the MBS assistance information provisioning                               | 18.4.0 |
| 2023-12 | CT#102 | CP-233250 | 1053 | 1 | F | Corrections to the definition of the SliceParamProvision API                                         | 18.4.0 |
| 2023-12 | CT#102 | CP-233282 | 1055 | 1 | B | Complete the definition of the new NSAC event                                                        | 18.4.0 |
| 2023-12 | CT#102 | CP-233234 | 1056 | 1 | F | Support of the new feature name EnQoSMon                                                             | 18.4.0 |
| 2023-12 | CT#102 | CP-233239 | 1057 | 1 | B | Updates on Common EAS/DNAI in Traffic Influence procedures                                           | 18.4.0 |
| 2023-12 | CT#102 | CP-233246 | 1058 | 1 | B | UEAddress service and procedures                                                                     | 18.4.0 |
| 2023-12 | CT#102 | CP-233246 | 1059 | 1 | B | UEAddress API definitions                                                                            | 18.4.0 |
| 2023-12 | CT#102 | CP-233246 | 1060 | - | B | Nnef_UEAddress OpenAPI file definitions                                                              | 18.4.0 |
| 2023-12 | CT#102 | CP-233255 | 1062 | 1 | A | Removal of error indicating failure in reserving transmission resources for MBS Session.             | 18.4.0 |
| 2023-12 | CT#102 | CP-233250 | 1065 | - | F | Remove the data types not referenced from the re-used data types table                               | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 1067 | 2 | F | Corrections on TimeSyncExposure service                                                              | 18.4.0 |
| 2023-12 | CT#102 | CP-233248 | 1068 | 3 | F | Corrections on clock quality parameters                                                              | 18.4.0 |
| 2023-12 | CT#102 | CP-233239 | 1069 | 1 | B | Updates in the DNAIMapping procedure and data models                                                 | 18.4.0 |
| 2023-12 | CT#102 | CP-233224 | 1072 | 1 | B | Analytics feedback information in Analytics exposure                                                 | 18.4.0 |



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| 2023-12 | CT#102 | CP-233239 | 1076 | 1 | F | Incorrect description of error handling in subscription creation procedure                        | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 1077 | 1 | F | procedure correction for ListUE 5G                                                                | 18.4.0 |
| 2023-12 | CT#102 | CP-233276 | 1079 | - | A | Incorrect data type in Media Streaming Event Exposure notification                                | 18.4.0 |
| 2023-12 | CT#102 | CP-233247 | 1081 | 1 | F | Correction to ECS Address Provision                                                               | 18.4.0 |
| 2023-12 | CT#102 | CP-233239 | 1082 | 1 | B | Impacts in AF influence on traffic procedures due to HR-SBO scenarios                             | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 1085 | - | F | Modification of the PDTQ warning notification procedure                                           | 18.4.0 |
| 2023-12 | CT#102 | CP-233207 | 1087 | 2 | B | Protocol description update                                                                       | 18.4.0 |
| 2023-12 | CT#102 | CP-233233 | 1088 | 1 | B | Feature granularity and definition for MultiModal & PowerSaving                                   | 18.4.0 |
| 2023-12 | CT#102 | CP-233236 | 1089 | 4 | B | Multiple AF Expected UE behaviour                                                                 | 18.4.0 |
| 2023-12 | CT#102 | CP-233248 | 1091 | 1 | B | Procedure and the data model for access stratum time distribution parameters                      | 18.4.0 |
| 2023-12 | CT#102 | CP-233245 | 1093 | - | B | Procedures for AF required QoS for target UE not identified by UE address                         | 18.4.0 |
| 2023-12 | CT#102 | CP-233233 | 1095 | - | B | Definition of L4S feature                                                                         | 18.4.0 |
| 2023-12 | CT#102 | CP-233244 | 1096 | 1 | B | Support of VPLMN-specific URSP delivery outcome                                                   | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 1097 | 1 | B | Updates to Member UE Selection procedures                                                         | 18.4.0 |
| 2023-12 | CT#102 | CP-233232 | 1099 | 1 | D | Updates to the service description procedures                                                     | 18.4.0 |
| 2023-12 | CT#102 | CP-233248 | 1101 | 1 | F | Correction of the data type of clock quality acceptance criteria result                           | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 1102 | 1 | F | Update Supported Features for NEF APIs                                                            | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 1103 | 1 | F | Update Supported Features for MemberUESelectionAssistance API                                     | 18.4.0 |
| 2023-12 | CT#102 | CP-233127 | 1105 | 2 | A | Reduced area indication when MBS service area is larger than MB-SMF service area                  | 18.4.0 |
| 2023-12 | CT#102 | CP-233232 | 1106 | 1 | F | Error handling support in MBSSession API when MBS service area is not supported by the MB-SMF(s). | 18.4.0 |
| 2023-12 | CT#102 | CP-233232 | 1107 | 1 | F | Error handling support in MBSTMG API when MBS service area is not supported by the MB-SMF(s)      | 18.4.0 |
| 2023-12 | CT#102 | CP-233284 | 1109 | 1 | F | EN related to PIN ID resolution.                                                                  | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 1110 | - | B | Corrections on End-to-end data volume transfer time                                               | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 1111 | 1 | B | Resolve the Editor's Note for Member UE filtering criteria                                        | 18.4.0 |
| 2023-12 | CT#102 | CP-233236 | 1112 | 1 | B | Support of Consolidated Data Rate for Multi-member AF session                                     | 18.4.0 |
| 2023-12 | CT#102 | CP-233267 | 1113 | - | F | Correcting the presence indicator of metadata attribute                                           | 18.4.0 |
| 2023-12 | CT#102 | CP-233257 | 1114 | 1 | F | Corrections to Application traffic detection                                                      | 18.4.0 |
| 2023-12 | CT#102 | CP-233270 | 1115 | - | F | Applicability of roamUePlmnlds                                                                    | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 1117 | - | F | Corrections to ApplyingBdtPolicy API                                                              | 18.4.0 |
| 2023-12 | CT#102 | CP-233236 | 1118 | 1 | B | Support of reporting recommended time windows per list of candidate UEs                           | 18.4.0 |
| 2023-12 | CT#102 | CP-233226 | 1119 | 1 | B | Enhance UE mobility analytics to support fine granularity                                         | 18.4.0 |
| 2023-12 | CT#102 | CP-233236 | 1120 | 1 | B | List of UE QoS handling procedure update for AsSessionWithQoS                                     | 18.4.0 |
| 2023-12 | CT#102 | CP-233239 | 1122 | 1 | B | Nnef_ECSAddress API procedures                                                                    | 18.4.0 |
| 2023-12 | CT#102 | CP-233240 | 1123 | 2 | B | Nnef_ECSAddress API resources and data model                                                      | 18.4.0 |
| 2023-12 | CT#102 | CP-233239 | 1124 | 1 | B | Nnef_ECSAddress API OpenAPI                                                                       | 18.4.0 |
| 2023-12 | CT#102 | CP-233239 | 1125 | 1 | B | Extending the Parameter Provisioning for ECS in roaming                                           | 18.4.0 |
| 2023-12 | CT#102 | CP-233226 | 1126 | 1 | F | Removal of muting exception instructions                                                          | 18.4.0 |
| 2023-12 | CT#102 | CP-233232 | 1127 | 1 | F | Traffic Influence data model corrections                                                          | 18.4.0 |
| 2023-12 | CT#102 | CP-233257 | 1128 | 1 | F | Application detection procedure corrections                                                       | 18.4.0 |
| 2023-12 | CT#102 | CP-233249 | 1129 | - | B | Updates in UE Id retrieval procedures                                                             | 18.4.0 |
| 2023-12 | CT#102 | CP-233236 | 1130 | 1 | B | Support WLAN Performance Analytics Exposure                                                       | 18.4.0 |
| 2023-12 | CT#102 | CP-233263 | 1132 | 2 | A | Corrections to boolean type definitions                                                           | 18.4.0 |
| 2023-12 | CT#102 | CP-233258 | 1134 | 1 | A | Correction on failure reason for event notification                                               | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 1135 | 1 | F | Corrections on UserServiceDescription data type                                                   | 18.4.0 |
| 2023-12 | CT#102 | CP-233232 | 1136 | 1 | F | Corrections on the Date Time                                                                      | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 1137 | 1 | F | Corrections on ServiceParameter API                                                               | 18.4.0 |
| 2023-12 | CT#102 | CP-233286 | 1138 | 1 | B | Support Network Slice Load Prediction                                                             | 18.4.0 |
| 2023-12 | CT#102 | CP-233234 | 1139 | 1 | B | Remove the Editor's Note for Data Burst Handling Information and update the terminology           | 18.4.0 |
| 2023-12 | CT#102 | CP-233248 | 1140 | 1 | B | Completion of Access Stratum Time Distribution Information                                        | 18.4.0 |
| 2023-12 | CT#102 | CP-233248 | 1141 | - | F | Corrections to the time sync exposure OpenAPI                                                     | 18.4.0 |
| 2023-12 | CT#102 | CP-233232 | 1143 | 1 | F | Updates in ServiceParameter API                                                                   | 18.4.0 |
| 2023-12 | CT#102 | CP-233232 | 1145 | 1 | F | Corrections to Lpi parameter provisioning update                                                  | 18.4.0 |
| 2023-12 | CT#102 | CP-233237 | 1148 | - | F | Update of info and externalDocs fields                                                            | 18.4.0 |
| 2024-03 | CT#103 | CP-240159 | 1094 | 7 | B | QoS monitoring alignment with SA2                                                                 | 18.5.0 |
| 2024-03 | CT#103 | CP-240171 | 1100 | 2 | F | Solving the issue of the missing functionalities in clause 4.3.1 and additional corrections       | 18.5.0 |
| 2024-03 | CT#103 | CP-240158 | 1150 | - | F | Resolve the Editor's Notes for QoS monitoring for congestion                                      | 18.5.0 |
| 2024-03 | CT#103 | CP-240159 | 1152 | 2 | F | Resolve the Editor's Notes for QoS monitoring for PDV                                             | 18.5.0 |
| 2024-03 | CT#103 | CP-240159 | 1153 | 2 | B | Completion of PDU Set handling functionality                                                      | 18.5.0 |
| 2024-03 | CT#103 | CP-240158 | 1154 | 1 | B | Interactions between ECN marking for L4S and Congestion Monitoring                                | 18.5.0 |

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| 2024-03 | CT#103 | CP-240187 | 1155 | 1 | F | MBSGroupMsgDelivery error handling with application errors.                     | 18.5.0 |
| 2024-03 | CT#103 | CP-240187 | 1156 | 1 | B | Support RedCap UEs indication in the MBS Session.                               | 18.5.0 |
| 2024-03 | CT#103 | CP-240187 | 1157 | - | F | Various updates and corrections to the definition of MBS Group Message Delivery | 18.5.0 |
| 2024-03 | CT#103 | CP-240162 | 1159 | 2 | B | Update WLAN performance analytics                                               | 18.5.0 |
| 2024-03 | CT#103 | CP-240175 | 1160 | 1 | B | Notifying the clock quality acceptance criteria result for NW TT                | 18.5.0 |
| 2024-03 | CT#103 | CP-240174 | 1162 | 1 | B | Addition of UE IP address to MemberUESelectionAssistance service                | 18.5.0 |
| 2024-03 | CT#103 | CP-240174 | 1163 | - | B | Enhancement of MemberUESelectionAssistance service                              | 18.5.0 |
| 2024-03 | CT#103 | CP-240174 | 1164 | 1 | B | Resolve the Editor's Note for MemberUESelectionAssistance service               | 18.5.0 |
| 2024-03 | CT#103 | CP-240177 | 1165 | 1 | B | Applicability of UNAVAILABLE DATA failure code                                  | 18.5.0 |
| 2024-03 | CT#103 | CP-240160 | 1167 | 2 | F | Clarification on Multiple UE handling with multimodal id                        | 18.5.0 |
| 2024-03 | CT#103 | CP-240159 | 1168 | - | F | QoS monitoring editors note removal                                             | 18.5.0 |
| 2024-03 | CT#103 | CP-240172 | 1169 | - | B | Corrections on Roaming ECS Address Provisioning                                 | 18.5.0 |
| 2024-03 | CT#103 | CP-240182 | 1171 | - | A | Corrections on PTP Relay instance                                               | 18.5.0 |
| 2024-03 | CT#103 | CP-240171 | 1172 | 1 | F | Fix issues of condition and feature control                                     | 18.5.0 |
| 2024-03 | CT#103 | CP-240175 | 1173 | 1 | F | Corrections on NetTimeSyncStatus functionality                                  | 18.5.0 |
| 2024-03 | CT#103 | CP-240172 | 1174 | 1 | F | Updates related to ECS Address Configuration Information                        | 18.5.0 |
| 2024-03 | CT#103 | CP-240162 | 1175 | 1 | F | Removal of duplicate feature                                                    | 18.5.0 |
| 2024-03 | CT#103 | CP-240161 | 1176 | - | F | Clarification for the accuracy request in AnalyticsRequest                      | 18.5.0 |
| 2024-03 | CT#103 | CP-240161 | 1177 | - | F | Corrections on Relative Proximity analytics                                     | 18.5.0 |
| 2024-03 | CT#103 | CP-240171 | 1183 | 1 | B | Updates on MTC Provider Information                                             | 18.5.0 |
| 2024-03 | CT#103 | CP-240176 | 1185 | - | F | Various updates and corrections                                                 | 18.5.0 |
| 2024-03 | CT#103 | CP-240187 | 1186 | - | F | Resolve the remaining EN on the MBS assistance information provisioning         | 18.5.0 |
| 2024-03 | CT#103 | CP-240193 | 1187 | 2 | B | NSCALE related updates                                                          | 18.5.0 |
| 2024-03 | CT#103 | CP-240179 | 1188 | 1 | F | Various corrections and alignments                                              | 18.5.0 |
| 2024-03 | CT#103 | CP-240159 | 1190 | - | F | Editor's note removal for multi-modal communication services                    | 18.5.0 |
| 2024-03 | CT#103 | CP-240198 | 1191 | 1 | B | URSP Rule request information for PIN                                           | 18.5.0 |
| 2024-03 | CT#103 | CP-240170 | 1194 | 1 | A | Corrections on QoS monitoring reports                                           | 18.5.0 |
| 2024-03 | CT#103 | CP-240172 | 1195 | 1 | B | Updates to DNAI Mapping data type                                               | 18.5.0 |
| 2024-03 | CT#103 | CP-240172 | 1196 | - | B | Updates attribute for common DNAI                                               | 18.5.0 |
| 2024-03 | CT#103 | CP-240172 | 1197 | - | F | Correction in the ECSAddress API definition                                     | 18.5.0 |
| 2024-03 | CT#103 | CP-240160 | 1200 | 1 | B | Support of the measurement of Round-Trip delay over two QoS flows               | 18.5.0 |
| 2024-03 | CT#103 | CP-240159 | 1201 | 1 | B | Support the provisioning of periodicity information at service data flow level  | 18.5.0 |
| 2024-03 | CT#103 | CP-240174 | 1202 | - | B | Update on feature support                                                       | 18.5.0 |
| 2024-03 | CT#103 | CP-240163 | 1203 | 1 | B | Updates to support PFD Determination Analytics                                  | 18.5.0 |
| 2024-03 | CT#103 | CP-240179 | 1204 | 1 | B | Provision mapping between Application Layer ID and GPSI                         | 18.5.0 |
| 2024-03 | CT#103 | CP-240174 | 1206 | - | B | Updates to MemberUESelectionAssistance API                                      | 18.5.0 |
| 2024-03 | CT#103 | CP-240181 | 1207 | 1 | B | AF provisioning of list of TNAP(s)                                              | 18.5.0 |
| 2024-03 | CT#103 | CP-240175 | 1208 | 2 | B | Corrections and alignments of TimeSyncExposure service data model               | 18.5.0 |
| 2024-03 | CT#103 | CP-240175 | 1209 | 2 | B | Corrections and alignments of ASTI service data model                           | 18.5.0 |
| 2024-03 | CT#103 | CP-240160 | 1210 | 1 | B | Provisioning of the AF per flow information into the PCF                        | 18.5.0 |
| 2024-03 | CT#103 | CP-240166 | 1213 | - | F | Update of info and externalDocs fields                                          | 18.5.0 |
| 2024-06 | CT#104 | CP-241096 | 1189 | 3 | B | Defining the missing 5MBS error handling procedures                             | 18.6.0 |
| 2024-06 | CT#104 | CP-241096 | 1205 | 4 | B | Updates in Nnef_UEId Service API                                                | 18.6.0 |
| 2024-06 | CT#104 | CP-241144 | 1215 |   | F | Correction on reference of PIN ID                                               | 18.6.0 |
| 2024-06 | CT#104 | CP-241118 | 1216 |   | F | Corrections to an attribute name.                                               | 18.6.0 |
| 2024-06 | CT#104 | CP-241095 | 1217 | 1 | B | Update to AKMA API to support AKMA service restrictions to roaming UE.          | 18.6.0 |
| 2024-06 | CT#104 | CP-241091 | 1221 | 1 | F | MemberUESelectionAssistance security OpenAPI Correction                         | 18.6.0 |
| 2024-06 | CT#104 | CP-241091 | 1222 | 1 | B | NEF local timer management for list of UE handling                              | 18.6.0 |
| 2024-06 | CT#104 | CP-241107 | 1223 | 1 | F | Ranging and Sidelink service procedure and configuration update                 | 18.6.0 |
| 2024-06 | CT#104 | CP-241095 | 1224 |   | F | AMInfluence security OpenAPI Correction                                         | 18.6.0 |
| 2024-06 | CT#104 | CP-241102 | 1225 |   | F | Removal of nonexistent data type for ATSI API                                   | 18.6.0 |
| 2024-06 | CT#104 | CP-241087 | 1226 | 1 | B | Offload capability reporting                                                    | 18.6.0 |
| 2024-06 | CT#104 | CP-241087 | 1227 | 1 | B | 5GC capabilities reporting in Traffic Influence notifications                   | 18.6.0 |
| 2024-06 | CT#104 | CP-241087 | 1228 | 1 | F | EAS-DNAI consistency check                                                      | 18.6.0 |
| 2024-06 | CT#104 | CP-241087 | 1229 |   | F | ECSAddress contents correction                                                  | 18.6.0 |
| 2024-06 | CT#104 | CP-241078 | 1230 | 1 | B | RoamingAnalytics impact on Analytics Exposure                                   | 18.6.0 |
| 2024-06 | CT#104 | CP-241077 | 1231 |   | F | Muting resolution                                                               | 18.6.0 |
| 2024-06 | CT#104 | CP-241083 | 1232 |   | F | Several OpenAPI Corrections                                                     | 18.6.0 |
| 2024-06 | CT#104 | CP-241080 | 1234 | 1 | F | Corrections to EnQoSMon procedure                                               | 18.6.0 |
| 2024-06 | CT#104 | CP-241092 | 1235 | 3 | B | Support of data rate monitoring for the list of UEs                             | 18.6.0 |
| 2024-06 | CT#104 | CP-241091 | 1236 |   | B | Support of filter values in the Member UE Selection Assistance notification     | 18.6.0 |
| 2024-06 | CT#104 | CP-241087 | 1237 | 1 | F | Corrections on the DNAIMapping API                                              | 18.6.0 |

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| 2024-06 | CT#104 | CP-241083 | 1238 | 1 | F | Notification via Websocket for Time Synchronization Configuration Notification                                             | 18.6.0 |
| 2024-06 | CT#104 | CP-241102 | 1240 |   | F | Correction of notification via Websocket for ASTI service                                                                  | 18.6.0 |
| 2024-06 | CT#104 | CP-241080 | 1241 | 1 | F | Support of Downlink Protocol Description in the MultiMedia feature                                                         | 18.6.0 |
| 2024-06 | CT#104 | CP-241083 | 1243 | 1 | F | Removal of the Editor's note about support feature                                                                         | 18.6.0 |
| 2024-06 | CT#104 | CP-241104 | 1245 |   | A | Corrections to TimeSyncExposure and ASTI services                                                                          | 18.6.0 |
| 2024-06 | CT#104 | CP-241102 | 1246 | 2 | F | Clean up of subscription control and time synchronization services status monitoring                                       | 18.6.0 |
| 2024-06 | CT#104 | CP-241102 | 1247 | 3 | F | Clean up of subscription control and ASTI status monitoring                                                                | 18.6.0 |
| 2024-06 | CT#104 | CP-241080 | 1248 | 1 | F | Remove editor's notes regarding the reporting frequency                                                                    | 18.6.0 |
| 2024-06 | CT#104 | CP-241080 | 1249 | 1 | B | Completion of Round Trip Time over two QoS flows                                                                           | 18.6.0 |
| 2024-06 | CT#104 | CP-241103 | 1250 | 1 | F | Various GMEC related corrections                                                                                           | 18.6.0 |
| 2024-06 | CT#104 | CP-241118 | 1251 |   | F | Various 5MBS_Ph2 related corrections                                                                                       | 18.6.0 |
| 2024-06 | CT#104 | CP-241111 | 1252 | 1 | F | Various eNS_Ph3 related corrections                                                                                        | 18.6.0 |
| 2024-06 | CT#104 | CP-241089 | 1253 | 2 | B | Resolve the remaining NSCALE related EN                                                                                    | 18.6.0 |
| 2024-06 | CT#104 | CP-241087 | 1254 | 1 | F | Various corrections to the definition of the DNAMapping API                                                                | 18.6.0 |
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| 2024-06 | CT#104 | CP-241091 | 1256 | 1 | F | Various corrections to the definition of the PdtqPolicyNegotiation API                                                     | 18.6.0 |
| 2024-06 | CT#104 | CP-241091 | 1257 | 1 | F | Various corrections to the definition of the MemberUESelectionAssistance API                                               | 18.6.0 |
| 2024-06 | CT#104 | CP-241101 | 1258 | 1 | F | Various corrections to the definition of the UeAddress API                                                                 | 18.6.0 |
| 2024-06 | CT#104 | CP-241115 | 1263 |   | A | Essential corrections to the PATCH method on the Individual 5GLAN Parameters Provision Subscription resource               | 18.6.0 |
| 2024-06 | CT#104 | CP-241088 | 1264 | 2 | B | Update to add security parameter to ECS address IE                                                                         | 18.6.0 |
| 2024-06 | CT#104 | CP-241083 | 1266 |   | F | Correction in ServiceParameter API                                                                                         | 18.6.0 |
| 2024-06 | CT#104 | CP-241083 | 1267 | 1 | F | Corrections to Websocket Notification in MBS related APIs                                                                  | 18.6.0 |
| 2024-06 | CT#104 | CP-241083 | 1268 | 1 | F | Corrections to Websocket Notification in MSeventExposure API and DNAMapping API                                            | 18.6.0 |
| 2024-06 | CT#104 | CP-241103 | 1269 | 1 | F | Update the 5G VN group communication indication Datatype                                                                   | 18.6.0 |
| 2024-06 | CT#104 | CP-241088 | 1272 | 2 | B | Completion of HR-SBO procedures in the AF requests for influence of traffic routing                                        | 18.6.0 |
| 2024-06 | CT#104 | CP-241292 | 1273 | 3 | B | Updates to GPSI and Application Layer ID mapping information                                                               | 18.6.0 |
| 2024-06 | CT#104 | CP-241091 | 1275 | 1 | B | NEF monitoring events to assist application AIML operation                                                                 | 18.6.0 |
| 2024-06 | CT#104 | CP-241140 | 1277 | 2 | B | Addition of an attribute to Nnef_TrafficInfluence API to support multiple traffic routing requirements in a single request | 18.6.0 |
| 2024-06 | CT#104 | CP-241092 | 1278 | 1 | F | Servers description update                                                                                                 | 18.6.0 |
| 2024-06 | CT#104 | CP-241266 | 1279 | 2 | F | Multimodal data flow QoS parameters editors note removal                                                                   | 18.6.0 |
| 2024-06 | CT#104 | CP-241103 | 1280 | 1 | F | Servers description update                                                                                                 | 18.6.0 |
| 2024-06 | CT#104 | CP-241107 | 1281 | 1 | B | Update on UE RangingSL Positioning privacy profile                                                                         | 18.6.0 |
| 2024-06 | CT#104 | CP-241088 | 1282 | 1 | B | Updates to ECS Address Configuration Information for roaming                                                               | 18.6.0 |
| 2024-06 | CT#104 | CP-241267 | 1283 | 3 | F | DNAM Mapping deletion notification                                                                                         | 18.6.0 |
| 2024-06 | CT#104 | CP-241091 | 1284 |   | F | Corrections on AIMLSys related features                                                                                    | 18.6.0 |
| 2024-06 | CT#104 | CP-241133 | 1286 |   | A | Correction on Data Reporting Provisioning Session Uri                                                                      | 18.6.0 |
| 2024-06 | CT#104 | CP-241083 | 1287 |   | F | Corrections on DataReporting API                                                                                           | 18.6.0 |
| 2024-06 | CT#104 | CP-241084 | 1288 |   | F | Corrections on DataReportingProvisioning API                                                                               | 18.6.0 |
| 2024-06 | CT#104 | CP-241084 | 1289 |   | F | Corrections on ExpectedUmtTime Add feature                                                                                 | 18.6.0 |
| 2024-06 | CT#104 | CP-241084 | 1290 | 1 | F | Various essential corrections                                                                                              | 18.6.0 |
| 2024-06 | CT#104 | CP-241088 | 1291 | 1 | B | Additional corrections to the DNAMapping API                                                                               | 18.6.0 |
| 2024-06 | CT#104 | CP-241088 | 1292 | 1 | B | Define the PATCH method on the ECS Address Configuration Information resource                                              | 18.6.0 |
| 2024-06 | CT#104 | CP-241101 | 1293 |   | F | Additional corrections to the definition of the UeAddress API                                                              | 18.6.0 |
| 2024-06 | CT#104 | CP-241092 | 1294 | 1 | F | Additional corrections and updates to the definition of the PdtqPolicyNegotiation API                                      | 18.6.0 |
| 2024-06 | CT#104 | CP-241092 | 1295 | 1 | F | Additional corrections and updates to the definition of the MemberUESelectionAssistance API                                | 18.6.0 |
| 2024-06 | CT#104 | CP-241127 | 1296 | 1 | F | Corrections to the provisions related to the application detection functionality                                           | 18.6.0 |
| 2024-06 | CT#104 | CP-241096 | 1297 | 1 | F | Essential corrections to the NSAC procedures                                                                               | 18.6.0 |
| 2024-06 | CT#104 | CP-241084 | 1298 | 1 | B | Updates error handling in ServiceParameter API                                                                             | 18.6.0 |
| 2024-06 | CT#104 | CP-241084 | 1302 | 1 | F | Corrections to error handling in UEId APIs                                                                                 | 18.6.0 |
| 2024-06 | CT#104 | CP-241103 | 1303 | 1 | F | Corrections to Websocket Notification in 5GLANParameterProvision API                                                       | 18.6.0 |
| 2024-06 | CT#104 | CP-241111 | 1305 | 1 | B | Error handling for network slice parameters provisioning                                                                   | 18.6.0 |
| 2024-06 | CT#104 | CP-241092 | 1308 | 1 | F | Corrections on Member UE Selection Assistance API                                                                          | 18.6.0 |
| 2024-06 | CT#104 | CP-241091 | 1309 |   | F | Corrections on WLAN performance analytics exposure                                                                         | 18.6.0 |
| 2024-06 | CT#104 | CP-241098 | 1310 |   | F | Targets of URSP guidance                                                                                                   | 18.6.0 |
| 2024-06 | CT#104 | CP-241098 | 1311 |   | F | Correction to Connection Capabilities                                                                                      | 18.6.0 |
| 2024-06 | CT#104 | CP-241121 | 1312 |   | F | Correction to A2X policy provisioning                                                                                      | 18.6.0 |
| 2024-06 | CT#104 | CP-241082 | 1314 | 1 | F | Corrections on PowerSaving feature                                                                                         | 18.6.0 |
| 2024-06 | CT#104 | CP-241082 | 1315 | 1 | B | Support of UL and DL policy control based on Round-Trip latency requirements                                               | 18.6.0 |

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| 2024-06 | CT#104 | CP-241085 | 1318 |   | F | Update of info and externalDocs fields                                                                  | 18.6.0 |
| 2024-07 | CT#104 |           |      |   |   | Correction to fix OpenAPI parsing errors                                                                | 18.6.1 |
| 2024-09 | CT#105 | CP-242216 | 1321 | 2 | F | Add list of supported PLMNs with ECSP information to the ECS address information                        | 18.7.0 |
| 2024-09 | CT#105 | CP-242149 | 1323 | 1 | A | Corrections to MBS Service Area related error handling                                                  | 18.7.0 |
| 2024-09 | CT#105 | CP-242140 | 1325 | 1 | F | Clarify AF disabling encryption for roaming UE for AKMA services.                                       | 18.7.0 |
| 2024-09 | CT#105 | CP-242125 | 1328 |   | F | Corrections on Consolidated Data Rate monitoring                                                        | 18.7.0 |
| 2024-09 | CT#105 | CP-242125 | 1329 |   | F | Corrections on MemberUESelectionAssistance API                                                          | 18.7.0 |
| 2024-09 | CT#105 | CP-242125 | 1330 |   | F | PDTQ warning notification handling after HTTP DELETE                                                    | 18.7.0 |
| 2024-09 | CT#105 | CP-242122 | 1332 | 1 | F | Corrections related to EnQoSMon feature                                                                 | 18.7.0 |
| 2024-09 | CT#105 | CP-242119 | 1333 | 1 | F | Adding missing cancelAcculnd attribute                                                                  | 18.7.0 |
| 2024-09 | CT#105 | CP-242119 | 1334 |   | F | Clarification on analytics accuracy notification                                                        | 18.7.0 |
| 2024-09 | CT#105 | CP-242125 | 1336 | 1 | F | Correction of procedure for Consolidated Data Rate monitoring                                           | 18.7.0 |
| 2024-09 | CT#105 | CP-242135 | 1337 | 1 | F | Correction to procedure for RSLPPI Parameters Provisioning                                              | 18.7.0 |
| 2024-09 | CT#105 | CP-242146 | 1338 | 1 | F | Correction to procedures for Group Parameters Provisioning                                              | 18.7.0 |
| 2024-09 | CT#105 | CP-242144 | 1339 | 1 | F | Correction to procedure for Network Slice Parameters Provisioning                                       | 18.7.0 |
| 2024-09 | CT#105 | CP-242156 | 1342 | 1 | F | NR RedCap UEs related updates                                                                           | 18.7.0 |
| 2024-09 | CT#105 | CP-242135 | 1343 | 1 | F | Corrections to the UeldMappingInfoPatch data type                                                       | 18.7.0 |
| 2024-09 | CT#105 | CP-242126 | 1345 |   | F | ECS Address Configuration Information consolidation                                                     | 18.7.0 |
| 2024-09 | CT#105 | CP-242140 | 1346 | 1 | F | Exposing GSPI in MSISDN format based on User Consent                                                    | 18.7.0 |
| 2024-09 | CT#105 | CP-242126 | 1349 | 1 | F | Corrections on ECSAddress API                                                                           | 18.7.0 |
| 2024-09 | CT#105 | CP-242119 | 1350 |   | F | Corrections on geographical area included in the analytics notification                                 | 18.7.0 |
| 2024-09 | CT#105 | CP-242137 | 1351 | 1 | F | Corrections to the provisioning of VPLMN Specific URSP rules                                            | 18.7.0 |
| 2024-09 | CT#105 | CP-242122 | 1352 | 1 | F | Corrections to L4S Support and feature application mistakes                                             | 18.7.0 |
| 2024-09 | CT#105 | CP-242126 | 1353 | 1 | F | Corrections to the ECSAddress OpenAPI                                                                   | 18.7.0 |
| 2024-09 | CT#105 | CP-242122 | 1354 |   | F | Corrections on the Protocol Description                                                                 | 18.7.0 |
| 2024-09 | CT#105 | CP-242135 | 1355 | 1 | F | Removal of AF in GET operation                                                                          | 18.7.0 |
| 2024-09 | CT#105 | CP-242120 | 1358 |   | F | Update of info and externalDocs fields                                                                  | 18.7.0 |
| 2024-09 | CT#105 | CP-242114 | 1239 | 4 | F | Redirection for the "inner" resource creation in TimeSyncExposure API and DataReportingProvisioning API | 19.0.0 |
| 2024-09 | CT#105 | CP-242115 | 1335 | 2 | F | MBSsession API name correction                                                                          | 19.0.0 |
| 2024-09 | CT#105 | CP-242114 | 1340 | 1 | F | Various updates and corrections                                                                         | 19.0.0 |
| 2024-09 | CT#105 | CP-242147 | 1341 | 1 | B | Updates to support RVAS Welcome SMS                                                                     | 19.0.0 |
| 2024-09 | CT#105 | CP-242114 | 1348 | 1 | F | Corrections to error handling in the UEAddress API                                                      | 19.0.0 |
| 2024-09 | CT#105 | CP-242133 | 1356 | 1 | B | QoS Monitoring enhancement on capability report                                                         | 19.0.0 |
| 2024-09 | CT#105 | CP-242113 | 1359 |   | F | Update of info and externalDocs fields                                                                  | 19.0.0 |
| 2024-12 | CT#106 | CP-243084 | 1319 | 3 | B | Removal of restriction on MultiTrafficInflu feature for future PDU session(s)                           | 19.1.0 |
| 2024-12 | CT#106 | CP-243121 | 1360 | 2 | B | CAG information parameter provision procedure                                                           | 19.1.0 |
| 2024-12 | CT#106 | CP-243121 | 1361 | 2 | B | CAG information parameter provision API data model definition                                           | 19.1.0 |
| 2024-12 | CT#106 | CP-243121 | 1362 | 2 | B | CAG information parameter provision open API                                                            | 19.1.0 |
| 2024-12 | CT#106 | CP-243104 | 1364 | 1 | B | Packet delay update                                                                                     | 19.1.0 |
| 2024-12 | CT#106 | CP-243107 | 1367 | 3 | A | Clarification for the URSP rule usage in the HPLMN and VPLMN                                            | 19.1.0 |
| 2024-12 | CT#106 | CP-243099 | 1371 | 1 | B | UE public address subscription resources and data model                                                 | 19.1.0 |
| 2024-12 | CT#106 | CP-243085 | 1373 |   | F | openAPI Specification File name correction                                                              | 19.1.0 |
| 2024-12 | CT#106 | CP-243085 | 1374 | 1 | F | Corrections for UEId API                                                                                | 19.1.0 |
| 2024-12 | CT#106 | CP-243085 | 1375 | 1 | F | Correction of feature negotiation for Nnef_UeAddress service                                            | 19.1.0 |
| 2024-12 | CT#106 | CP-243111 | 1376 | 1 | B | Support 5G ProSe Multi-hop UE-to-Network Relay                                                          | 19.1.0 |
| 2024-12 | CT#106 | CP-243111 | 1377 | 1 | B | Support 5G ProSe Multi-hop UE-to-UE Relay                                                               | 19.1.0 |
| 2024-12 | CT#106 | CP-243082 | 1378 |   | F | Complete the support of the active periods in the form of a repetition rule                             | 19.1.0 |
| 2024-12 | CT#106 | CP-243082 | 1380 | 1 | F | Corrections to the support of multiple sets of traffic routing requirements                             | 19.1.0 |
| 2024-12 | CT#106 | CP-243123 | 1383 | 1 | A | Corrections to MBS service area related error handling                                                  | 19.1.0 |
| 2024-12 | CT#106 | CP-243082 | 1384 | 1 | F | Further clarifications and corrections to the UE ID retrieval service description definition            | 19.1.0 |
| 2024-12 | CT#106 | CP-243105 | 1385 | 1 | B | MPS for Messaging Indication parameter provisioning via NEF                                             | 19.1.0 |
| 2024-12 | CT#106 | CP-243113 | 1387 | 1 | B | Definition of the service description clauses of the new StaticIpAddrParamProvision API                 | 19.1.0 |
| 2024-12 | CT#106 | CP-243113 | 1388 | 1 | B | Definition of the API data model clauses of the new AddressingParamProvision API                        | 19.1.0 |
| 2024-12 | CT#106 | CP-243113 | 1389 | 2 | B | Open API specification of the new AddressingParamProvision API                                          | 19.1.0 |
| 2024-12 | CT#106 | CP-243099 | 1392 | 1 | B | Update Open API for Enhancement of getting NATed UE public IP address and port number                   | 19.1.0 |
| 2024-12 | CT#106 | CP-243108 | 1395 |   | A | Corrections on the attribute name for EAS deployment information                                        | 19.1.0 |
| 2024-12 | CT#106 | CP-243093 | 1397 |   | A | Corrections on the UE mobility exposure analytics                                                       | 19.1.0 |
| 2024-12 | CT#106 | CP-243085 | 1399 | 1 | F | Optimization on the paragraph structure of AF setting up an AF session with required QoS                | 19.1.0 |
| 2024-12 | CT#106 | CP-243097 | 1400 | 3 | B | UAVFlightAssistance API and data model definition                                                       | 19.1.0 |
| 2024-12 | CT#106 | CP-243106 | 1402 | 2 | A | Corrections on the attribute name and feature name                                                      | 19.1.0 |
| 2024-12 | CT#106 | CP-243110 | 1405 |   | A | Corrections on the N6 termination indication                                                            | 19.1.0 |

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| 2024-12 | CT#106 | CP-243086 | 1409 | 1 | B | Updates to Network Slice Exposure in AnalyticsExposure API                                                | 19.1.0 |
| 2024-12 | CT#106 | CP-243087 | 1410 | 3 | F | Correction to 5G VN group data provisioning                                                               | 19.1.0 |
| 2024-12 | CT#106 | CP-243085 | 1413 | 1 | F | Corrections to API definitions in UEId API                                                                | 19.1.0 |
| 2024-12 | CT#106 | CP-243097 | 1414 | 2 | B | UAVFlightAssistance service descriptions and procedures                                                   | 19.1.0 |
| 2024-12 | CT#106 | CP-243099 | 1417 | 1 | B | Service procedures to obtain UE Public Address                                                            | 19.1.0 |
| 2024-12 | CT#106 | CP-243100 | 1420 | 1 | B | Support N6 delay measurement via AF influence procedure                                                   | 19.1.0 |
| 2024-12 | CT#106 | CP-243083 | 1421 | 1 | B | Support for traffic routing outcome report                                                                | 19.1.0 |
| 2024-12 | CT#106 | CP-243113 | 1422 |   | B | Add the new AddressingParamProvision API in clause 5.1                                                    | 19.1.0 |
| 2024-12 | CT#106 | CP-243097 | 1423 | 1 | B | Add the new UAVFlightAssistance API in clause 5.1                                                         | 19.1.0 |
| 2024-12 | CT#106 | CP-243121 | 1424 | 1 | B | Add the new FemtoParamProvision API in clauses 4.1 and 5.1                                                | 19.1.0 |
| 2024-12 | CT#106 | CP-243084 | 1425 | 1 | F | Updates to AKMA service disablement                                                                       | 19.1.0 |
| 2024-12 | CT#106 | CP-243117 | 1426 | 2 | B | Definition of Nnef_ImSessionManagement Service                                                            | 19.1.0 |
| 2024-12 | CT#106 | CP-243117 | 1427 | 1 | B | IMS Event Exposure Service descriptions and procedures                                                    | 19.1.0 |
| 2024-12 | CT#106 | CP-243117 | 1428 | 1 | B | IMS Event Exposure API definitions and data model                                                         | 19.1.0 |
| 2024-12 | CT#106 | CP-243252 | 1429 | 2 | B | IMS Event Exposure Services OpenAPI file definition                                                       | 19.1.0 |
| 2024-12 | CT#106 | CP-243086 | 1431 |   | F | Feature name correction                                                                                   | 19.1.0 |
| 2024-12 | CT#106 | CP-243095 | 1432 | 1 | B | Support of the signalling storm analytics for AnalyticsExposure API                                       | 19.1.0 |
| 2024-12 | CT#106 | CP-243101 | 1433 | 1 | B | Introduce data burst size marking support indication                                                      | 19.1.0 |
| 2024-12 | CT#106 | CP-243101 | 1434 | 1 | B | Introduce (S)RTP Multiplexed Media Information                                                            | 19.1.0 |
| 2024-12 | CT#106 | CP-243093 | 1436 |   | A | Corrections on the attribute names and data types                                                         | 19.1.0 |
| 2024-12 | CT#106 | CP-243089 | 1437 | 1 | B | Clarifications for the presence condition of the attribute                                                | 19.1.0 |
| 2024-12 | CT#106 | CP-243118 | 1439 |   | A | E2E Data Volume correction                                                                                | 19.1.0 |
| 2024-12 | CT#106 | CP-243100 | 1440 | 1 | B | N6 delay measurement support in EAS Deployment information                                                | 19.1.0 |
| 2024-12 | CT#106 | CP-243115 | 1443 | 1 | B | Add connectivity Id to the traffic descriptor                                                             | 19.1.0 |
| 2024-12 | CT#106 | CP-243097 | 1447 | 1 | B | Support list of UEs in QoS Sustainability and Movement Behaviour Analyses Exposure                        | 19.1.0 |
| 2024-12 | CT#106 | CP-243097 | 1449 | 1 | B | RetrieveInfoUAVFlight service descriptions and procedures                                                 | 19.1.0 |
| 2024-12 | CT#106 | CP-243097 | 1450 | 1 | B | RetrieveInfoUAVFlight API definitions                                                                     | 19.1.0 |
| 2024-12 | CT#106 | CP-243097 | 1451 | 1 | B | RetrieveInfoUAVFlight API OpenAPI definitions                                                             | 19.1.0 |
| 2024-12 | CT#106 | CP-243108 | 1454 |   | A | Correction on the attributes for spatial validity condition                                               | 19.1.0 |
| 2024-12 | CT#106 | CP-243086 | 1458 | 1 | F | Corrections on the re-used data type                                                                      | 19.1.0 |
| 2024-12 | CT#106 | CP-243124 | 1459 | 1 | B | Support of the non-3GPP devices information                                                               | 19.1.0 |
| 2024-12 | CT#106 | CP-243097 | 1461 | 1 | B | UAVFlightAssistanceAPI OpenAPI definitions                                                                | 19.1.0 |
| 2024-12 | CT#106 | CP-243113 | 1462 | 1 | B | Parameter provisioning for 5G VN group's UP Security Policy                                               | 19.1.0 |
| 2024-12 | CT#106 | CP-243087 | 1463 | 1 | B | Support new PEI during change of SUPI-PEI association event report                                        | 19.1.0 |
| 2024-12 | CT#106 | CP-243099 | 1464 | 1 | B | Support of handling of Payload Headers in TrafficInfluence API                                            | 19.1.0 |
| 2024-12 | CT#106 | CP-243147 | 1467 |   | F | Update of info and externalDocs fields                                                                    | 19.1.0 |
| 2025-03 | CT#107 | CP-250092 | 1448 | 3 | B | Update TTC predictions in Relative Proximity Analytics Exposure                                           | 19.2.0 |
| 2025-03 | CT#107 | CP-250124 | 1468 | 1 | B | UEId Service API support for MSISDN verification operation                                                | 19.2.0 |
| 2025-03 | CT#107 | CP-250236 | 1469 | 3 | B | Support of AF requested network slice replacement in the Nnef_AMInfluence API                             | 19.2.0 |
| 2025-03 | CT#107 | CP-250111 | 1470 | 1 | B | Support Energy related information exposure                                                               | 19.2.0 |
| 2025-03 | CT#107 | CP-250092 | 1471 |   | B | Support Altitude reporting information in the RetrieveInfoUAVFlight API                                   | 19.2.0 |
| 2025-03 | CT#107 | CP-250257 | 1472 | 4 | B | Support Altitude reporting information in the Nnef_UAVFlightAssistance API                                | 19.2.0 |
| 2025-03 | CT#107 | CP-250106 | 1474 | 1 | A | Support eRedCap UE in receiving MBS service                                                               | 19.2.0 |
| 2025-03 | CT#107 | CP-250100 | 1475 | 1 | B | Support AF requested slice selection in AMPolicyAuthorization API                                         | 19.2.0 |
| 2025-03 | CT#107 | CP-250102 | 1478 | 1 | F | Corrections and clarification on feature related.                                                         | 19.2.0 |
| 2025-03 | CT#107 | CP-250088 | 1479 | 1 | B | Correction on the Non-3GPP device provisioning                                                            | 19.2.0 |
| 2025-03 | CT#107 | CP-250082 | 1480 | 1 | B | Support of on-path N6 signaling to deliver Media related information                                      | 19.2.0 |
| 2025-03 | CT#107 | CP-250082 | 1481 | 1 | B | Support of AF request rate limitation information reporting over NEF interface                            | 19.2.0 |
| 2025-03 | CT#107 | CP-250095 | 1483 | 1 | F | Delay measurement protocol corrections                                                                    | 19.2.0 |
| 2025-03 | CT#107 | CP-250085 | 1486 | 1 | F | Wrong API names                                                                                           | 19.2.0 |
| 2025-03 | CT#107 | CP-250085 | 1487 | 1 | F | Presence condition correction                                                                             | 19.2.0 |
| 2025-03 | CT#107 | CP-250080 | 1488 | 1 | B | Indicating the acceptable QoS to the AF                                                                   | 19.2.0 |
| 2025-03 | CT#107 | CP-250088 | 1489 | 1 | F | Presence condition alignment                                                                              | 19.2.0 |
| 2025-03 | CT#107 | CP-250088 | 1491 | 1 | F | Restrictions of provisioning non-3gpp device information                                                  | 19.2.0 |
| 2025-03 | CT#107 | CP-250102 | 1493 | 1 | F | Service parameter authorization in the PCF                                                                | 19.2.0 |
| 2025-03 | CT#107 | CP-250090 | 1495 |   | B | Completion of header handling functionality                                                               | 19.2.0 |
| 2025-03 | CT#107 | CP-250091 | 1496 | 1 | B | IMS Subscription and Notification procedures                                                              | 19.2.0 |
| 2025-03 | CT#107 | CP-250091 | 1497 | 1 | B | IMS data channel capability exposure procedures update                                                    | 19.2.0 |
| 2025-03 | CT#107 | CP-250090 | 1498 | 1 | B | Updates to NAT mapping information retrieval and removal of ENs                                           | 19.2.0 |
| 2025-03 | CT#107 | CP-250113 | 1499 | 1 | B | Correction to avoid getting duplicate Static IP assignment                                                | 19.2.0 |
| 2025-03 | CT#107 | CP-250093 | 1500 |   | B | Support Layer-2 multi-hop UE-to-Network Relaying                                                          | 19.2.0 |
| 2025-03 | CT#107 | CP-250093 | 1501 |   | B | Updates to the definition of 5G ProSe Multi-hop UE-to-Network Relay and 5G ProSe Multi-hop UE-to-UE Relay | 19.2.0 |
| 2025-03 | CT#107 | CP-250093 | 1502 |   | F | Corrections to 5G ProSe Multi-hop UE-to-UE Relaying                                                       | 19.2.0 |
| 2025-03 | CT#107 | CP-250113 | 1503 | 1 | F | Updates and corrections to the AddressingParamProvision API                                               | 19.2.0 |

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| 2025-03 | CT#107 | CP-250123 | 1504 | 1 | F | Updates and corrections to the CagInfoParamProvision API                                                  | 19.2.0 |
| 2025-03 | CT#107 | CP-250096 | 1507 | 1 | A | Corrections to the support of multiple sets of traffic routing requirements                               | 19.2.0 |
| 2025-03 | CT#107 | CP-250091 | 1508 | 1 | B | Notify of IMS session management                                                                          | 19.2.0 |
| 2025-03 | CT#107 | CP-250091 | 1511 | 1 | B | Updates to API definitions and OpenAPI file of ImsEventExposure API                                       | 19.2.0 |
| 2025-03 | CT#107 | CP-250091 | 1512 | 1 | B | IMS Parameters Provision service descriptions and procedures                                              | 19.2.0 |
| 2025-03 | CT#107 | CP-250091 | 1513 |   | B | IMS Parameters Provision API definitions                                                                  | 19.2.0 |
| 2025-03 | CT#107 | CP-250091 | 1514 |   | B | IMS Parameters Provision OpenAPI file definitions                                                         | 19.2.0 |
| 2025-03 | CT#107 | CP-250090 | 1517 | 1 | B | Mapping AF Identifier to DNN and Snssai for UE NATeAddress subscription                                   | 19.2.0 |
| 2025-03 | CT#107 | CP-250090 | 1518 |   | F | Mandate immRepInd attribute for UE NATed Address subscription                                             | 19.2.0 |
| 2025-03 | CT#107 | CP-250082 | 1519 |   | F | Providing data burst size marking indication in multi-modal services provisioning procedure               | 19.2.0 |
| 2025-03 | CT#107 | CP-250084 | 1520 | 1 | B | Support of Prediction Error handling                                                                      | 19.2.0 |
| 2025-03 | CT#107 | CP-250080 | 1522 | 1 | F | Corrections related to DCAMP                                                                              | 19.2.0 |
| 2025-03 | CT#107 | CP-250081 | 1523 | 1 | F | Correction to XRM procedures                                                                              | 19.2.0 |
| 2025-03 | CT#107 | CP-250119 | 1525 |   | A | Incorrect data type name                                                                                  | 19.2.0 |
| 2025-03 | CT#107 | CP-250091 | 1527 | 1 | F | Corrections on the ImsSessionManagement API                                                               | 19.2.0 |
| 2025-03 | CT#107 | CP-250088 | 1529 | 1 | F | Updates and corrections to the Non3gppDevice feature definition                                           | 19.2.0 |
| 2025-03 | CT#107 | CP-250090 | 1530 | 1 | B | Updates and corrections to the UE Address Subscription functionality                                      | 19.2.0 |
| 2025-03 | CT#107 | CP-250085 | 1531 | 1 | F | Updates and corrections to the UeAddress API                                                              | 19.2.0 |
| 2025-03 | CT#107 | CP-250083 | 1532 | 1 | B | Enhancements on the signalling storm analytics                                                            | 19.2.0 |
| 2025-03 | CT#107 | CP-250084 | 1533 | 1 | B | Enhancements on the QoS Sustainability analytics exposure                                                 | 19.2.0 |
| 2025-03 | CT#107 | CP-250092 | 1534 | 2 | F | Updates and corrections to the RetrieveInfoUAVFlight API                                                  | 19.2.0 |
| 2025-03 | CT#107 | CP-250092 | 1535 | 1 | B | Updates and corrections to the UAVFlightAssistance API                                                    | 19.2.0 |
| 2025-03 | CT#107 | CP-250082 | 1536 | 1 | B | Support of PDU Set QoS parameters in Alternative QoS                                                      | 19.2.0 |
| 2025-03 | CT#107 | CP-250080 | 1537 |   | F | Corrections in NEF Traffic Influence Service                                                              | 19.2.0 |
| 2025-03 | CT#107 | CP-250094 | 1538 | 2 | F | Clarification on the Qos monitoring capability                                                            | 19.2.0 |
| 2025-03 | CT#107 | CP-250255 | 1540 | 3 | F | Update of info and externalDocs fields                                                                    | 19.2.0 |
| 2025-06 | CT#108 | CP-251095 | 1543 | 1 | F | Clarification of AltReportReqs data model definition                                                      | 19.3.0 |
| 2025-06 | CT#108 | CP-251116 | 1544 | 3 | B | Define the service description clauses of the Nnef_AIoT API                                               | 19.3.0 |
| 2025-06 | CT#108 | CP-251116 | 1545 | 3 | B | Define the API definition clauses of the Nnef_AIoT API                                                    | 19.3.0 |
| 2025-06 | CT#108 | CP-251273 | 1546 | 4 | B | Define the OpenAPI description of the Nnef_AIoT API                                                       | 19.3.0 |
| 2025-06 | CT#108 | CP-251084 | 1547 |   | F | Corrections to references                                                                                 | 19.3.0 |
| 2025-06 | CT#108 | CP-251084 | 1548 | 1 | F | Corrections to the service specific parameter provisioning procedures description                         | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1549 | 2 | B | Updates and corrections to the ImsSessionManagement API                                                   | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1550 | 1 | B | Updates and corrections to the ImsEventExposure API                                                       | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1551 | 1 | F | Updates and corrections to the ImsParamProvision API                                                      | 19.3.0 |
| 2025-06 | CT#108 | CP-251095 | 1552 | 1 | B | Merging the service description clauses of the RetrieveInfoUAVFlight API into the UAVFlightAssistance API | 19.3.0 |
| 2025-06 | CT#108 | CP-251095 | 1553 | 3 | B | Merging the API definition clauses of the RetrieveInfoUAVFlight API into the UAVFlightAssistance API      | 19.3.0 |
| 2025-06 | CT#108 | CP-251095 | 1554 | 3 | B | Merging the OpenAPI description part of the RetrieveInfoUAVFlight API into the UAVFlightAssistance API    | 19.3.0 |
| 2025-06 | CT#108 | CP-251095 | 1555 | 2 | B | Additional updates and corrections to the UAVFlightAssistance API                                         | 19.3.0 |
| 2025-06 | CT#108 | CP-251252 | 1556 | 3 | B | Updates and corrections to the new AF-requested Network Slice Replacement functionality                   | 19.3.0 |
| 2025-06 | CT#108 | CP-251129 | 1557 | 1 | B | Complete the definition of the error handling for the AF requested IP address parameters provisioning     | 19.3.0 |
| 2025-06 | CT#108 | CP-251094 | 1559 | 1 | F | Update event attribute value to align with stage-2 definition                                             | 19.3.0 |
| 2025-06 | CT#108 | CP-251091 | 1561 | 1 | B | Support threshold and periodic reporting for energy based exposure events                                 | 19.3.0 |
| 2025-06 | CT#108 | CP-251091 | 1562 |   | B | Support S-NSSAI level exposure related to EnergySys feature                                               | 19.3.0 |
| 2025-06 | CT#108 | CP-251080 | 1563 | 1 | B | Time to Next Burst Support Indication                                                                     | 19.3.0 |
| 2025-06 | CT#108 | CP-251103 | 1566 | 3 | A | L4S_SUPP Event handling                                                                                   | 19.3.0 |
| 2025-06 | CT#108 | CP-251088 | 1567 | 1 | B | QoS Sustainability thresholds                                                                             | 19.3.0 |
| 2025-06 | CT#108 | CP-251082 | 1568 | 1 | B | Simultaneous Connectivity failure events                                                                  | 19.3.0 |
| 2025-06 | CT#108 | CP-251104 | 1571 | 1 | F | Corrections to NATed UE public IP address                                                                 | 19.3.0 |
| 2025-06 | CT#108 | CP-251104 | 1572 |   | F | Corrections to Payload Headers notification                                                               | 19.3.0 |
| 2025-06 | CT#108 | CP-251086 | 1573 |   | B | Adding cause NF for Signalling Storm analytics                                                            | 19.3.0 |
| 2025-06 | CT#108 | CP-251091 | 1574 | 1 | B | Energy indicator for BDT policy                                                                           | 19.3.0 |
| 2025-06 | CT#108 | CP-251091 | 1575 |   | B | periodic reporting of Energy consumption information                                                      | 19.3.0 |
| 2025-06 | CT#108 | CP-251084 | 1576 |   | F | Corrections to GMEC                                                                                       | 19.3.0 |
| 2025-06 | CT#108 | CP-251102 | 1577 | 1 | B | Completion of non-3gpp device identifier information handling                                             | 19.3.0 |
| 2025-06 | CT#108 | CP-251289 | 1579 | 4 | B | Support of Nnef_VFLNFDISCOVERY Service                                                                    | 19.3.0 |
| 2025-06 | CT#108 | CP-251287 | 1580 | 6 | B | Support of procedure for Nnef_VFLNFDISCOVERY Service                                                      | 19.3.0 |
| 2025-06 | CT#108 | CP-251082 | 1581 |   | F | Corrections on the QoS monitoring and multi-modal service descriptions                                    | 19.3.0 |
| 2025-06 | CT#108 | CP-251080 | 1582 |   | B | Enhancements on the PDU Set QoS in Alternative QoS Profile                                                | 19.3.0 |

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| 2025-06 | CT#108 | CP-251080 | 1583 | 2 | B | Support of the available data rate exposure                                               | 19.3.0 |
| 2025-06 | CT#108 | CP-251084 | 1584 |   | F | Correction to the incorrect description of the boolean type for the mandatory attribute   | 19.3.0 |
| 2025-06 | CT#108 | CP-251095 | 1585 | 1 | B | Updates to UAVFlightAssistance API                                                        | 19.3.0 |
| 2025-06 | CT#108 | CP-251091 | 1586 | 1 | B | Resolving EN on UE QoS flow                                                               | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1587 | 3 | B | Updates to IMS Event                                                                      | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1588 | 2 | B | Resolving EN on ImsData                                                                   | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1589 |   | F | ImsSessionManagement API service operation update                                         | 19.3.0 |
| 2025-06 | CT#108 | CP-251098 | 1590 | 1 | B | Update the QME reporting                                                                  | 19.3.0 |
| 2025-06 | CT#108 | CP-251080 | 1591 | 1 | B | Complete the on-path N6 signaling procedure                                               | 19.3.0 |
| 2025-06 | CT#108 | CP-251098 | 1593 |   | F | Updates on the Qos monitoring capability                                                  | 19.3.0 |
| 2025-06 | CT#108 | CP-251091 | 1594 | 1 | F | Support for Time Window                                                                   | 19.3.0 |
| 2025-06 | CT#108 | CP-251085 | 1595 | 1 | F | Replacing the incorrect NF Service Consumer terminology by AF                             | 19.3.0 |
| 2025-06 | CT#108 | CP-251085 | 1596 | 1 | F | Further corrections to the service specific parameter provisioning procedures description | 19.3.0 |
| 2025-06 | CT#108 | CP-251084 | 1597 |   | F | Clarifying the description of the candidate DNAI related boolean attributes               | 19.3.0 |
| 2025-06 | CT#108 | CP-251095 | 1599 |   | F | Correct the OpenAPI definition of the UAVFlightAssistNotifResp data type                  | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1600 | 2 | F | Update of Nnef_ImsEventExposure data structure                                            | 19.3.0 |
| 2025-06 | CT#108 | CP-251085 | 1603 | 1 | D | Corrections on table of reused data types                                                 | 19.3.0 |
| 2025-06 | CT#108 | CP-251083 | 1605 | 2 | F | Clarify the applicability of the candDnaiInd attribute                                    | 19.3.0 |
| 2025-06 | CT#108 | CP-251081 | 1606 | 1 | B | Complete the Expedited Transfer indication                                                | 19.3.0 |
| 2025-06 | CT#108 | CP-251080 | 1607 |   | B | Correct the feature name for the rate limit reporting                                     | 19.3.0 |
| 2025-06 | CT#108 | CP-251249 | 1608 | 3 | B | UE policy delivery outcome handling                                                       | 19.3.0 |
| 2025-06 | CT#108 | CP-251085 | 1610 | 1 | F | Corrections of HTTP methods                                                               | 19.3.0 |
| 2025-06 | CT#108 | CP-251089 | 1611 | 1 | B | Support of UE group ID in the Relative proximity statistics                               | 19.3.0 |
| 2025-06 | CT#108 | CP-251081 | 1612 |   | B | Enhancements on Data Rate Limitation Information for Non-GBR service data flow            | 19.3.0 |
| 2025-06 | CT#108 | CP-251095 | 1613 | 1 | B | Support altitude reporting failure in the notification                                    | 19.3.0 |
| 2025-06 | CT#108 | CP-251097 | 1616 | 1 | A | Corrections on the data type of the attribute                                             | 19.3.0 |
| 2025-06 | CT#108 | CP-251099 | 1619 |   | A | Correction to misplaced disperReqs attribute in AnalyticsExposure API                     | 19.3.0 |
| 2025-06 | CT#108 | CP-251097 | 1622 | 1 | A | Data type corrections to policyDuration attribute in AMPolicyAuthorization API            | 19.3.0 |
| 2025-06 | CT#108 | CP-251085 | 1623 | 1 | F | Corrections to OpenAPI file of EASDeployment API                                          | 19.3.0 |
| 2025-06 | CT#108 | CP-251084 | 1624 |   | F | Correction to AfResultStatus data type in TrafficInfluence API                            | 19.3.0 |
| 2025-06 | CT#108 | CP-251084 | 1625 |   | F | Correction to repPeriod support for eLCS in MonitoringEventSubscription                   | 19.3.0 |
| 2025-06 | CT#108 | CP-251084 | 1626 |   | F | Correction to PatchItem in MBS Session                                                    | 19.3.0 |
| 2025-06 | CT#108 | CP-251242 | 1627 | 1 | F | Corrections to OpenAPI file of UAVFlightAssistance API                                    | 19.3.0 |
| 2025-06 | CT#108 | CP-251095 | 1628 | 1 | B | Support to stop altitude reporting in UAVFlightAssistance API                             | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1630 | 1 | B | Support reporting requirement and immediate report in ImsEventExposure API                | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1631 | 1 | B | Updates API definitions in ImsSessionManagement API                                       | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1632 | 1 | B | OpenAPI file definition of ImsSessionManagement API                                       | 19.3.0 |
| 2025-06 | CT#108 | CP-251102 | 1634 | 1 | F | Non-3gpp Device Information clarifications                                                | 19.3.0 |
| 2025-06 | CT#108 | CP-251093 | 1635 | 1 | B | IMS Event exposure error handling update                                                  | 19.3.0 |
| 2025-06 | CT#108 | CP-251231 | 1638 |   | F | Update of info and externalDocs fields                                                    | 19.3.0 |
| 2025-09 | CT#109 | CP-252076 | 1641 | 1 | F | Remove the editor's note for for IMS session update procedure                             | 19.4.0 |
| 2025-09 | CT#109 | CP-252076 | 1642 | 1 | F | Add 403 Forbidden application error for Nnef_imsEE_Subscribe operation                    | 19.4.0 |
| 2025-09 | CT#109 | CP-252074 | 1644 | 1 | B | Update Alternative QoS Parameter Set                                                      | 19.4.0 |
| 2025-09 | CT#109 | CP-252070 | 1645 | 1 | B | QoS Monitoring capability report update                                                   | 19.4.0 |
| 2025-09 | CT#109 | CP-252076 | 1647 | 1 | F | Add 403 Forbidden application error for ImsSessionManagement API                          | 19.4.0 |
| 2025-09 | CT#109 | CP-252076 | 1648 |   | B | Supported Features in IMS Session Management and IMS Event Exposure APIs                  | 19.4.0 |
| 2025-09 | CT#109 | CP-252080 | 1651 | 1 | F | Clarification on AF requested slice replacement for individual UE                         | 19.4.0 |
| 2025-09 | CT#109 | CP-252083 | 1654 |   | F | Update of Scope and Abbreviations for AmbientIoT                                          | 19.4.0 |
| 2025-09 | CT#109 | CP-252075 | 1656 | 1 | F | Corrections related to eLCS feature                                                       | 19.4.0 |
| 2025-09 | CT#109 | CP-252083 | 1657 | 1 | F | Update the data type ExtAloTArea                                                          | 19.4.0 |
| 2025-09 | CT#109 | CP-252076 | 1659 | 2 | F | Removal of ExternalGroupid usage in ImsParamProvision API                                 | 19.4.0 |
| 2025-09 | CT#109 | CP-252202 | 1662 | 2 | B | Notification URI in IMS Session Management API                                            | 19.4.0 |
| 2025-09 | CT#109 | CP-252209 | 1664 | 2 | B | Definition of Northbound Nnef_VFLInference                                                | 19.4.0 |
| 2025-09 | CT#109 | CP-252072 | 1665 | 1 | B | Nnef_VFLTraining service operation descriptions                                           | 19.4.0 |
| 2025-09 | CT#109 | CP-252072 | 1666 | 1 | B | Nnef_VFLTraining data model                                                               | 19.4.0 |
| 2025-09 | CT#109 | CP-252072 | 1667 | 1 | B | Nnef_VFLTraining OpenAPI                                                                  | 19.4.0 |
| 2025-09 | CT#109 | CP-252072 | 1668 | 1 | B | Nnef_VFLInference service operation descriptions                                          | 19.4.0 |
| 2025-09 | CT#109 | CP-252104 | 1672 |   | A | Wrong data type                                                                           | 19.4.0 |
| 2025-09 | CT#109 | CP-252082 | 1673 | 1 | B | Last known location in UE Mobility exposure                                               | 19.4.0 |
| 2025-09 | CT#109 | CP-252073 | 1674 | 1 | B | Correction of Service Coverage requests and notifications                                 | 19.4.0 |

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| 2025-09 | CT#109 | CP-252101 | 1675 | 2 | F | Clarifying the usage of application identifiers for non-3gpp device info   | 19.4.0 |
| 2025-09 | CT#109 | CP-252075 | 1677 |   | F | Correction of the applicability of Af service id and DNN and S-NSSAI       | 19.4.0 |
| 2025-09 | CT#109 | CP-252080 | 1678 | 1 | B | Correction of SliceReplReqInfoRm data type                                 | 19.4.0 |
| 2025-09 | CT#109 | CP-252083 | 1679 |   | F | Complete the definition of the general clauses of the Nnef_AIoT API        | 19.4.0 |
| 2025-09 | CT#109 | CP-252083 | 1680 | 1 | B | Complete the definition of the Nnef_AIoT_Inventory service operation       | 19.4.0 |
| 2025-09 | CT#109 | CP-252083 | 1681 | 1 | B | Complete the definition of the Nnef_AIoT_Command service operation         | 19.4.0 |
| 2025-09 | CT#109 | CP-252083 | 1682 | 1 | B | Complete the definition of the Nnef_AIoT_Notify service operation          | 19.4.0 |
| 2025-09 | CT#109 | CP-252075 | 1683 | 1 | F | Correct the incorrect references to TS 29.501 in some OpenAPI descriptions | 19.4.0 |
| 2025-09 | CT#109 | CP-252077 | 1684 | 1 | B | Updates and corrections to Energy Consumption information exposure         | 19.4.0 |
| 2025-09 | CT#109 | CP-252076 | 1685 | 1 | F | Updates and corrections to the new IMS related NEF APIs                    | 19.4.0 |
| 2025-09 | CT#109 | CP-252076 | 1686 | 1 | F | Missing changes in the agreed C3-252532                                    | 19.4.0 |
| 2025-09 | CT#109 | CP-252075 | 1687 | 1 | F | Corrections to Supported Features                                          | 19.4.0 |
| 2025-09 | CT#109 | CP-252075 | 1688 | 1 | B | Updates to UAV feature in MonitoringEvent API                              | 19.4.0 |
| 2025-09 | CT#109 | CP-252074 | 1690 | 1 | B | Support RAT Type Exposure for PDU Session                                  | 19.4.0 |
| 2025-09 | CT#109 | CP-252070 | 1692 | 1 | B | Complete error handling for XRM_Ph2                                        | 19.4.0 |
| 2025-09 | CT#109 | CP-252071 | 1693 | 1 | B | Update the multiplexed media information over NEF interface                | 19.4.0 |
| 2025-09 | CT#109 | CP-252076 | 1694 | 1 | F | Correction on ImsSessionManagement API                                     | 19.4.0 |
| 2025-09 | CT#109 | CP-252076 | 1695 |   | F | Corrections to PATCH in ImsParamProvision API                              | 19.4.0 |
| 2025-09 | CT#109 | CP-252076 | 1696 | 1 | F | Corrections to ImsEESubsc data type                                        | 19.4.0 |
| 2025-09 | CT#109 | CP-252076 | 1697 |   | F | Corrections to ImsData data type                                           | 19.4.0 |
| 2025-09 | CT#109 | CP-252100 | 1698 |   | F | Updates and corrections to the UAVFlightAssistance API definition          | 19.4.0 |
| 2025-09 | CT#109 | CP-252071 | 1699 | 1 | B | Support of reporting the QoS notification event with direction information | 19.4.0 |
| 2025-09 | CT#109 | CP-252070 | 1700 | 1 | F | Corrections on the feature name                                            | 19.4.0 |
| 2025-09 | CT#109 | CP-252072 | 1705 |   | B | Correction and completion of VFLNFDiscovers impacts                        | 19.4.0 |
| 2025-09 | CT#109 | CP-252113 | 1706 |   | F | Update of info and externalDocs fields                                     | 19.4.0 |



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# History

| Version | Date          | Status      |
|---------|---------------|-------------|
| V19.4.0 | February 2026 | Publication |
|         |               |             |
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