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Foreword

This Technical Specification has been produced by the 3rd 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:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies the protocol that is used for service based interface. The API definitions and data type definitions are aligned with the common charging architecture specified in TS 32.240 [1]. The present document is related to other 3GPP charging TSs as follows:

- The common 3GPP charging architecture is specified in TS 32.240 [1].
- The 5G data connectivity charging is specified in TS 32.255 [30].
- The 5G connection and mobility charging is specified in TS 32.256 [31].
- The service, operations and procedures of 5G charging for service based interface is specified in TS 32.290 [58].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition of the 5G System are specified in 3GPP TS 29.500 [299] and 3GPP TS 29.501 [300].

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*.

- [1] 3GPP TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".
- [2] - [13] Void.
- [14] 3GPP TS 32.254: "Telecommunication management; Charging management; Exposure function Northbound Application Program Interfaces (APIs) charging".
- [15] - [28] Void.
- [29] 3GPP TS 32.274: "Telecommunication management; Charging management; Short Message Service (SMS) charging".
- [30] 3GPP TS 32.255: "Telecommunication management; Charging management; 5G Data connectivity domain charging; stage 2".
- [31] 3GPP TS 32.256: "Telecommunication management; Charging management; 5G connection and mobility domain charging; stage 2".
- [32] 3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".
- [33] 3GPP TS 32.275: "Telecommunication management; Charging management; MultiMedia Telephony (MMTel) charging".
- [34] 3GPP TS 32.281: "Telecommunication management; Charging management; Announcement".
- [35] 3GPP TS 32.277: "Telecommunication management; Charging management; Proximity-based Services (ProSe) charging".
- [36] 3GPP TS 32.257: "Telecommunication management; Charging management; Edge computing domain charging; stage 2".

- [37] - [49] Void.
- [50] - [57] Void.
- [58] 3GPP TS 32.290: "Telecommunication management; Charging management; 5G system; Services, operations and procedures of charging using Service Based Interface (SBI).
- [59] - [69] Void.[70] 3GPP TS 28.201: "Charging management; Network slice performance and analytics charging in the 5G System (5GS); Stage 2".
- [71] 3GPP TS 28.202: "Charging management; Network slice management charging in the 5G System (5GS); Stage 2".
- [72] - [99] Void.
- [100] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [101] 3GPP TR 21.900: "Technical Specification Group working methods".
- [102] 3GPP TS 24.605: "Conference (CONF) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".
- [103] - [199] Void
- [200] - [252] Void
- [253] 3GPP TS 28.532: "Management and orchestration; Management services".
- [254] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".
- [255] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".
- [256] 3GPP TS 28.554: "Management and orchestration;5G end to end Key Performance Indicators (KPI)".
- [257] 3GPP TS 28.623: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions".
- [258] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP; Stage 3".
- [259] 3GPP TS 29.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL); CAMEL Application Part (CAP) specification".
- [260] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx and Dx interface; signalling flows and message contents".
- [261] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [262] 3GPP TS 28.550: "Management and orchestration; Performance assurance ".
- [263] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements ".
- [264] - [298] Void
- [299] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [300] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [301] 3GPP TS 29.594: "5G System; Spending Limit Control Service; Stage 3".
- [302] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".
- [303] 3GPP TS 24.501: "Non-Access-Stratum (NAS) Protocol for 5G System (5GS); Stage 3".
- [304] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

- [305] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".
- [306] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".
- [307] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".
- [308] 3GPP TS 24.334: " Proximity-services (ProSe) User Equipment (UE) to ProSe function protocol aspects; Stage 3".
- [309] 3GPP TS 29.558: "Enabling Edge Applications; Application Programming Interface (API) specification; stage 3".
- [310] 3GPP TS 28.538: "Management and orchestration; Edge Computing Management".
- [311] 3GPP TS 24.558: "Enabling Edge Applications; Protocol specification".
- [312] - [370] Void
- [371] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [372] - [389] Void
- [390] 3GPP TS 33.501: "Security architecture and procedures for 5G System".
- [391] - [399] Void
- [400] Void.
- [401] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2) ".
- [402] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format ".
- [403] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [404] IETF RFC 3986: "Uniform Resource Identifiers (URI): Generic Syntax".
- [405] IETF RFC 7315: "Private Extensions to the Session Initiation Protocol (SIP) for the 3rd Generation Partnership Projects (3GPP)".
- [406] IETF RFC 3261: "SIP: Session Initiation Protocol".
- [407] IETF RFC 8866: "SDP: Session Description Protocol".
- [408] IETF RFC 5646: "Tags for Identifying Languages".
- [409] - [499] Void.
- [500] OpenAPI: "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>.
- [501] - [599] Void.

3 Definitions, symbols 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 [100].

3.2 Symbols

For the purposes of the present document, the following symbols apply:

Nchf Service based interface exhibited by CHF.

3.3 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].

| | |
|-------|---|
| AF | Application Function |
| AMF | Access and Mobility Management Function |
| ATSSS | Access Traffic Steering, Switching, Splitting |
| CHF | Charging Function |
| CEF | Charging Enablement Function |
| CTF | Charging Trigger Function |
| GPSI | Generic Public Subscription Identifier |
| GUAMI | Globally Unique AMF Identifier |
| I-SMF | Intermediate SMF |
| MnS | Management Service |
| NF | Network Function |
| PEI | Permanent Equipment Identifier |
| QBC | QoS flow Based Charging |
| QFI | QoS Flow Identifier |
| SMSF | Short Message Service Function |
| SMF | Session Management Function |
| SSC | Session and Service Continuity |
| SUPI | Subscription Permanent Identifier |

4 Overview

4.1 Service architecture

The Converged Charging Service or Offline Only Charging Service is provided by the CHF to the consumer and shown in the SBI representation model in figure 4.1.1.

The ConvergedCharging Service (Nchf_ConvergedCharging) or Offline Only Charging Service (Nchf_OfflineOnlyCharging) is part of the Nchf service-based interface exhibited by the Charging Function (CHF). The list of NF Service Consumer(s) is provided in Table 5.1-1.

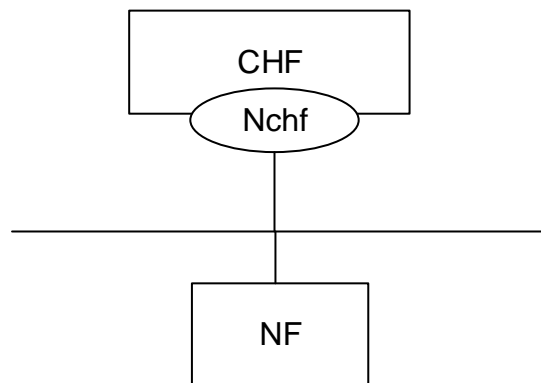


Figure 4.1.1: Reference Architecture for the Nchf_ConvergedCharging Service; SBI representation

4.2 Network functions

4.2.1 Charging Function (CHF)

The CHF is responsible for converged online charging and offline charging functionalities. The CHF provides the following:

- Quota;
- Re-authorisation triggers;
- Notification when Charging Domain determines rating conditions is affected or when CHF determines to terminate the charging service;
- Receiving service usage reports from NF Service Consumer; and
- CDRs generation.

4.2.2 NF Service Consumers

The NF Service Consumers shall support:

- Requesting and receiving the quota(s);
- Sending service usage reports; and
- Handling quota re-authorisation or abort notifications.

5 Services offered by the CHF

5.1 Introduction

The following services are provided by the CHF.

Table 5.1-1: NF Services provided by CHF

| Service Name | Description | Consumer |
|----------------------------------|--|---|
| Nchf_ConvergedCharging service | This service provides a converged charging for session and event based NF services, with and without quota management, as well as charging information record generation | SMF, SMSF, AMF, NEF, PGW-C+SMF, IMS-Node, CEF, MnS Producer, 5G DDNMF |
| Nchf_OfflineOnlyCharging service | This service provides an offline only charging for session based NF service. | SMF |
| Nchf_SpendingLimitControl | This service enables the PCF to retrieve policy counter status information per UE from the CHF by subscribing to spending limit reporting (i.e. notifications of policy counter status changes). | PCF |

The "Nchf_SpendingLimitControl" service is defined in 29.594 [301].

5.2 Nchf_ConvergedCharging service

5.2.1 Service description

This service provides charging in converged charging scenario by the CHF to the NF service consumer as defined in subclause 6.2 in 3GPP TS 32.290[58].

It includes the following functionalities:

- Create resource at service establishment or no existing ChargingData resource, and may allocate quotas based on the request from NF consumer;
- During the service consumption lifecycle, update resource upon receiving the quota usage or service usage report under a number of circumstances and allocate subsequent quotas based on the request from NF consumer;
- Release upon service termination, Unit Count Inactivity Timer expiry or error response; and
- Notify NF Service Consumer of the re-authorisation triggers when CHF determines rating conditions is affected, or the abort triggers when CHF determines to terminate the charging service.
- Charging information record generation

5.2.2 Service operations

5.2.2.1 Introduction

The service operations defined for Nchf_ConvergedCharging are shown in table 5.2.2.1-1.

Table 5.2.2.1-1: Nchf_ConvergedCharging Operations

| Service Operation Name | Description | Initiated by | Corresponding Converged charging messages in 3GPP TS 32.290[58] |
|--------------------------------|--|--------------|---|
| Nchf_ConvergedCharging_Create | First Interrogation of unit reservation; And/or initial report of service usage. | NF consumer | Charging Data Request/Response [Initial] |
| | One Time request for the service. | | Charging Data Request/Response [Event] |
| Nchf_ConvergedCharging_Update | Intermediate Interrogation for subsequent units reservation when: <ul style="list-style-type: none"> - the granted service unitfor one rating group are spent - expiry of granted service units validity time - service events occur, which might affect the rating of the current service And/or Intermediate report of service usage. | NF consumer | Charging Data Request/Response [Update] |
| Nchf_ConvergedCharging_Release | Final Interrogation without any unit reservation And/or last report of service usage. | NF consumer | Charging Data Request/Response [Termination] |
| Nchf_ConvergedCharging_Notify | Request that the user be re-authorized or the charging session context be terminated. | CHF | Charging Notify Request/Response |

5.2.2.2 Nchf_ConvergedCharging_Create Operation

The Nchf_ConvergedCharging_Create service operation provides means for NF (CTF) to request quotas for service delivery or initial report of service usage.

The following procedures using the Nchf_ConvergedCharging_Create service operation are supported:

- No existing charging data resource.

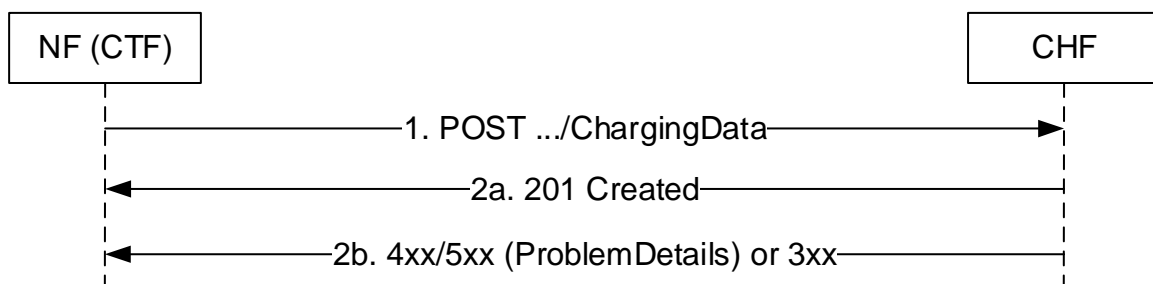


Figure 5.2.2.2-1: Nchf_ConvergedCharging_Create Service Operation

1. NF (CTF) sends a Nchf_ConvergedCharging_Create request to the CHF to create resource for charging.
Requested quota and notification URI for Nchf_ConvergedCharging_Notify service operation are included in the request body.
- 2a. At successful operation, "201 Created" response is returned. In the "201 Created" response, the CHF includes a Location header field and the allocated quota in the body. The Location header field shall contain the URI of the created resource. The NF (CTF) shall use the URI received in the Location header in subsequent requests to the CHF for the same PDU session.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

5.2.2.3 Nchf_ConvergedCharging_Update Operation

The Nchf_ConvergedCharging_Update service operation provides means for NF (CTF) to update the charging data.

The following procedures using the Nchf_ConvergedCharging_Update service operation are supported:

- the granted service units for one rating group are spent
- expiry of granted service units' validity time
- charging events occur, which might affect the rating of the current service
- receiving re-authorization notification from CHF

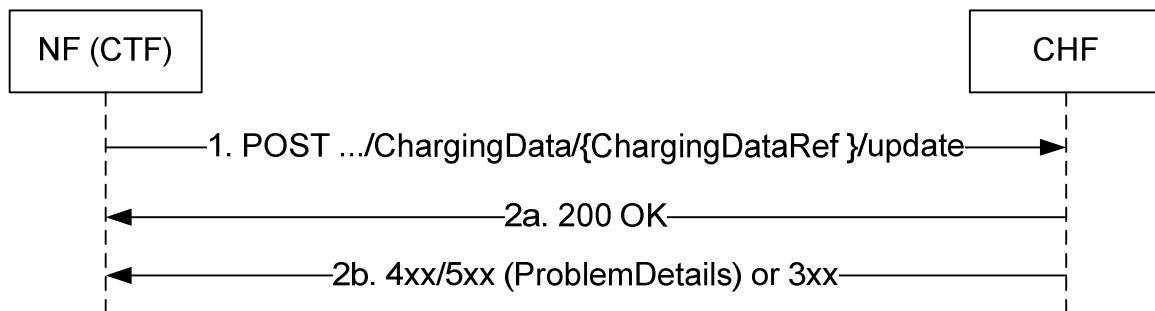


Figure 5.2.2.3-1: Nchf_ConvergedCharging_Update Service Operation

1. NF (CTF) sends a Nchf_ConvergedCharging_Update request to the CHF. The {ChargingDataRef } in the URI identifies the "Charging Data" to be updated. The requested service unit and previous used service unit is included in the request body.
- 2a. At successful operation, "200 OK" response is returned. The CHF includes the granted service unit in the "200 OK" response.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

5.2.2.4 Nchf_ConvergedCharging_Release Operation

The Nchf_ConvergedCharging_Release service operation provides means for NF (CTF) to terminate charging Session.

The following procedures using the Nchf_ConvergedCharging_Release service operation are supported:

- Expiry of unit count inactivity timer in NF Consumer.
- Abort notification is received from CHF.

- Service termination in NF Consumer.

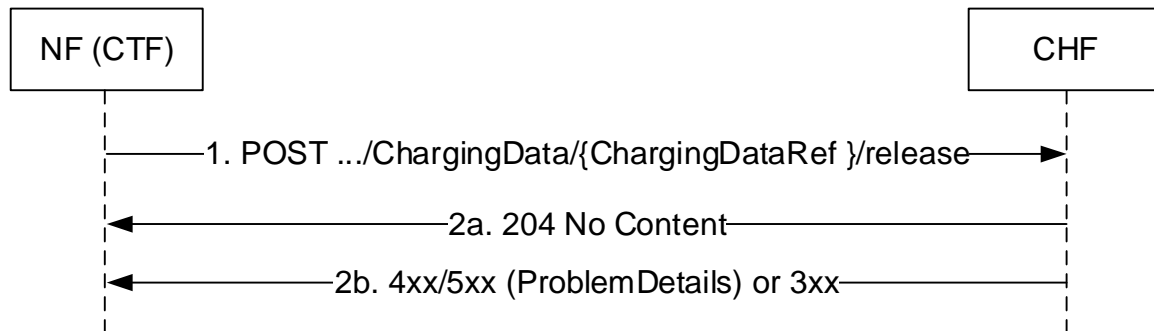


Figure 5.2.2.4-1: Nchf_ConvergedCharging_Release Service Operation

1. NF(CTF) sends a Nchf_ConvergedCharging_Release request to the CHF. The {ChargingDataRef} in the URI identifies the "Charging Data" to be updated and then released. The final used service unit is included in the request body.
- 2a. At successful operation, "204 No Content" response is returned.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.4.3.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

5.2.2.5 Nchf_ConvergedCharging_Notify Operation

The Nchf_ConvergedCharging_Notify service operation provides means for CHF to notify the NF(CTF) to update or terminate charging of the PDU Session.

The following procedures using the Nchf_ConvergedCharging_Notify service operation are supported:

- CHF determines re-authorization.
- CHF determines abort of charging.

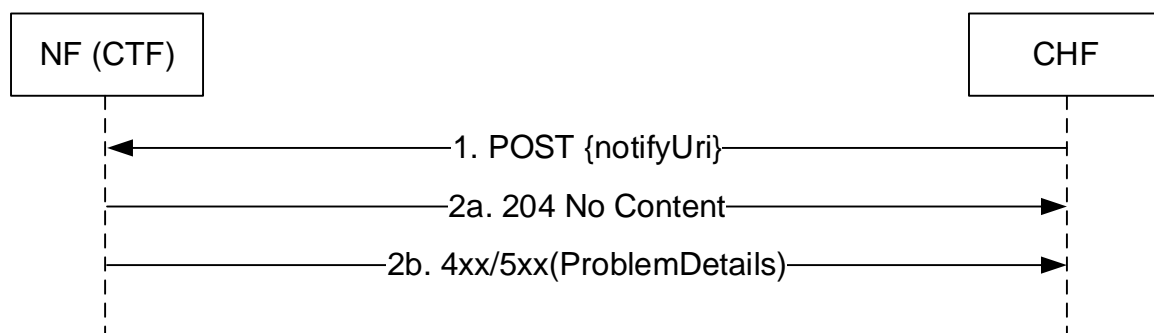


Figure 5.2.2.5-1: Nchf_ConvergedCharging_Notify Service Operation

1. The CHF sends a Nchf_ConvergedCharging_Notify request to the NF (CTF). The {notifyUri} identifies the notification URI which is sent in the Nchf_ConvergedCharging_Create and can be sent in Nchf_ConvergedCharging_Update request. The notification type is included in the request body.
- 2a. At successful operation, "204 No Content" response is returned.

- 2b. On failure , one of the HTTP status code listed in Table 6.1.5.2.3.1-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

After successful operation, when the NF Service Consumer receives a Charging Notify Request while not waiting for any Charging Data Response from the CHF, CTF can send a new Charging Data Request.

5.3 Nchf_OfflineOnlyCharging service

5.3.1 Service description

This service provides charging in offline only charging scenario by the CHF to the NF service consumer (i.e. SMF) as defined in subclause 6.5 in 3GPP TS 32.290 [58].

It includes the following functionalities:

- Create resource at service establishment based on the request from NF consumer;
- During the service consumption lifecycle, update resource based on the request from NF consumer;
- Release upon service termination;
- Charging information record generation.

5.3.2 Service Operations

5.3.2.1 Introduction

The service operations defined for Nchf_OfflineOnlyCharging are shown in table 5.3.2.1-1.

Table 5.3.2.1-1: Nchf_OfflineOnlyCharging Operations

| Service Operation Name | Description | Initiated by | Corresponding Offline only charging messages in 3GPP TS 32.290[58] |
|----------------------------------|---------------------------------------|--------------|--|
| Nchf_OfflineOnlyCharging_Create | Initial report of service usage. | NF consumer | Charging Data Request/Response [Initial] |
| Nchf_OfflineOnlyCharging_Update | Intermediate report of service usage. | NF consumer | Charging Data Request/Response [Update] |
| Nchf_OfflineOnlyCharging_Release | Last report of service usage. | NF consumer | Charging Data Request/Response [Termination] |

5.3.2.2 Nchf_OfflineOnlyCharging_Create Operation

The Nchf_OfflineOnlyCharging_Create operation provides means for NF (CTF) to request initial report of service usage.

The following procedures using the Nchf_OfflineOnlyCharging_Create service operation are supported:

- No existing charging data resource.

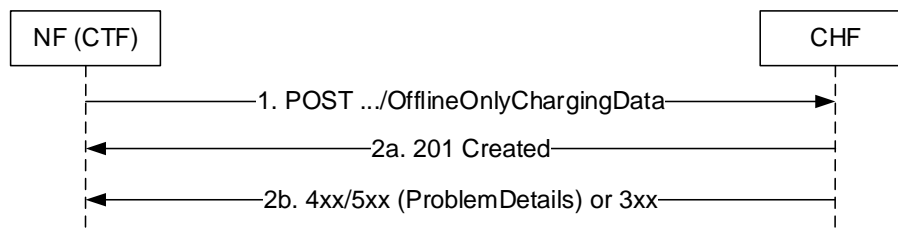


Figure 5.3.2.2-1: Nchf_OfflineOnlyCharging_Create Service Operation

1. NF (CTF) sends a Nchf_OfflineOnlyCharging_Create request to the CHF to create resource for starting charging.
- 2a. At successful operation, "201 Created" response is returned. In the "201 Created" response, the CHF includes a Location header field in the body. The Location header field shall contain the URI of the created resource. The NF (CTF) shall use the URI received in the Location header in subsequent requests to the CHF for the same PDU session.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.2.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.2.7.3-1.

5.3.2.3 Nchf_OfflineOnlyCharging_Update Operation

The Nchf_OfflineOnlyCharging_Update operation provides means for NF (CTF) to update the charging data.

The following procedures using the Nchf_OfflineOnlyCharging_Update service operation are supported:

- charging events occur.

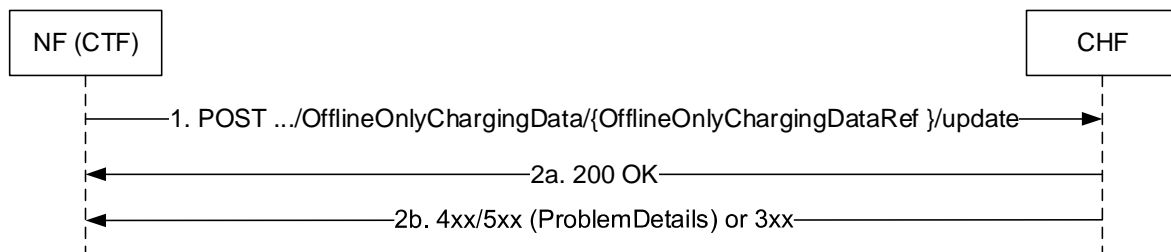


Figure 5.3.2.3-1: Nchf_OfflineOnlyCharging_Update Service Operation

1. NF (CTF) sends a Nchf_OfflineOnlyCharging_Update request to the CHF. The {OfflineChargingDataRef} in the URI identifies the "Offline Only Charging Data" to be updated. The used service unit is included in the request body.
- 2a. At successful operation, "200 OK" response is returned.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.2.3.3.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.2.7.3-1.

5.3.2.4 Nchf_OfflineOnlyCharging_Release Operation

The Nchf_OfflineOnlyCharging_Release service operation provides means for NF (CTF) to terminate charging Session.

The following procedures using the Nchf_OfflineOnlyCharging_Release service operation are supported.

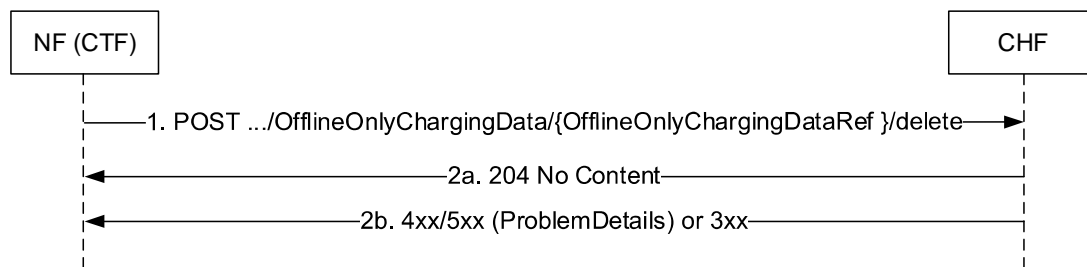


Figure 5.3.2.4-1: Nchf_OfflineOnlyCharging_Release Service Operation

1. NF(CTF) sends a Nchf_OfflineOnlyCharging_Release request to the CHF. The {OfflineChargingDataRef} in the URI identifies the "Offline Only Charging Data" to be updated and then released. The final used service unit is included in the request body.
- 2a. At successful operation, "204 No Content" response is returned.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.2.3.3.4.3.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.2.7.3-1.

6 API definitions

6.1 Nchf_ConvergedCharging Service API

6.1.1 Introduction

The APIs defined in this subclause implement the service operation defined in subclause 5.2.2.

The Nchf_ConvergedCharging service shall use the Nchf_ConvergedCharging API.

The request URI used in each HTTP request from the NF service consumer towards the CHF shall have the structure defined in subclause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

{apiRoot}/{apiName}/{apiVersion}/{apiSpecificResourceUriPart}

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The {apiName} shall be "nchf-convergedcharging".
- The {apiVersion} shall be "v3".
- The {apiSpecificResourceUriPart} shall be set as described in subclause 6.1.3.

6.1.2 Usage of HTTP

6.1.2.1 General

HTTP/2 as described in IETF RFC 7540 [401] shall be used as specified in subclause 5.2 of 3GPP TS 29.500 [299].

6.1.2.2 HTTP standard headers

6.1.2.2.1 General

See subclause 5.2.2 of 3GPP TS 29.500 [299] for the usage of HTTP standard headers.

HTTP/2, shall be transported as specified in subclause 5.3 of 3GPP TS 29.500 [299].

6.1.2.2.2 Content type

JSON, IETF RFC 8259 [402], shall be used as content type of the HTTP bodies specified in the present specification, as specified in subclause 5.4 of 3GPP TS 29.500 [299].

6.1.2.3 HTTP custom headers

6.1.2.3.1 General

HTTP custom headers specified in clause 5.2.3.2 of 3GPP TS 29.500 [299] shall be supported, and Optional HTTP custom headers specified in clause 5.2.3.3 of TS 29.500[299] may be supported

No specific custom headers are defined in the present document.

6.1.3 Resources

6.1.3.1 Overview

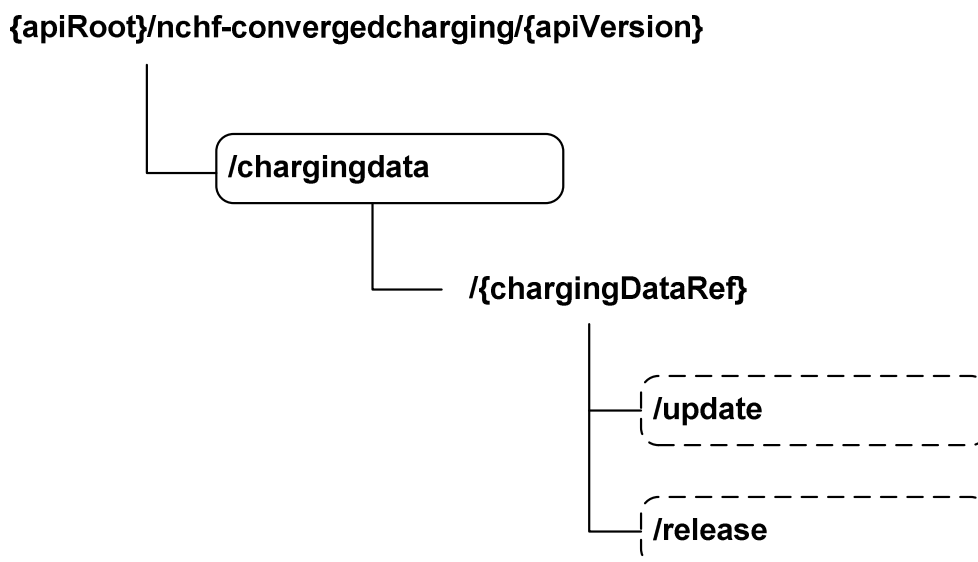


Figure 6.1.3.1-1: Resource URI structure of the Nchf_ConvergedCharging API

Charging Data Ref is a unique identifier for a charging data resource in a PLMN. It's created in CHF when CHF receives a Nchf_ConvergedCharging_Create request and provided to NF (CTF) in the Location header field in the Nchf_ConvergedCharging_Create response. The NF (CTF) shall use the Charging Data Ref received in subsequent requests to the CHF for the same charging data resource.

Table 6.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.1.3.1-1: Resources and methods overview

| Resource name | Resource URI | HTTP method or custom operation | Description | Corresponding service operation |
|--------------------------|---|---------------------------------|--|---------------------------------|
| Charging Data | {apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata | POST | Create a new Charging Data resource | Nchf_ConvergedCharging_Create |
| Individual Charging Data | {apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata/{ChargingDataRef}/update | update (POST) | Update an existing Charging Data resource. | Nchf_ConvergedCharging_Update |
| | {apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata /{ChargingDataRef}/release | release (POST) | Update and release an existing Charging Data resource. | Nchf_ConvergedCharging_Release |

6.1.3.2 Resource: Charging Data

6.1.3.2.1 Description

Charging Data resource represents a collection of the different charging data resources created by the CHF for converged charging as defined in 3GPP TS 32.290 [58].

6.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nchf-convergedcharging/{apiVersion}/chargingData**

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.1.3.2.2-1: Resource URI variables for this resource

| Name | Definition |
|---------|---------------------|
| apiRoot | See subclause 6.1.1 |

6.1.3.2.3 Resource Standard Methods

6.1.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

Table 6.1.3.2.3.1-1: URI query parameters supported by the POST method on this resource

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a | | | | |

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

Table 6.1.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|---------------------|---|-------------|--|
| ChargingDataRequest | M | 1 | Parameters to create a new Charging Data resource. |

Table 6.1.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|---------------------------|--|
| ChargingDataResponse | M | 1 | 201 Created | The creation of a Charging Data resource is confirmed, and a representation of that resource is returned. The Charging Data resource which is created and returned successfully. The representation of created resource is identified via Location header field in the 201 response. |
| n/a | | | 307 Temporary Redirect | Dependent on support of ES3XX (NOTE 2) |
| n/a | | | 308 Permanent Redirect | Dependent on support of ES3XX (NOTE 2) |
| ProblemDetails | O | 0..1 | 400 Bad Request | Dependent on support of ES4XX (NOTE 2) |
| ChargingDataResponse | O | 0..1 | 400 Bad Request | Dependent on support of ES4XX (NOTE 2) |
| n/a | | | 401 Unauthorized | (NOTE 2) |
| ProblemDetails | O | 0..1 | 403 Forbidden | Dependent on support of ES4XX (NOTE 2) |
| ChargingDataResponse | O | 0..1 | 403 Forbidden | Dependent on support of ES4XX (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | Dependent on support of ES4XX (NOTE 2) |
| ChargingDataResponse | O | 0..1 | 404 Not Found | Dependent on support of ES4XX (NOTE 2) |
| n/a | | | 405 Method Not Allowed | (NOTE 2) |
| n/a | | | 408 Request Timeout | (NOTE 2) |
| n/a | | | 410 Gone | (NOTE 2) |
| n/a | | | 411 Length Required | (NOTE 2) |
| n/a | | | 413 Payload Too Large | (NOTE 2) |
| n/a | | | 500 Internal Server Error | (NOTE 2) |
| n/a | | | 503 Service Unavailable | (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply. | | | | |
| NOTE 2: Failure cases are described in clause 6.1.7. | | | | |

Table 6.1.3.2.3.1-4: 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}/nchf-convergedcharging/{apiversion}/chargingdata/{chargingDataRef} |

Table 6.1.3.2.3.1-5: 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 CHF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | String | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

Table 6.1.3.2.3.1-6: 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 CHF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

6.1.3.2.4 Resource Custom Operations

None.

6.1.3.3 Resource: Individual Charging Data

6.1.3.3.1 Description

Individual Charging Data resource represents a Charging data resource created in the CHF.

6.1.3.3.2 Resource Definition

Resource URI: **{apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata/{ChargingDataRef}**

This resource shall support the resource URI variables defined in table 6.1.3.3.2-1.

Table 6.1.3.3.2-1: Resource URI variables for this resource

| Name | Definition |
|-----------------|--|
| apiRoot | See subclause 6.1.1 |
| ChargingDataRef | Charging data resource reference assigned by the CHF during the Nchf_ConvergedCharging_Create operation, |

6.1.3.3.3 Resource Standard Methods

None.

6.1.3.3.4 Resource Custom Operations

6.1.3.3.4.1 Overview

Table 6.1.3.3.4.1-1: Custom operations

| Custom operation URI | Mapped HTTP method | Description |
|---|--------------------|--|
| {apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata/{ChargingDataRef}/update | POST | Update an existing Charging Data resource. |
| {apiRoot}/nchf-convergedcharging/{apiVersion}/chargingdata/{ChargingDataRef}/release | POST | Update and release an existing Charging Data resource. |

6.1.3.3.4.2 Operation: update

6.1.3.3.4.2.1 Description

This operation updates an existing Charging Data resource.

6.1.3.3.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.3.3.4.2.2-1 and the response data structures and response codes specified in table 6.1.3.3.4.2.2-2.

Table 6.1.3.3.4.2.2-1: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|---------------------|---|-------------|--|
| ChargingDataRequest | M | 1 | Parameters to modify an existing Charging Data resource matching the ChargingDataRef according to the representation in the ChargingData. The request URI is the representation in the Location header field in the 201 response of resource creation. |

Table 6.1.3.3.4.2.2-2: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|----------------------|---|-------------|---------------------------|---|
| ChargingDataResponse | M | 1 | 200 OK | The modification of a Charging Data resource is confirmed, and a representation of that resource is returned. The Charging Data resource which is modified and returned successfully. |
| n/a | | | 307 Temporary Redirect | Dependent on support of ES3XX (NOTE 2) |
| n/a | | | 308 Permanent Redirect | Dependent on support of ES3XX (NOTE 2) |
| ProblemDetails | O | 0..1 | 400 Bad Request | Dependent on support of ES4XX (NOTE 2) |
| ChargingDataResponse | O | 0..1 | 400 Bad Request | Dependent on support of ES4XX (NOTE 2) |
| n/a | | | 401 Unauthorized | (NOTE 2) |
| ProblemDetails | O | 0..1 | 403 Forbidden | Dependent on support of ES4XX (NOTE 2) |
| ChargingDataResponse | O | 0..1 | 403 Forbidden | Dependent on support of ES4XX (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | Dependent on support of ES4XX (NOTE 2) |
| ChargingDataResponse | O | 0..1 | 404 Not Found | Dependent on support of ES4XX (NOTE 2) |
| n/a | | | 405 Method Not Allowed | (NOTE 2) |
| n/a | | | 408 Request Timeout | (NOTE 2) |
| n/a | | | 410 Gone | (NOTE 2) |
| n/a | | | 411 Length Required | (NOTE 2) |
| n/a | | | 413 Payload Too Large | (NOTE 2) |
| n/a | | | 500 Internal Server Error | (NOTE 2) |
| n/a | | | 503 Service Unavailable | (NOTE 2) |

NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.

NOTE 2: Failure cases are described in clause 6.1.7.

Table 6.1.3.3.4.2.2-3: 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 CHF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

Table 6.1.3.3.4.2.2-4: 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 CHF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

6.1.3.3.4.3 Operation: release

6.1.3.3.4.3.1 Description

This operation update and release an existing Charging session

6.1.3.3.4.3.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.3.3.4.3.2-1 and the response data structures and response codes specified in table 6.1.3.3.4.3.2-2.

Table 6.1.3.3.4.3.2-1: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|---------------------|---|-------------|--|
| ChargingDataRequest | M | 1 | Parameters to modify and then release the Charging Data resource matching the ChargingDataRef according to the representation in the ChargingData. The request URI is the representation in the Location header field in the 201 response of resource creation. |

Table 6.1.3.3.4.3.2-2: 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 Charging Data resource matching the ChargingDataRef is modified and then released. |
| n/a | | | 401 Unauthorized | (NOTE 2) |
| n/a | | | 307 Temporary Redirect | Dependent on support of ES3XX (NOTE 2) |
| n/a | | | 308 Permanent Redirect | Dependent on support of ES3XX (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | Dependent on support of ES4XX (NOTE 2) |
| ChargingDataResponse | O | 0..1 | 404 Not Found | Dependent on support of ES4XX (NOTE 2) |
| n/a | | | 410 Gone | (NOTE 2) |
| n/a | | | 411 Length Required | (NOTE 2) |
| n/a | | | 413 Payload Too Large | (NOTE 2) |
| n/a | | | 500 Internal Server Error | (NOTE 2) |
| n/a | | | 503 Service Unavailable | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of TS 29.500 [4] also apply. | | | | |
| NOTE 2: Failure cases are described in clause 6.1.7. | | | | |

Table 6.1.3.3.4.3.2-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|--|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative CHF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

Table 6.1.3.3.4.3.2-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|--|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative CHF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

6.1.4 Custom Operations without associated resources

None.

6.1.5 Notifications

6.1.5.1 General

Notifications shall comply to subclause 6.2 of 3GPP TS 29.500 [299] and subclause 4.6.2.3 of 3GPP TS 29.501 [300].

6.1.5.2 Event Notification

6.1.5.2.1 Description

The Notification is used by the CHF to notify NF consumers , which implements the Nchf_ConvergedCharging_Notify operation defined in 3GPP TS 32.290 [58].

6.1.5.2.2 Target URI

The Notification URI "{**notifyUri**}" shall be used with the resource URI variables defined in table 6.1.5.2.2-1.

Table 6.1.5.2.2-1: Resource URI variables for this resource

| Name | Definition |
|-----------|---|
| notifyUri | String formatted as URI with the Notification URI is provided by the SMF during the creation and can be provided in update of the Charging Data resource and within the ChargingData type, as defined in subclause 6.1.6. |

6.1.5.2.3 Standard Methods

6.1.5.2.3.1 POST

This method shall support the request data structures specified in table 6.1.5.2.3.1-1 and the response data structures and response codes specified in table 6.1.5.2.3.1-2.

Table 6.1.5.2.3.1-1: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|-----------------------|---|-------------|---|
| ChargingNotifyRequest | M | 1 | Provides Information about active Charging events. ChargingNotifyRequest data type is defined in subclause 6.1.6. |

Table 6.1.5.2.3.1-2: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|------------------------|---|
| ChargingNotifyResponse | O | 0..1 | 200 | The receipt of the notification acknowledged, with information. Dependent on support of NotifyInfoResponse |
| n/a | | | 204 No Content | The receipt of the notification is acknowledged, without information. |
| n/a | | | 307 Temporary Redirect | Dependent on support of ES3XX (NOTE 2) |
| n/a | | | 308 Permanent Redirect | Dependent on support of ES3XX (NOTE 2) |
| ProblemDetails | O | 0..1 | 400 Bad Request | Dependent on support of NotifyInfoResponse (NOTE 2) |
| ChargingNotifyResponse | O | 0..1 | 400 Bad Request | Dependent on support of NotifyInfoResponse (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply. | | | | |
| NOTE 2: Failure cases are described in clause 6.1.7. | | | | |

Table 6.1.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|--|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

Table 6.1.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|--|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative NF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

6.1.6 Data Model

6.1.6.1 General

This subclause specifies the application data model supported by the API.

The Nchf_ConvergedCharging Service API allows the NF consumer to consume the converged charging service from the CHF as defined in 3GPP TS 32.290 [58].

Table 6.1.6.1-1 specifies the data types defined for the ConvergedCharging service based interface protocol.

Table 6.1.6.1-1: Nchf_ConvergedCharging specific Data Types

| Data type | Section defined | Description | Applicability |
|------------------------|----------------------------|---|----------------------|
| ChargingDataRequest | 6.1.6.2.1.1 6.1.6.2.2.1 | Describes the attributes of Charging Data Request to CHF for initial, update and termination of the charging session. | |
| ChargingDataResponse | 6.1.6.2.1.2 6.1.6.2.2.2 | Describes the attributes of Charging Data Response from CHF on charging session initial, update and termination. | |
| ChargingNotifyRequest | 6.1.6.2.1.3 | Describes Notifications about events that occurred in request message. | |
| ChargingNotifyResponse | 6.1.6.2.1.16 | Describes the response of notification. | |

Table 6.1.6.1-2 specifies data types re-used by the Nchf_ConvergedCharging 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 Nchf_ConvergedCharging service based interface.

Table 6.1.6.1-2: Nchf_ConvergedCharging re-used Data Types

| Data type | Reference | Comments | Applicability |
|-----------------------|----------------------|--|---------------|
| Supi | 3GPP TS 29.571 [371] | The identification of the user (i.e. IMSI, NAI, GLI, GCI). (NOTE 1) | |
| Uint32 | 3GPP TS 29.571 [371] | Unsigned 32-bit integers | |
| Uint64 | 3GPP TS 29.571 [371] | Unsigned 64-bit integers | |
| PduSessionId | 3GPP TS 29.571 [371] | The identification of the PDU session. | |
| PduSessionType | 3GPP TS 29.571 [371] | the type of a PDU session | |
| Uri | 3GPP TS 29.571 [371] | String providing an URI | |
| AccessType | 3GPP TS 29.571 [371] | The identification of the type of access network. | |
| DateTime | 3GPP TS 29.571 [371] | The time. | |
| ChargingId | 3GPP TS 29.571 [371] | Charging identifier allowing correlation of charging information | |
| RatType | 3GPP TS 29.571 [371] | The identification of the RAT type. | |
| RatingGroup | 3GPP TS 29.571 [371] | The identification of the rating group | |
| IpAddr | 3GPP TS 29.571 [371] | Ipv4 address, Ipv6 address, or Ipv6Prefix | |
| Ipv4Addr | 3GPP TS 29.571 [371] | Ipv4 address. | |
| Ipv6Prefix | 3GPP TS 29.571 [371] | The Ipv6 prefix allocated for the user. | |
| Ipv6Addr | 3GPP TS 29.571 [371] | Ipv6 Address. | |
| Pei | 3GPP TS 29.571 [371] | The Identification of a Permanent Equipment. | |
| TimeZone | 3GPP TS 29.571 [371] | Time zone information | |
| NfInstanceId | 3GPP TS 29.571 [371] | String uniquely identifying a NF instance. | |
| Gpsi | 3GPP TS 29.571 [371] | String identifying a Gpsi | |
| DefaultQosInformation | 3GPP TS 29.571 [371] | Identifies the information of the default QoS. | |
| SubscribedDefaultQos | 3GPP TS 29.571 [371] | subscribed default QoS. | |
| AuthorizedDefaultQos | 3GPP TS 29.512 [302] | Authorized default QoS. | |
| Ambr | 3GPP TS 29.571 [371] | Aggregate Maximum Bit rate | |
| QosData | 3GPP TS 29.512 [302] | Contains QoS parameters | |
| UserLocation | 3GPP TS 29.571 [371] | User location information | |
| PlmnId | 3GPP TS 29.571 [371] | PLMN id | |
| Guami | 3GPP TS 29.571 [371] | Globally Unique AMF Identifier | |
| DurationSec | 3GPP TS 29.571 [371] | Identifies a period of time in units of seconds. | |
| Snssai | 3GPP TS 29.571 [371] | SNSSAI | |

| | | | |
|------------------------|----------------------|--|------------------------|
| ProblemDetails | 3GPP TS 29.571 [371] | additional details of the error | |
| ServiceId | 3GPP TS 29.571 [371] | Identifier of service | |
| SscMode | 3GPP TS 29.571 [371] | SSC Mode type | |
| PresenceInfo | 3GPP TS 29.571 [371] | PRA information including PRAId, PRA element list and PRA status | |
| Qfi | 3GPP TS 29.571 [371] | QoS flow identifier designated as "Qfi". | |
| AmfId | 3GPP TS 29.571 [371] | AMF identifier | |
| Dnn | 3GPP TS 29.571 [371] | Data Network Name | |
| GroupId | 3GPP TS 29.571 [371] | Network internal Identifier for a group of IMSIs | |
| ExternalGroupId | 3GPP TS 29.571 [371] | External Group Identifier for one or more subscriptions associated to a group of IMSIs | |
| Bytes | 3GPP TS 29.571 [371] | String with format "byte" | |
| Tai | 3GPP TS 29.571 [371] | Tracking Area Identifier | |
| Area | 3GPP TS 29.571 [371] | List of TACs or Operator specific codes | |
| CoreNetworkType | 3GPP TS 29.571 [371] | 5GC or EPC | |
| ServiceAreaRestriction | 3GPP TS 29.571 [371] | Service Area restriction | |
| GlobalRanNodeId | 3GPP TS 29.571 [371] | Global RAN Node Id | |
| QosCharacteristics | 3GPP TS 29.512 [302] | Map of QoS characteristics for non standard 5QIs and non-preconfigured 5QIs. | |
| SupportedFeatures | 3GPP TS 29.571 [371] | See TS 29.500 [299] clause 6.6 | |
| NsiLoadLevelInfo | 3GPP TS 29.520 [306] | Represents the load level information for an S-NSSAI and the associated network slice instance | |
| ServiceExperienceInfo | 3GPP TS 29.520 [306] | ServiceExperience | |
| ApplicationChargingId | 3GPP TS 29.571 [371] | Application provided charging identifier allowing correlation of charging information. | AF_Charging_Identifier |
| SharingLevel | 3GPP TS 28.541 [254] | Ressources sharing level | |
| MobilityLevel | 3GPP TS 28.541 [254] | UE mobility Level | |
| SsT | 3GPP TS 28.541 [254] | Slice Service type (SST) | |
| Support | 3GPP TS 28.541 [254] | Supported, Not Supported indicator | |
| Float | 3GPP TS 29.571 [371] | Number with format "float" | |
| MaPduIndication | 3GPP TS 29.512 [302] | MA PDU session indication | ATSSS |

| | | | |
|---|----------------------|--|---------------------|
| AtsssCapability | 3GPP TS 29.571 [371] | ATSSS capabilities | ATSSS |
| SteeringFunctionality | 3GPP TS 29.571 [371] | Steering functionalities for MA PDU session | ATSSS |
| SteeringMode | 3GPP TS 29.512 [302] | Steering mode for MA PDU session | ATSSS |
| OperationalState | 3GPP TS 28.623 [257] | Operational state | |
| AdministrativeState | 3GPP TS 28.623 [257] | Administrative state | |
| RanNasRelCause | 3GPP TS 29.512 [302] | Indicates the RAN or NAS release cause code information. | EnhancedDiagnostics |
| Ecgi | 3GPP TS 29.571 [371] | E-UTRA Cell Id | |
| Ncgi | 3GPP TS 29.571 [371] | NR Cell Id | |
| ServingLocation | 3GPP TS 28.538 [310] | Serving location | Edge Computing |
| SoftwareImageInfo | 3GPP TS 28.538 [310] | Software image information | Edge Computing |
| AffinityAntiAffinity | 3GPP TS 28.538 [310] | Affinity and anti-requirements | Edge Computing |
| VirtualResource | 3GPP TS 28.538 [310] | Virtual resource requirements | Edge Computing |
| NOTE 1: A SUPI containing GLI or GCI is used to support 5G-RG and FN-RG in scenarios of wireline network. | | | |

6.1.6.2 Structured data types

6.1.6.2.1 Common Data Type

6.1.6.2.1.1 Type ChargingDataRequest

Table 6.1.6.2.1.1-1: Definition of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|--------------------------|----------------|-------------|--|---------------|
| subscriberIdentifier | Supi | O _M | 0..1 | Identifier of the subscriber that uses the requested service. | |
| nfConsumerIdentification | NFIdentification | M | 1 | This is a grouped field which contains a set of information identifying the NF consumer of the charging service. | |
| chargingId | ChargingId | O _M | 0..1 | Charging identifier for correlation between different records. Only applicable if not available in the service specific information. | |
| invocationTimeStamp | DateTime | M | 1 | The time at which the request is send | |
| invocationSequenceNumber | Uint32 | M | 1 | This field contains the sequence number of the charging service invocation by the NF consumer, i.e. the order of charging data requests. The sequence number in charging data request [initial] starts from 1, and increased by 1 for subsequent charging data request. It is allowed to start from 0 for backwards compatibility. | |
| retransmissionIndicator | boolean | O _C | 0..1 | This field indicates, if included, this is a retransmitted request message. | |
| oneTimeEvent | boolean | O _C | 0..1 | Indicates, if included, that this is event based charging and whether this is a one-time event. If true, this is a one-time event that there will be no update or release. | |
| oneTimeEventType | EventType | O _C | 0..1 | Indicates the type of the one time event, i.e. Immediate or Post event charging. | |
| notifyUri | Uri | O _C | 0..1 | Identifies the recipient of Notifications sent by the CHF. In case of session based charging it shall be present in create request message, and may be present in update. | |
| supportedFeatures | SupportedFeatures | O _C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.1.8 is supported. | |
| serviceSpecificationInfo | String | O _C | 0..1 | Identifies service specific document that applies to the request, e.g. the service specific document ('middle tier' TS) and 3GPP release the service specific document is based upon. | |
| multipleUnitUsage | array(MultipleUnitUsage) | O _C | 0..N | This field contains the parameters for the quota management request and/or usage reporting. | |
| triggers | array(Trigger) | O _C | 0..N | This field identifies the event(s) triggering the request. | |

6.1.6.2.1.2 Type ChargingDataResponse

Table 6.1.6.2.1.2-1: Definition of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|--------------------------------|----------------|-------------|---|---------------|
| invocationTimestamp | DateTime | M | 1 | This field holds the timestamp of the charging service response from the CHF. | |
| invocationResult | InvocationResult | O _C | 0..1 | This field holds the result of charging service invocation by the NF consumer | |
| invocationSequenceNumber | Uint32 | M | 1 | This field contains the sequence number of the charging service invocation by the NF consumer. The same value of the sequence number received in the request should be used in the response | |
| sessionFailover | SessionFailover | O _C | 0..1 | This field indicates whether alternative CHF is supported for ongoing charging service failover handling by NF consumer. | |
| supportedFeatures | SupportedFeatures | O _C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.1.8 is supported. | |
| multipleUnitInformation | array(MultipleUnitInformation) | O _C | 0..N | This field holds the parameters for the quota management and/or usage reporting information. It may have multiple occurrences. | |
| triggers | array(Trigger) | O _C | 0..N | This field identifies the chargeable event(s) supplied by CHF to override/activate the existing chargeable event(s) in NF consumer. The presence of the triggers attribute without any triggerType is used by CHF to disable all the triggers except rating group level triggers. | |

6.1.6.2.1.3 Type ChargingNotifyRequest

Table 6.1.6.2.1.3-1: Definition of type ChargingNotifyRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------|-------------------------------|----------------|-------------|---|---------------|
| notificationType | NotificationType | M | 1 | Type of notification to indicate re-authorization or termination. | |
| reauthorizationDetails | array(ReauthorizationDetails) | O _C | 0..N | descriptors for re-authorization to determine which quota or usage reporting to be updated. | |

6.1.6.2.1.4 Type NFIdentification

Table 6.1.6.2.1.4-1: Definition of type NFIdentification

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------|-------------------|----------------|-------------|--|---------------|
| nodeFunctionality | NodeFunctionality | M | 1 | This field contains the function of the node. | |
| nFName | NfInstanceId | O _C | 0..1 | Identifier of NF instance. At least one of the nFName or nFIPv4Address or nFIPv6Address shall be present. | |
| nFIPv4Address | Ipv4Addr | O _C | 0..1 | The IPv4 address of the NF. At least one of the nFName or nFIPv4Address or nFIPv6Address shall be present. | |
| nFIPv6Address | Ipv6Addr | O _C | 0..1 | The IPv6 address of the NF. At least one of the nFName or nFIPv4Address or nFIPv6Address shall be present. | |
| nFFqdn | string | O _C | 0..1 | FQDN of the NF | |
| nFPLMNID | PlmnId | O _C | 0..1 | This field holds the PLMN ID of the network the NF belongs to. | |

6.1.6.2.1.5 Type MultipleUnitUsage

Table 6.1.6.2.1.5-1: Definition of type MultipleUnitUsage

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------|--------------------------|----------------|-------------|--|---------------|
| ratingGroup | RatingGroup | M | 1 | The identifier of a rating group. | |
| requestedUnit | RequestedUnit | O _C | 0..1 | This field indicates that quota management is required, and may contain the amount of requested service units. (See TS 32.290 [58] clause 7) | |
| usedUnitContainer | array(UsedUnitContainer) | O _C | 0..N | This field contains the amount of used non-monetary service units measured. | |

6.1.6.2.1.6

Type InvocationResult

Table 6.1.6.2.1.6-1: Definition of type InvocationResult

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------|-----------------|----|-------------|--|---------------|
| error | ProblemDetails | Oc | 0..1 | More information on the error shall be provided in the "cause" attribute of the "ProblemDetails" structure in case of unsuccessful charging service invocation by the NF consumer. The "invalidParams" attribute of the "ProblemDetails" structure shall contain invalid parameters which caused the rejection. | |
| failureHandling | FailureHandling | Oc | 0..1 | This field holds the failure handling to be performed by the NF consumer when charging service invocation is temporarily prevented. The provided value shall always override any already existing value in NF consumer. In case of failure, it indicates which action to be performed by the NF consumer. In case of success, it indicates which action to be performed by the NF consumer in case subsequent charging service invocation are temporarily prevented. | |

6.1.6.2.1.7

Type Trigger

Table 6.1.6.2.1.7-1: Definition of type Trigger

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------|-----------------|----------------|-------------|--|---------------|
| triggerType | TriggerType | O _C | 0..1 | the events whose occurrence lead to charging event is issued towards the CHF | |
| triggerCategory | TriggerCategory | M | 1 | This field indicates whether the charging data generated by the NF consumer for the trigger lead to a Charging Event towards the CHF immediately or not. | |
| timeLimit | DurationSec | O _C | 0..1 | Time limit if trigger type is "Expiry of data time limit" | |
| volumeLimit | Uint32 | O _C | 0..1 | Volume limit if trigger type is "Expiry of data volume limit". This attribute is not valid from Nchf_ ConvergedCharging API version v2.0.0 | |
| volumeLimit64 | Uint64 | O _C | 0..1 | Volume limit if trigger type is "Expiry of data volume limit". This attribute replaces the volumeLimit attribute from Nchf_ ConvergedCharging API v2.0.0 | |
| eventLimit | Uint32 | O _C | 0..1 | Event limit if trigger type is "Expiry of data event limit". | |
| maxNumberOfcc | Uint32 | O _C | 0..1 | Maximum number if trigger type is "Max nb of number of charging condition changes" | |
| tariffTimeChange | DateTime | O _C | 0..1 | This field contains UTC time indicating the switch time when the tariff will be changed. | |

6.1.6.2.1.8 Type MultipleUnitInformation

Table 6.1.6.2.1.8-1: Definition of type MultipleUnitInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------|---------------------|----|-------------|--|---------------|
| resultCode | ResultCode | Oc | 0..1 | This field contains the result of the Rating group quota allocation. | |
| ratingGroup | RatingGroup | M | 1 | The identifier of a rating group. | |
| grantedUnit | GrantedUnit | Oc | 0..1 | This field holds the granted quota. | |
| triggers | array(Trigger) | Oc | 0..N | This field holds triggers for usage reporting associated to the rating group, which is supplied from the CHF. The presence of the triggers attribute without any triggerType is used by CHF to disable all the triggers to the associated rating group. | |
| validityTime | DurationSec | Oc | 0..1 | This field defines the time in order to limit the validity of the granted quota for a given category instance. | |
| quotaHoldingTime | DurationSec | Oc | 0..1 | This field holds the quota holding time in seconds. It applies equally to the granted time quota and to the granted volume quota. The NF Consumer shall deem a quota to have expired when no traffic associated with the quota is observed for the value indicated by this attribute. A quotaHoldingTime value of zero indicates that this mechanism shall not be used. If the quotaHoldingTime attribute is not present, then a locally configurable default value in the NF Consumer shall be used. | |
| finalUnitIndication | FinalUnitIndication | Oc | 0..1 | This field indicates the granted final units for the service. | |
| timeQuotaThreshold | integer | Oc | 0..1 | indicates the threshold in seconds for the granted time quota. | |
| volumeQuotaThreshold | Uint64 | Oc | 0..1 | indicates the threshold in octets when the granted quota is volume | |
| unitQuotaThreshold | integer | Oc | 0..1 | indicates the threshold in service specific units, that are defined in the service specific documents, when the granted quota is service specific | |

6.1.6.2.1.9 Type RequestedUnit

Table 6.1.6.2.1.9-1: Definition of type RequestedUnit

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|-----------|----------------|-------------|---|---------------|
| time | Uint32 | O _C | 0..1 | This field holds the amount of requested time (seconds). | |
| totalVolume | Uint64 | O _C | 0..1 | This field holds the amount of requested volume (bytes) in both uplink and downlink directions. | |
| uplinkVolume | Uint64 | O _C | 0..1 | This field holds the amount of requested volume (bytes) in uplink direction. | |
| downlinkVolume | Uint64 | O _C | 0..1 | This field holds the amount of requested volume (bytes) in downlink direction. | |
| serviceSpecificUnits | Uint64 | O _C | 0..1 | This field holds the amount of requested service specific units. | |
| NOTE: If no attribute is included i.e., "RequestedUnit": {}, the category and amount is determined by CHF, online charging with centralized unit determination and rating scenario. | | | | | |

6.1.6.2.1.10 Type UsedUnitContainer

Table 6.1.6.2.1.10-1: Definition of type UsedUnitContainer

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|--------------------------|----------------|-------------|--|---------------|
| serviceId | ServiceId | O _C | 0..1 | This field identity of the used service | |
| quotaManagementIndicator | QuotaManagementIndicator | O _C | 0..1 | an indicator on whether the reported used units are with or without quota management control. If the attribute is not present, it indicates the used unit is without quota management applied. | |
| triggers | array (Trigger) | O _C | 0..N | This field specifies the reason for usage reporting for one or more types of unit associated to the rating group. | |
| triggerTimestamp | DateTime | O _C | 0..1 | This field holds the timestamp when the reporting trigger occur. | |
| time | Uint32 | O _C | 0..1 | This field holds the amount of used time(seconds). | |
| totalVolume | Uint64 | O _C | 0..1 | This field holds the amount of used volume (bytes) in both uplink and downlink directions. | |
| uplinkVolume | Uint64 | O _C | 0..1 | This field holds the amount of used volume (bytes) in uplink direction. | |
| downlinkVolume | Uint64 | O _C | 0..1 | This field holds the amount of used volume (bytes) in downlink direction. | |
| serviceSpecificUnits | Uint64 | O _C | 0..1 | This field holds the amount of used service specific units. | |
| eventTimestamps | Array(DateTime) | O _C | 0..N | This field holds the timestamps of the event reported in the Service Specific Units, if the reported units are event based | |
| localSequenceNumber | integer | M | 1 | holds the Used Unit sequence number, i.e. the order when charging event occurs. It starts from 1 and increased by 1 for each Used Unit generation. | |

6.1.6.2.1.11 Type GrantedUnit

Table 6.1.6.2.1.11-1: Definition of type GrantedUnit

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------|-----------|----------------|-------------|--|---------------|
| tariffTimeChange | DateTime | O _C | 0..1 | This field contains UTC time indicating the switch time when the tariff will be changed. | |
| time | Uint32 | O _C | 0..1 | This field holds the amount of granted time(seconds). | |
| totalVolume | Uint64 | O _C | 0..1 | This field holds the amount of granted volume(bytes) in both uplink and downlink directions. | |
| uplinkVolume | Uint64 | O _C | 0..1 | This field holds the amount of granted volume (bytes) in uplink direction. | |
| downlinkVolume | Uint64 | O _C | 0..1 | This field holds the amount of granted volume(bytes) in downlink direction. | |
| serviceSpecificUnits | Uint64 | O _C | 0..1 | This field holds the amount of granted requested service specific units. | |

6.1.6.2.1.12 Type FinalUnitIndication

Table 6.1.6.2.1.12-1: Definition of type FinalUnitIndication

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------------|---------------------|----------------|-------------|--|----------------|
| finalUnitAction | FinalUnitAction | M | 1 | indicates to the service consumer the action to be taken when the user's account cannot cover the service cost | |
| restrictionFilterRule | IPFilterRule | O _C | 0..1 | filter rule corresponding to services that are to remain accessible even if there are no more service units granted. | |
| restrictionFilterRuleList | array(IPFilterRule) | O _C | 1..N | used instead of restrictionFilterRule if more than one restrictionFilterRule is needed | FilterRuleList |
| filterId | string | O _C | 0..1 | the IP packet filter corresponding to services that are to remain accessible even if there are no more service units granted. May be used as a reference to a list of IPFilterRules. | |
| filterIdList | array(string) | O _C | 1..N | used instead of filterId if more than one filterId is needed | FilterRuleList |
| redirectServer | RedirectServer | O _C | 0..1 | the address information of the redirect server with which the end user is to be connected when the account cannot cover the service cost. | |

6.1.6.2.1.13 Type RedirectServer

Table 6.1.6.2.1.13-1: Definition of type RedirectServer

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------|---------------------|---|-------------|-------------------------------------|---------------|
| redirectAddressType | RedirectAddressType | M | 1 | The type of redirect server address | |
| redirectServerAddress | string | M | 1 | the address of redirect server | |

6.1.6.2.1.14 Type ReauthorizationDetails

Table 6.1.6.2.1.14-1: Definition of type ReauthorizationDetails

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--|--------------------------|----------------|-------------|--|---------------|
| service | ServiceId | O _C | 0..1 | identifier for a service | |
| ratingGroup | RatingGroup | O _C | 0..1 | identifier of a rating group. This attribute shall be present if serviceIdentifier attribute is present. | |
| quotaManagementIndicator | QuotaManagementIndicator | O _C | 0..1 | an indicator on whether the re-authorization notification is for quota management control or not. | |
| NOTE 1: The service is always applicable for a rating group. If both ratingGroup and quotaManagementIndicator are included, the quotaManagementIndicator is considered to be applicable for that ratingGroup. If all attributes are included, the quotaManagementIndicator is considered to be applicable for that ratingGroup and service combination. If only the quotaManagementIndicator is included, it is applicable for all ratingGroups. | | | | | |

6.1.6.2.1.15 Void

6.1.6.2.1.16 Type ChargingNotifyResponse

Table 6.1.6.2.1.16-1: Definition of type ChargingNotifyResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------|------------------|----------------|-------------|--|---------------|
| invocationResult | InvocationResult | O _C | 0..1 | This field holds the result of notification. | |

6.1.6.2.2 5G Data Connectivity Specified Data Type

6.1.6.2.2.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for 5G data connectivity charging described in 3GPP TS 32.255[30].

Table 6.1.6.2.2.1-1: 5G Data Connectivity Specified attribute of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------------|-------------------------------|----------------|-------------|---|---------------|
| pDUSessionChargingInformation | PDUSessionChargingInformation | O _M | 0..1 | This field holds the 5G data connectivity specific information. | |
| roamingQBCInformation | RoamingQBCInformation | O _M | 0..1 | This field holds the 5G data connectivity specific information roaming QBC. | |

6.1.6.2.2.2 Type ChargingDataResponse

This clause is additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for 5G data connectivity charging described in 3GPP TS 32.255[30].

Table 6.1.6.2.2.2-1: 5G Data Connectivity Specified attribute of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------------|-------------------------------|----------------|-------------|---|---------------|
| pDUSessionChargingInformation | PDUSESSIONCHARGINGINFORMATION | O _M | 0..1 | This field holds the 5G data connectivity specific information. | |
| roamingQBCInformation | ROAMINGQBCINFORMATION | O _M | 0..1 | This field holds the 5G data connectivity specific information roaming QBC. | |

6.1.6.2.2.3 Type MultipleUnitUsage

This clause is additional attributes of the type MultipleUnitUsage defined in clause 6.1.6.2.1.5 for 5G data connectivity charging described in 3GPP TS 32.255[30].

Table 6.1.6.2.2.3-1: 5G Data Connectivity Specified attribute of type MultipleUnitUsage

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------|--------------|----------------|-------------|--|---------------|
| uPFID | NfInstanceId | O _C | 0..1 | identifier of UPF | |
| multihomedPDUAddress | PDUADDRESS | O _C | 0..1 | IPv6 prefix used by UPF. It may only be used for IPv6 multi-homed PDU sessions and then only for reporting used units. | |

6.1.6.2.2.4 Type MultipleUnitInformation

This clause is additional attributes of the type MultipleUnitInformation defined in clause 6.1.6.2.1.8 for 5G data connectivity charging described in 3GPP TS 32.255[30].

Table 6.1.6.2.2.4-1: 5G Data Connectivity Specified attribute of type MultipleUnitInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|--------------|----------------|-------------|-------------|---------------|
| uPFID | NfInstanceId | O _C | 0..1 | UPF id | |

6.1.6.2.2.5 Type UsedUnitContainer

This clause is additional portion of the type UsedUnitContainer defined in clause 6.1.6.2.1.10 for 5G data connectivity charging described in 3GPP TS 32.255[30].

Table 6.1.6.2.2.5-1: 5G Data Connectivity Specified portion of type UsedUnitContainer

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------|-------------------------|----------------|-------------|---|---------------|
| pDUContainerInformation | PDUCONTAINERINFORMATION | O _C | 0..1 | the 5G data connectivity specific information | |

6.1.6.2.2.6 Type PDUSessionChargingInformation

Table 6.1.6.2.2.6-1: Definition of type PDUSessionChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------------------|-----------------------|----------------|-------------|---|-----------------|
| chargingId | ChargingId | O _M | 0..1 | Charging identifier for correlation between different records of a single PDU session | |
| sMFChargingId | string | O _M | 0..1 | Used instead of ChargingId when feature is active. | SMF_Charging_Id |
| homeProvidedChargingId | ChargingId | O _C | 0..1 | Charging identifier for correlation between H-SMF and V-SMF. | |
| sMFHomeProvidedChargingId | string | O _C | 0..1 | Used instead of homeProvidedChargingId when feature is active. | SMF_Charging_Id |
| userInformation | UserInformation | O _M | 0..1 | including information of user and user equipment, | |
| userLocationInfo | UserLocation | O _C | 0..1 | provides information on the location | |
| mAPDUNon3GPPUserLocationInfo | UserLocation | O _C | 0..1 | provides information on the location under the non-3GPP access for the MA PDU session | ATSSS |
| non3GPPUserLocationTime | DateTime | O _C | 0..1 | represents the UTC time provided by the non-3GPP access, and is related to the userLocationTime. This field is only present if the non-3GPP access provides a time. | |
| mAPDUNon3GPPUserLocationTime | DateTime | O _C | 0..1 | represents the UTC time provided by the non-3GPP access, and is related mAPDUNon3GPPUserLocationInfo. This field is only present if the non-3GPP access for the MA PDU session provides a time. | ATSSS |
| presenceReportingAreaInformation | map(PresenceInfo) | O _C | 0..N | When the data type is present in response message, it includes the PRA information provisioned by the CHF, in which case the "presenceState" attribute within the PresenceInfo data type shall not be supplied. When the data type is present in request message, it's used to report user presence reporting area status. The "prald" attribute within the PresenceInfo data type shall be the key of the map. The location related attributes (i.e. "trackingAreaList", "ecgiList", "ncgiList") within the PresenceInfo data type are not required in the request message, and may be ignored by the CHF. | |
| ueTimeZone | TimeZone | O _C | 0..1 | the UE Timezone the UE is currently located | |
| pduSessionInformation | PDUSessionInformation | O _C | 0..1 | PDUSessionInformation, including PDU session ID, PDU type, SSC Mode, QoS, network slicing etc. It needs to be present in the request, but it is optional in the response. | |

| | | | | | |
|----------------------------|----------------------------|----------------|------|---|--|
| unitCountInactivityTimer | DurationSec | O _C | 0..1 | threshold for the time period resource idle Upon the initial interaction with the CHF, the SMF use this attribute to provide pre-configured threshold to CHF. when present in response message, it contains the threshold supplied by CHF in response of initial request to override existing threshold in SMF. It's only present when unit count inactivity timer trigger is active. | |
| rANSecondaryRATUsageReport | RANSecondaryRATUsageReport | O _C | 0..1 | Secondary RAT usage reported from RAN. | |

6.1.6.2.2.7 Type UserInformation

Table 6.1.6.2.2.7-1: Definition of type UserInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------|-------------|----------------|-------------|--|---------------|
| servedGPSI | Gpsi | O _C | 0..1 | the Generic Public Subscription Identifier (GPSI) of the served party, if available. | |
| servedPEI | Pei | O _C | 0..1 | the identification of Permanent Equipment Identifier. | |
| unauthenticatedFlag | boolean | O _C | 0..1 | indicates the served SUPI is not authenticated | |
| roamerInOut | RoamerInOut | O _C | 0..1 | In-bound or Out-bound roamer | |

6.1.6.2.2.8 Type PDUSessionInformation

Table 6.1.6.2.2.8-1: Definition of type PDUSessionInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------------------|--------------------------------------|----------------|-------------|---|---------------------|
| networkSlicingInfo | NetworkSlicingInfo | O _M | 0..1 | information of network slice serving the PDU session | |
| pduSessionID | PduSessionId | M | 1 | | |
| pduType | PduSessionType | O _M | 0..1 | type of the PDU session | |
| sscMode | SscMode | O _C | 0..1 | information of SSC Mode type. | |
| hPlmnId | PlmnId | O _C | 0..1 | PLMN identifier of the home network | |
| servingNetworkFunctionID | ServingNetworkFunctionID | O _C | 0..1 | This field holds serving Network Function identifier. | |
| servingCNPlmnId | PlmnId | O _C | 0..1 | Serving Core Network Operator PLMN ID selected by the UE in shared networks. | |
| ratType | RatType | O _C | 0..1 | the RAT Type of the PDU session | |
| mAPDUon3GPPRATType | RatType | O _C | 0..1 | the RAT Type of non-3GPP access for the MA PDU session | ATSSS |
| dnnId | Dnn | M | 1 | a Data Network Name | |
| dnnSelectionMode | DnnSelectionMode | O _C | 0..1 | This field indicates how the DNN was selected. | |
| chargingCharacteristics | string | O _C | 0..1 | the Charging Characteristics for this PDU session. It carries the value in hexadecimal representation Pattern: '[0-9a-fA-F]{1,4}\$' | |
| chargingCharacteristicsSelectionMode | ChargingCharacteristicsSelectionMode | O _C | 0..1 | information about how the "Charging Characteristics" was selected. | |
| startTime | DateTime | O _C | 0..1 | the UTC time which represents the start of a PDU session at the SMF | |
| stopTime | DateTime | O _C | 0..1 | the UTC time which represents the stop of a PDU session at the SMF | |
| 3gppPSDataOffStatus | 3GPPPSDataOffStatus | O _C | 0..1 | This field holds the 3GPP Data off Status when UE's 3GPP Data Off status is Activated or Deactivated. | |
| sessionStopIndicator | boolean | O _C | 0..1 | This field indicates to the CHF that the PDU session has been terminated. | |
| pduAddress | PDUAddress | O _C | 0..1 | Group of user ip address/prefix | |
| diagnostics | Diagnostics | O _C | 0..1 | provides a detailed cause value from SMF. | |
| enhancedDiagnostics | EnhancedDiagnostics5G | O _C | 0..N | provides a more detailed cause value from SMF. | EnhancedDiagnostics |
| authorizedQoSInformation | AuthorizedDefaultQoS | O _C | 0..1 | This field holds the authorized QoS applied to PDU session. | |
| subscribedQoSInformation | SubscribedDefaultQoS | O _C | 0..1 | This field holds the subscribed Default QoS | |
| authorizedSessionAMBR | Ambr | O _C | 0..1 | This field holds the authorized session-AMBR. | |
| subscribedSessionAMBR | Ambr | O _C | 0..1 | This field holds the subscribed session-AMBR. | |
| mAPDUSessionInformation | MAPDUSessionInformation | O _C | 0..1 | This field holds the MA PDU session information. | ATSSS |
| redundantTransmissionType | RedundantTransmissionType | O _C | 0..1 | Indicates the redundant transmission type. If this field isn't present, it should be seen as a non-redundant transmission. | URLLC |

| | | | | | |
|-------------------------------|------------------|----|------|---|---------|
| pDUSessionPairID | Uint32 | Oc | 0..1 | This field identifies the two redundant PDU Sessions that belong together for dual connectivity based end to end redundant user plane paths type. | URLLC |
| cpCioTOptimizationIndicator | boolean | Oc | 0..1 | This field holds the indicator whether control plane optimization CioT for 5GS is used during the PDU session, if this feature is enabled. The default value is false. | 5GSCioT |
| 5GSControlPlaneOnlyIndicator | boolean | Oc | 0..1 | This field holds the indicator whether the control plane only is used, i.e., the PDU data only transfers to control plane in case of control plane CioT optimization. The default value is false. | 5GSCioT |
| smallDataRateControlIndicator | boolean | Oc | 0..1 | This field holds the indicator whether the small data rate control for 5GS CioT is used during the PDU session. The default value is false. | 5GSCioT |
| 5GLANTypeService | 5GLANTypeService | Oc | 0..1 | 5G LAN Type service information, if present, the 5G LAN Type service is used. | 5GLAN |

6.1.6.2.2.9 Type PDUContainerInformation

Table 6.1.6.2.2.9-1: Definition of type PDUContainerInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------------------|---------------------------------|----|-------------|---|------------------------|
| timeofFirstUsage | DateTime | Oc | 0..1 | the UTC time indicating time stamp for the first IP packet to be transmitted and mapped to the reporting used unit. | |
| timeofLastUsage | DateTime | Oc | 0..1 | the UTC time indicating time stamp for the last IP packet to be transmitted and mapped to the reporting used unit. | |
| qoSInformation | QoSData | Oc | 0..1 | the QoS applied for the reporting used unit. In case gbrUI or gbrDI are present for GBR flow, the GBR targets are "GUARANTEED", otherwise, are "NOT_GUARANTEED". | |
| qoSCharacteristics | QoSCharacteristics | Oc | 0..1 | Map of QoS characteristics for non standard 5QIs and non-preconfigured 5QIs. | |
| afChargingIdentifier | ChargingId | Oc | 0..1 | An identifier, provided from the AF, may be used to correlate the measurement for the Charging key/Service identifier values in this PCC rule with application level reports. | |
| afChargingIdString | ApplicationChargingId | Oc | 0..1 | Used instead of afChargingIdentifier when feature is active. | AF_Charging_Identifier |
| userLocationInformation | UserLocation | Oc | 0..1 | provides information on the location | |
| ueTimeZone | TimeZone | Oc | 0..1 | the UE Time Zone during the used unit container interval. | |
| ratType | RatType | Oc | 0..1 | the RAT Type of the used unit | |
| servingNodeID | array(ServingNetworkFunctionID) | Oc | 0..N | the list of serving node identifiers during the used unit container interval. | |
| presenceReportingAreaInformation | map(PresenceInfo) | Oc | 0..N | the Presence Reporting Area status of UE during the used unit container interval. | |
| 3gppPSDataOffStatus | 3GPPPSDataOffStatus | Oc | 0..1 | the 3GPP Data off Status during the used unit container interval. | |
| sponsorIdentity | string | Oc | 0..1 | an identifier of the sponsor. | |
| applicationServiceProviderIdentity | string | Oc | 0..1 | an identifier of the application service provider | |
| chargingRuleBaseName | string | Oc | 0..1 | the reference to group of PCC rules predefined at the SMF. | |
| mAPDUSteeringFunctionality | SteeringFunctionality | Oc | 0..1 | Steering functionality . | ATSSS |
| mAPDUSteeringMode | SteeringMode | Oc | 0..1 | Steering Mode | ATSSS |
| trafficForwardingWay | TrafficForwardingWay | Oc | 0..1 | This field identifies which traffic forwarding way is used for the 5G LAN VN Group communication. | 5GLAN |
| qoSMonitoringReport | array(QoSMonitoringReport) | Oc | 0..N | This field holds QoS Monitoring reporting information. | QoSMonitoring |

6.1.6.2.2.10 Type NetworkSlicingInfo

Table 6.1.6.2.2.10-1: Definition of type NetworkSlicingInfo

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|---|---------------|
| sNSSAI | Snsasai | M | 1 | Single Network Slice Selection Assistance Information | |

6.1.6.2.2.11 Type PDUAddress

Table 6.1.6.2.2.11-1: Definition of type PDUAddress

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--|-------------------|----------------|-------------|---|---------------|
| pduIPv4Address | Ipv4Addr | O _C | 0..1 | the IPv4 address of the served SUPI allocated for the PDU session | |
| pduIPv6Address withPrefix | Ipv6Addr | O _C | 0..1 | the IPv6 address with prefix of the served SUPI allocated for the PDU session | |
| pduAddressprefix length | integer | O _C | 0..1 | PDU Address prefix length of an IPv6 typed Served PDU Address. The field needs not available for prefix length of 64 bits. | |
| IPv4dynamicAddressFlag | boolean | O _C | 0..1 | This field indicates whether served IPv4 address is dynamically allocated. This field is missing if address is static. | |
| IPv6dynamicPrefixFlag | boolean | O _C | 0..1 | This field indicates whether served IPv6 address prefix is dynamically allocated. This field is missing if address is static. | |
| addIPv6AddrPrefixes | Ipv6Prefix | O _C | 0..1 | One additional IPv6 prefix allocated for the PDU session. May be used when there is only one additional IPv6 address prefix. | |
| addIPv6AddrPrefixList | array(Ipv6Prefix) | O _C | 0..N | List of additional IPv6 prefix allocated for the PDU session. | |
| NOTE 1: If both the addIPv6AddrPrefixList and addIPv6AddrPrefixes are included, the IPv6 address prefix in addIPv6AddrPrefixes is also present in the addIPv6AddrPrefixList. | | | | | |

6.1.6.2.2.12 Type ServingNetworkFunctionID

Table 6.1.6.2.2.12-1: Definition of type ServingNetworkFunctionID

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------------------|------------------|----------------|-------------|--|---------------|
| servingNetworkFunctionInformation | NFIdentification | M | 1 | Serving Network Function information: i.e. AMF, I-SMF, SGW, V-SMF, SGSN or ePDG. For V-SMF, the NFIdentification.nodeFunctionality has the value SMF or V-SMF. | |
| amFId | Amfld | O _C | 0..1 | AMF identifier | |

6.1.6.2.2.13 Type RoamingQBCInformation

Table 6.1.6.2.1.13-1: Definition of type RoamingQBCInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------|-----------------------------|----------------|-------------|--|---------------|
| multipleQFIcontainer | array(MultipleQFIcontainer) | O _C | 0..N | list of QFI containers | |
| uPFID | NfInstanceId | O _C | 0..1 | identifier of UPF, included for backwards compatibility and can be included based on operators requirement | |
| roamingChargingProfile | RoamingChargingProfile | O _C | 0..1 | Roaming Charging Profile associated to the PDU session for roaming QBC. | |

6.1.6.2.2.14 Type MultipleQFIcontainer

Table 6.1.6.2.1.14-1: Definition of type MultipleQFIcontainer

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------|-------------------------|----------------|-------------|---|---------------|
| triggers | array (Trigger) | O _C | 0..N | This field holds reason for closing the QFI unit container. | |
| triggerTimestamp | DateTime | O _C | 0..1 | This field holds the UTC time indicating timestamp when the reporting trigger occur. | |
| time | Uint32 | O _C | 0..1 | This field holds the amount of time. | |
| totalVolume | Uint64 | O _C | 0..1 | This field holds the amount of volume in both uplink and downlink directions. | |
| uplinkVolume | Uint64 | O _C | 0..1 | This field holds the amount of volume in uplink direction. | |
| downlinkVolume | Uint64 | O _C | 0..1 | This field holds the amount of volume in downlink direction. | |
| localSequenceNumber | integer | M | 1 | QFI data container sequence number. It starts from 1 and increased by 1 for each container generation | |
| qFIContainerInformation | QFIContainerInformation | O _C | 0..1 | This field holds the QFI data container information | |

6.1.6.2.2.15 Type RoamingChargingProfile

Table 6.1.6.2.1.15-1: Definition of type RoamingChargingProfile

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------|---------------------|----------------|-------------|--|---------------|
| triggers | array(Trigger) | O _C | 0..N | Trigger for roaming QBC | |
| partialRecordMethod | PartialRecordMethod | O _C | 0..1 | method uses for partial record closure | |

6.1.6.2.2.16 Type QFIContainerInformation

Table 6.1.6.2.1.16-1: Definition of type QFIContainerInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------------------|---------------------------------|----------------|-------------|---|-------------------------|
| qFI | Qfi | O _M | 0..1 | QoS Flow Identifier (QFI) | |
| reportTime | DateTime | M | 1 | the UTC time indicating time stamp when the QFI data container was closed | |
| timeofFirstUsage | DateTime | O _C | 0..1 | the UTC time indicating time stamp for the first IP packet to be transmitted and mapped to the QFI container | |
| timeofLastUsage | DateTime | O _C | 0..1 | the UTC time indicating time stamp for the last IP packet to be transmitted and mapped to the QFI container. | |
| qoSInformation | QoSData | O _C | 0..1 | the QoS applied to QFI container. In case gbrUI or gbrDI are present for GBR QoS flow, the GBR targets are "GUARANTEED", otherwise, are "NOT_GUARANTEED". | |
| qoSCharacteristics | QoSCharacteristics | O _C | 0..1 | Map of QoS characteristics for non standard 5QIs and non-preconfigured 5QIs. | |
| userLocationInformation | UserLocation | O _C | 0..1 | provides information on the location | |
| uetimeZone | TimeZone | O _C | 0..1 | UE Time Zone the UE is currently located | |
| presenceReportingAreaInformation | map(PresenceInfo) | O _C | 0..N | the Presence Reporting Area status of UE during the QFI container interval. | |
| rATType | RatType | O _C | 0..1 | the RAT Type of the used unit | |
| servingNetworkFunctionID | array(ServingNetworkFunctionID) | O _C | 0..N | the list of serving Node Identifiers during the used QFI container interval. | |
| 3gppPSDataOffStatus | 3GPPPSDataOffStatus | O _C | 0..1 | the 3GPP Data off Status during the QFI container interval. | |
| 3gppChargingId | ChargingId | O _C | 0..1 | IP-CAN bearer (or PDP context) Charging identifier used to identify this IP-CAN bearer (or PDP context) in different records created by PGW-C+SMF. Charging Id is generated by PGW at IP-CAN bearer (or PDP context) activation and is included in all containers in order to identify the containers which pertain to the IP-CAN bearer (or PDP context). Only applicable for 5GS and EPS interworking, or GERAN/UTRAN access. | 5GIEPC_CH, TEI17_NIESGU |
| diagnostics | Diagnostics | O _C | 0..1 | provides a more detailed cause value for the release. Only applicable for 5GS and EPS interworking, or GERAN/UTRAN access | 5GIEPC_CH, TEI17_NIESGU |
| enhancedDiagnostics | array(string) | O _C | 0..N | provides a set of causes for the release Only applicable for 5GS and EPS interworking, or GERAN/UTRAN access. | 5GIEPC_CH, TEI17_NIESGU |

6.1.6.2.2.17 Type RANSecondaryRATUsageReport

Table 6.1.6.2.2.17-1: Definition of type RANSecondaryRATUsageReport

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------|----------------------------|----------------|-------------|--|---------------|
| rANSecondaryRATType | RatType | O _M | 0..1 | RAT type associated to the reported usage on secondary RAT. The following values are applicable: - "NR" - "EUTRA" | |
| qosFlowsUsageReports | Array(QosFlowsUsageReport) | O _M | 0..N | list of containers per QFI with volumes reported. | |

6.1.6.2.2.18 Type QosFlowsUsageReport

Table 6.1.6.2.2.18-1: Definition of type QosFlowsUsageReport

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|----------------|-------------|---|---------------|
| qFI | Qfi | O _M | 0..1 | QoS Flow Identifier (QFI) | |
| startTimestamp | DateTime | O _C | 0..1 | Start time of the reported usage | |
| endTimestamp | DateTime | O _C | 0..1 | End time of the reported usage | |
| downlinkVolume | Uint64 | O _C | 0..1 | Amount of volume in downlink direction. | |
| uplinkVolume | Uint64 | O _C | 0..1 | Amount of volume in uplink direction. | |

6.1.6.2.2.19 Type MAPDUSessionInformation

Table 6.1.6.2.2.19-1: Definition of MAPDUSessionInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------|-----------------|----------------|-------------|--|---------------|
| mAPDUSessionIndicator | MaPduIndication | O _C | 0..1 | MA PDU session indication, i.e., MA PDU Request or MA PDU Network-Upgrade Allowed. | ATSSS |
| aTSSSCapability | AtsssCapability | O _C | 0..1 | ATSSS capability | ATSSS |

6.1.6.2.2.20 Type EnhancedDiagnostics5G

Table 6.1.6.2.2.19-1: Definition of EnhancedDiagnostics5G

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------|-----------------------|----------------|-------------|--|---------------------|
| ranNasCauseList | array(RanNasRelCause) | O _M | 0..1 | List of the RAN or NAS release cause code information. | EnhancedDiagnostics |

6.1.6.2.2.1 Type QosMonitoringReport

Table 6.1.6.2.2.1-1: Definition of QosMonitoringReport

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|----------------|----------------|-------------|--|---------------|
| ulDelays | array(integer) | O _C | 0..N | Uplink packet delay in units of milliseconds. (NOTE) | |
| dlDelays | array(integer) | O _C | 0..N | Downlink packet delay in units of milliseconds. (NOTE) | |
| rtDelays | array(integer) | O _C | 0..N | Round trip delay in units of milliseconds. (NOTE) | |
| NOTE: In the present document the maximum number of elements in the array is 2. If more than one value is received at one given point of time for UL packet delay, DL packet delay or round trip packet delay respectively, the NF service consumer reports the minimum and maximum packet delays to the CHF. | | | | | |

6.1.6.2.2.2 Type 5GLANTypeService

Table 6.1.6.2.2.2-1: Definition of type 5GLANTypeService

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------|-----------|---|-------------|------------------------------------|---------------|
| internalGroupIdentifier | GroupId | M | 0..1 | Identifier of the 5G LAN VN group. | |

6.1.6.2.3 SMS Specified Data Type

6.1.6.2.3.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.3.1 for SMS charging described in 3GPP TS 32.274[28].

Table 6.1.6.2.3.1-1: SMS Specified attribute of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------|------------------------|----------------|-------------|---|---------------|
| smsChargingInformation | SMSChargingInformation | O _M | 0..1 | This field holds the SMSspecific information. | |

6.1.6.2.3.2 Type SMSChargingInformation

Table 6.1.6.2.3-2: Definition of type SMSChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------|----------------------|----------------|-------------|---|---------------|
| originatorInfo | OriginatorInfo | O _M | 0..1 | originator of the SM | |
| recipientInfo | Array(RecipientInfo) | O _C | 0..N | recipient information for the SM | |
| userEquipmentInfo | Pei | O _C | 0..1 | the identification of the terminal | |
| roamerInOut | RoamerInOut | O _C | 0..1 | In-bound or Out-bound roamer | |
| userLocationInfo | UserLocation | O _C | 0..1 | provides information on the location | |
| uetimeZone | TimeZone | O _C | 0..1 | the UE Time Zone the UE is currently located | |
| rATType | RatType | O _C | 0..1 | The identification of the RAT type. | |
| sMSCAddress | string | O _M | 0..1 | the address (e.g. E.164) of the SMS-service centre sending the Charging Data Request used for producing the record. (SMSC Address) | |
| sMDataCodingScheme | integer | O _M | 0..1 | the data coding scheme used within the SM. The information to populate this field is obtained from TP-DCS header. | |
| sMMessageType | SMmessageType | O _M | 0..1 | identifies the message that triggered the generation of charging information. | |
| sMReplyPathRequested | ReplyPathRequested | O _C | 0..1 | an indication of whether a reply SM to an original SM was requested to follow the same path as identified by the TP-Reply-Path (TP-RP) flag. | |
| sMUserDataHeader | string | O _C | 0..1 | carries the user data header extracted from the user data of the SM. The user data header (TP-UDH) is specified in TS 23.040 [x]. | |
| sMStatus | string | O _C | 0..1 | the information from the TP-Status field in a Status-Report TPDU. It carries the value in hexadecimal representation Pattern: '[0-7]?[0-9a-fA-F]' | |
| sMDischargeTime | DateTime | O _C | 0..1 | the time associated with the event being reported in the SM Status field. This information is only applicable to delivery report charging procedures. | |
| numberOfMessagesSent | Uint32 | O _C | 0..1 | the number of SMSs sent by the IMS application or the total number of short messages when this SM is part of concatenated short message, if applicable. | |
| sMServiceType | SMSServiceType | O _C | 0..1 | the type of SM service that caused the charging interaction. It is only applicable for SM supplementary service procedures. | |
| sMSequenceNumber | Uint32 | O _C | 0..1 | the sequence number of this SM within the concatenated short message | |

| | | | | | |
|-------------------------|-------------------------|----------------|------|---|--|
| sMSresult | Uint32 | C | 0..1 | the result of the attempted SM transaction, if unsuccessful. This field is only for offline charging. | |
| submissionTime | DateTime | O _C | 0..1 | the timestamp of when the submitted SM arrived at the originating SMS Node | |
| sMpriority | SMPriority | O _C | 0..1 | any priority information associated with an SM | |
| messageReference | string | O _M | 0..1 | the identity used to identify an SM in the SMS node associated with entity that submitted it | |
| messageSize | Uint32 | O _M | 0..1 | the total number of short messages when this SM is part of concatenated short message | |
| messageClass | MessageClass | O _M | 0..1 | implementation dependent the value selected for a specific transaction. | |
| deliveryReportRequested | DeliveryReportRequested | O _C | 0..1 | indicates whether a delivery report is requested by the SM originator | |

6.1.6.2.3.3 Type OriginatorInfo

Table 6.1.6.2.3.3-1: Definition of type OriginatorInfo

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------------|---------------|----------------|-------------|--|---------------|
| originatorSUPI | supi | O _M | 0..1 | SUPI of the originator of the SMS | |
| originatorGPSI | gpsi | O _C | 0..1 | GPSI of the originator of the SMS | |
| originatorOtherAddress | SMAddressInfo | O _M | 0..1 | the address of the recipient of the SM, when different from SUPI and GPSI | |
| originatorReceivedAddress | SMAddressInfo | O _C | 0..1 | original, unmodified address of the originator of the SM, as received by the SMS node, in case address manipulation (such as number plan corrections) have been applied in the SMS node. | |
| originatorSCCPAddress | string | O _C | 0..1 | SCCP calling address used to receive the SM at the SMS node | |
| sMOriginatorInterface | Interface | O _M | 0..1 | Provide the information describing the interface on which the SM was received by the SMS node. | |
| sMOriginatorProtocolId | string | O _C | 0..1 | the protocol used for the SM by originator | |

6.1.6.2.3.4 Type RecipientInfo

Table 6.1.6.2.3.4-1: Definition of type RecipientInfo

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|----------------|----------------|-------------|---|---------------|
| recipientSUPI | supi | O _M | 0..1 | SUPI of the recipient of the SM, as received by the SMS Node | |
| recipientGPSI | gpsi | O _C | 0..1 | GPSI of the recipient of the SM, as received by the SMS Node | |
| recipientOtherAddress | SMAAddressInfo | O _C | 0..1 | the address of the recipient of the SM, as received by the SMS Node, when different from SUPI and GPSI | |
| recipientReceivedAddress | SMAAddressInfo | O _C | 0..1 | original, unmodified address of the recipient of the SM, as received by the SMS node, in case address manipulation (such as number plan corrections) have been applied in the SMS node. | |
| recipientSCCPAddress | string | O _C | 0..1 | SCCP called address used by the SMS node to onward deliver the SM | |
| sMDestinationInterface | SMInterface | O _M | 0..1 | containing information describing the interface on which the SM was requested to be delivered | |
| sMRecipientProtocolId | string | O _C | 0..1 | holds the TP-PROTOCOL-ID (TP-PID) | |

6.1.6.2.3.5 Type SMAAddressInfo

Table 6.1.6.2.3.5-1: Definition of type SMAAddressInfo

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------|------------------|----------------|-------------|---|---------------|
| sMAddressType | SMAAddressType | O _C | 0..1 | the type of address carried | |
| sMAddressData | string | O _C | 0..1 | the address information and formatted according type of address | |
| sMAddressDomain | SMAAddressDomain | O _C | 0..1 | the domain/network to which the associated address resides | |

6.1.6.2.3.6 Type RecipientAddress

Table 6.1.6.2.3.6-1: Definition of type RecipientAddress

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------|------------------|----------------|-------------|--|---------------|
| recipientAddressInfo | SMAAddressInfo | O _C | 0..1 | indicates the type of address carried | |
| sMAddresseeType | SMAAddresseeType | O _C | 0..1 | identifies the how the recipient is addressed in the header of an MM | |

6.1.6.2.3.7 Type MessageClass

Table 6.1.6.2.3.7-1: Definition of type MessageClass

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------|-----------------|----------------|-------------|--------------------------------|---------------|
| classIdentifier | ClassIdentifier | O _c | 0..1 | indicate the class identifier | |
| tokenText | string | O _c | 0..1 | contains extension information | |

6.1.6.2.3.8 Type SMAddressDomain

Table 6.1.6.2.3.8-1: Definition of type SMAddressDomain

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|----------------|-------------|--|---------------|
| domainName | string | O _c | 0..1 | represents a fully qualified domain name (FQDN). | |
| 3GPPIMSIMCCMNC | string | O _c | 0..1 | MCC and MNC extracted from the user's IMSI (first 5 or 6 digits, as applicable from the presented IMSI). | |

6.1.6.2.3.9 Type SMInterface

Table 6.1.6.2.3.9-1: Definition of type SMInterface

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|---------------|----------------|-------------|---|---------------|
| interfaceId | string | O _c | 0..1 | the interface identification provided by the messaging node (originator/destination). | |
| interfaceText | string | O _c | 0..1 | It is the consolidation information about the application associated with the charging event | |
| interfacePort | string | O _c | 0..1 | the port-identification or contains information about the transport layer port used by the application associated with the charging event | |
| interfaceType | InterfaceType | O _c | 0..1 | type of interface / nature of the transaction in the messaging node for which the charging event occurs | |

6.1.6.2.4 5G connection and mobility Specified Data Type

6.1.6.2.4.1 Type ChargingDataRequest

This clause specifies additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for 5G connection and mobility described in 3GPP TS 32.256 [31].

Table 6.1.6.2.4.1-1: 5G connection and mobility Specified attribute of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------------------|--------------------------------------|----------------|-------------|--|---------------|
| aMFId | AmfId | O _C | 0..1 | AMF identifier | |
| registrationChargingInformation | RegistrationChargingInformation | O _M | 0..1 | This field holds the 5G registration specific information. | |
| n2ConnectionChargingInformation | N2ConnectionChargingInformation | O _M | 0..1 | This field holds the 5G N2 connection specific information. | |
| locationReportingChargingInformation | LocationReportingChargingInformation | O _M | 0..1 | This field holds the 5G Location reporting specific information. | |

6.1.6.2.4.2 Type ChargingDataResponse

This clause specifies additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for 5G connection and mobility described in 3GPP TS 32.256 [31].

Table 6.1.6.2.4.2-1: 5G connection and mobility Specified attribute of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------------------|--------------------------------------|----------------|-------------|---|---------------|
| locationReportingChargingInformation | LocationReportingChargingInformation | O _C | 0..1 | This field holds the 5G connection and mobility location reporting specific information | AMF_subs_PRA |

6.1.6.2.4.3 Type RegistrationChargingInformation

Table 6.1.6.2.4.3-1: Definition of type RegistrationChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|--------------------------|----------------|-------------|---|---------------|
| registrationMessage type | RegistrationMessage Type | M | 1 | Message type received by the AMF: registration (initial, initial, mobility, periodic, emergency), deregistration. | |
| userInformation | UserInformation | O _M | 0..1 | Includes information of user and user equipment | |
| userLocationinfo | UserLocation | O _C | 0..1 | Information on the location and location time | |
| pSCellInformation | PSCellInformation | O _C | 0..1 | Primary SCG (Secondary Cell Group) Cell | |
| ueTimeZone | TimeZone | O _C | 0..1 | UE Timezone the UE is currently located | |
| ratType | RatType | O _C | 0..1 | RAT Type of the registration | |
| 5gMMCapability | Bytes | O _C | 0..1 | 5GMM capability IE as specified in clause 9.11.3.1 of 3GPP TS 24.501 [303] | |
| micOModeIndication | MICOModeIndication | O _C | 0..1 | Indicates whether the requested use of MICO mode is accepted or not by the network | |
| smsIndication | SmsIndication | O _C | 0..1 | Indicates whether the SMS delivery over NAS is supported | |
| taList | array(Tai) | O _C | 0..N | An array of TAIs representing the set of tracking areas composing the Registration Area. | |
| serviceAreaRestriction | ServiceAreaRestriction | O _C | 0..1 | Service Area Restriction for the UE. | |
| requestedNSSAI | array(Snssai) | O _C | 0..N | Requested NSSAI. | |
| allowedNssai | array(Snssai) | O _C | 0..N | Allowed NSSAI. | |
| rejectedNSSAI | array(Snssai) | O _C | 0..N | Rejected NSSAI. | |
| nSSAIMapList | array(NSSAIMap) | O _C | 0..N | Mapping of each S-NSSAI of the Allowed NSSAI to the S-NSSAIs of the Subscribed S-NSSAIs. | |
| amfUeNgapId | integer | O _M | 0..1 | UE association over the N2 interface within the AMF. | |
| ranUeNgapId | integer | O _M | 0..1 | RAN UE NGAP ID over N2 interface | |
| ranNodeId | GlobalRanNodeId | O _C | 0..1 | Identity of the RAN node. | |

6.1.6.2.4.4 Type N2ConnectionChargingInformation

Table 6.1.6.2.4.4-1: Definition of type N2ConnectionChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------|-------------------------|----------------|-------------|---|---------------|
| n2ConnectionMessageType | N2ConnectionMessageType | M | 1 | N2 message type received by the AMF specified in clause 9.7 3GPP TS 24.501 [303] | |
| userInformation | UserInformation | O _M | 0..1 | Includes information of user and user equipment | |
| userLocationInfo | UserLocation | O _C | 0..1 | Information on the location and location time | |
| pSCellInformation | PSCellInformation | O _C | 0..1 | Primary SCG (Secondary Cell Group) Cell | |
| ueTimeZone | TimeZone | O _C | 0..1 | UE Timezone the UE is currently located | |
| ratType | RatType | O _C | 0..1 | RAT Type of the registration | |
| amfUeNgapId | integer | O _M | 0..1 | UE association over the N2 interface within the AMF. | |
| ranUeNgapId | integer | O _M | 0..1 | RAN UE NGAP ID over N2 interface | |
| ranNodeId | GlobalRanNodeId | O _C | 0..1 | Identity of the RAN node. | |
| restrictedRatList | array(RatType) | O _C | 0..N | List of RAT types that are restricted for the UE | |
| forbiddenAreaList | array(Area) | O _C | 0..N | List of forbidden areas for the UE | |
| serviceAreaRestriction | ServiceAreaRestriction | O _C | 0..1 | Service Area Restriction for the UE. | |
| restrictedCnList | array(CoreNetworkType) | O _C | 0..N | List of Core Network Types that are restricted for the UE | |
| allowedNssai | array(Snssai) | O _C | 0..N | Allowed NSSAI. | |
| rrcEstCause | string | O _C | 0..1 | RRC Establishment Cause, if received from the 5G-AN, specified in TS 38.413 [304], clause 9.3.1.111. It carries the value in hexadecimal representation Pattern: '[0-9a-fA-F]+\$' | |

6.1.6.2.4.5 Type LocationReportingChargingInformation

Table 6.1.6.2.4.5-1: Definition of type LocationReportingChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------------------|------------------------------|----------------|-------------|---|---------------|
| locationReportingMessageType | LocationReportingMessageType | M | 1 | Includes Location reporting message type | |
| userInformation | UserInformation | O _M | 0..1 | Includes information of user and user equipment | |
| userLocationInfo | UserLocation | O _M | 0..1 | Information on the location and location time | |
| pSCellInformation | PSCellInformation | O _C | 0..1 | Primary SCG (Secondary Cell Group) Cell | |
| ueTimeZone | TimeZone | O _C | 0..1 | UE Timezone the UE is currently located | |
| presenceReportingAreaInformation | map(PresenceInfo) | O _C | 0..N | The Presence Reporting Area(s) and status of UE presence. | |
| ratType | RatType | O _C | 0..1 | RAT Type of the registration | |

6.1.6.2.4.6 Type: PSCellInformation

Table 6.1.6.2.4.6-1: Definition of type PSCellInformation

| Attribute name | Data type | P | Cardinality | Description |
|----------------|-----------|----------------|-------------|----------------------|
| nrcgi | Ncgi | O _C | 0..1 | NR Cell Identity |
| ecgi | Ecgi | O _C | 0..1 | E-UTRA Cell Identity |

6.1.6.2.4.7 Type: NSSAIMap

Table 6.1.6.2.4.7-1: Definition of type NSSAIMap

| Attribute name | Data type | P | Cardinality | Description |
|----------------|-----------|---|-------------|-----------------------------|
| servingSnssai | Snssai | M | 1 | S-NSSAI in the serving PLMN |
| homeSnssai | Snssai | M | 1 | S-NSSAI in home PLMN |

6.1.6.2.5 Exposure Function Northbound API Specified Data Type

6.1.6.2.5.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for Exposure Function Northbound API charging described in 3GPP TS 32.254[14].

Table 6.1.6.2.5.1-1: Exposure Function Northbound API Specified attribute of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------|------------------------|----------------|-------------|---|---------------|
| nEFCharging Information | NEFChargingInformation | O _M | 0..1 | This field holds the Exposure Function Northbound API specific information. | |

6.1.6.2.5.1a Type ChargingDataResponse

This clause specifies additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for Exposure Function Northbound API charging described in 3GPP TS 32.254[14].

Table 6.1.6.2.5.2-1: Exposure Function Northbound API Specified attribute of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
| | | | | | |

6.1.6.2.5.2 Type NEFChargingInformation

Table 6.1.6.2.5.3-2: Definition of type NEFChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------------|-------------------------|----------------|-------------|---|---------------|
| externalIndividualIdentifier | Gpsi | O _C | 0..1 | The external Identifier or the MSISDN associated to the GPSI of the individual UE. | |
| externalIndividualIdList | array(Gpsi) | O _C | 1..N | Used instead of externalIndividualIdentifier if there is more than one externalIndividualIdentifier. | |
| externalGroupIdentifier | ExternalGroupIdentifier | O _C | 0..1 | The external Identifier identifying a group of individual UE(s). | |
| groupIdentifier | GroupIdentifier | O _C | 0..1 | The network internal globally unique Identifier identifying a set of IMSIs. | |
| aPIDirection | APIDirection | M | 1 | The direction to indicate if it is an API invocation from an AF or notification to an AF. | |
| aPITargetNetworkFunction | NFIdentification | O _C | 0..1 | The identifier of the network function that either is the destination of the API invocation or triggers the notification. | |
| aPIResultCode | Uint32 | O _C | 0..1 | The result of API Invocation. | |
| aPIName | string | M | 1 | The name of the API invoked. | |
| aPIReference | Uri | O _C | 0..1 | The reference to the definition of the format of the API invocation. | |
| aPIContent | string | O _C | 0..1 | The actual content of the API invocation, in the format described by the aPIReference. | |

6.1.6.2.6 Network Slice Management (NSM) Specified Data Type

6.1.6.2.6.1 Type ChargingDataRequest

This clause specifies additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for Network Slice Management (NSM) charging described in 3GPP TS 28.202 [71].

Table 6.1.6.2.6.1-1: Network Slice Management (NSM) charging specified attribute of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------|------------------------|----------------|-------------|---|---------------|
| tenantIdentifier | string | O _M | 0..1 | Identifier of the tenant | |
| mnSConsumerIdentifier | string | O _M | 0..1 | MnS consumer Identifier | |
| nSMChargingInformation | NSMChargingInformation | O _M | 0..1 | This field holds the Network Slice Management (NSM) specific information. | |

6.1.6.2.6.2 Type ChargingDataResponse

This clause specifies additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 Network Slice Management (NSM) charging described in 3GPP TS 28.202 [71].

Table 6.1.6.2.6.2-1: Network Slice Management (NSM) charging specified attribute of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
| | | | | | |

6.1.6.2.6.3 Type NSMChargingInformation

Table 6.1.6.2.6.3-1: Definition of type NSMChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|----------------|-------------|---|---------------|
| managementOperation | ManagementOperation | M | 1 | Management operation associated to the provisioning specified in TS 28.532 [253]. | |
| idNetworkSliceInstance | string | O _M | 0..1 | Managed Object Instance (MOI) of NetworkSlice IOC. This is a full DN according to 3GPP TS 32.300 [255]. | |
| listOfServiceProfileChargingInformation | Array (ServiceProfileChargingInformation) | O _M | 0..N | List of Service profile charging information | |
| managementOperationStatus | ManagementOperationStatus | O _C | 0..1 | Status of the management operation | |
| operationalState | OperationalState | O _C | 0..1 | Operational state of the network slice instance | |
| administrativeState | AdministrativeState | O _C | 0..1 | Administrative state of the network slice instance | |

6.1.6.2.6.4 Type ServiceProfileChargingInformation

Table 6.1.6.2.6.4-1: Definition of type ServiceProfileChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------------|---------------|----------------|-------------|---|---------------|
| serviceProfileIdentifier | string | O _M | 0..1 | Described in TS 28.541 [254] clause 6.4 serviceProfileIdentifier attribute | |
| sNSSAList | array(Snssai) | O _M | 0..N | List of S-NSSAI(s) | |
| sST | Sst | O _M | 0..1 | Described in TS 28.541 [254] clause 6.4 sST attribute | |
| latency | integer | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 latency attribute | |
| availability | number | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 availability attribute | |
| resourceSharingLevel | SharingLevel | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 serviceProfile.resourceSharingLevel attribute | |
| jitter | integer | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 jitter attribute | |
| reliability | string | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 reliability attribute | |
| maxNumberOfUEs | integer | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 maxNumberOfUEs attribute | |
| coverageArea | String | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 coverageArea attribute | |
| uEMobilityLevel | MobilityLevel | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 uEMobilityLevel attribute | |
| delayToleranceIndicator | Support | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 delayTolerance.support attribute | |
| dLThptPerSlice | Throughput | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 dLThptPerSlice attribute | |
| dLThptPerUE | Throughput | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 dLThptPerUE attribute | |
| uLThptPerSlice | Throughput | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 uLThptPerSlice attribute | |
| uLThptPerUE | Throughput | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 uLThptPerUE attribute | |
| maxNumberOfPDUsessions | integer | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 maxNumberOfConns.nOfConn attribute | |
| kPIMonitoringList | string | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 kPIMonitoring.kPIList attribute | |
| supportedAccessTechnology | integer | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 SupportedAccessTech.accTechList attribute | |
| v2XCommunicationModeIndicator | Support | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 V2XCommMode.v2XMode attribute | |
| addServiceProfileChargingInfo | string | O _C | 0..1 | This field contains additional attributes of the service profile. | |

6.1.6.2.6.5 Type Throughput

Table 6.1.6.2.6.5-1: Definition of type Throughput

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|----------------|-------------|---|---------------|
| guaranteedThpt | Float | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 guaThpt attribute | |
| maximumThpt | Float | O _C | 0..1 | Described in TS 28.541 [254] clause 6.4 maxThpt attribute | |

6.1.6.2.7 NS performance and analytics Specified Data Type

6.1.6.2.7.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.7.1 for NS performance and analytics charging described in 3GPP TS 28.201[201].

Table 6.1.6.2.7.1-1: NS performance and analytics Specified attribute of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|--------------------------|----------------|-------------|---|---------------|
| tenantIdentifier | string | O _M | 0..1 | This field contains the identification of the subscriber of the network slice | |
| nSPACchargingInformation | NSPACchargingInformation | O _C | 0..1 | This field holds the network slice information, which is reported to the CHF | |

6.1.6.2.7.2 Type ChargingDataResponse

This clause is additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.7.2 for NS performance and analytics charging described in 3GPP TS 28.201[201].

Table 6.1.6.2.7.2-1: NS performance and analytics Specified attribute of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
| | | | | | |

6.1.6.2.7.3 Type UsedUnitContainer

This clause is additional portion of the type UsedUnitContainer defined in clause 6.1.6.2.1.10 for NS performance and analytics charging described in 3GPP TS 28.201[201].

Table 6.1.6.2.7.3-1: NS performance and analytics charging of type UsedUnitContainer

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------------|---------------------------|----------------|-------------|---|---------------|
| nSPACcontainerInformation | NSPACcontainerInformation | O _C | 0..1 | the network slice performance and analytics container specific information. | |

6.1.6.2.7.4 Type NSPAChargingInformation

Table 6.1.6.2.7.4-1: Definition of type NSPAChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|---|---------------|
| singleNSSAI | Snssai | M | 0..1 | This field holds single Network Slice Selection Assistance Information for performance reporting. | |

6.1.6.2.7.5 Type NSPAContainerInformation

Table 6.1.6.2.7.5-1: Definition of type NSPAContainerInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------------------|-----------------------|----------------|-------------|---|---------------|
| uplinkLatency | integer | O _c | 0..1 | This field holds uplink latency | |
| downlinkLatency | integer | O _c | 0..1 | This field holds downlink latency. | |
| uplinkThroughput | Throughput | O _c | 0..1 | This field holds uplink throughput, which is identified by the MaximumThpt. | |
| downlinkThroughput | Throughput | O _c | 0..1 | This field holds downlink throughput, which is identified by the MaximumThpt. | |
| maximumPacketLossRate | string | O _c | 0..1 | This field holds maximum packet loss rate. | |
| maximumPacketLossRateDL | integer | O _c | 0..1 | This field holds maximum packet loss rate downlink. | |
| serviceExperienceStatisticsData | ServiceExperienceInfo | O _c | 0..1 | This field holds service experience statistics data. | |
| theNumberOfPDU Sessions | integer | O _c | 0..1 | This field holds the number of PDU sessions. | |
| theNumberOfRegisteredSubscribers | integer | O _c | 0..1 | This field holds the number of registered subscribers. | |
| loadLevel | NsiLoadLevelInfo | O _c | 0..1 | This field holds the load level of network slice. | |

6.1.6.2.8 IMS Specified Data Type

6.1.6.2.8.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for IMS charging described in 3GPP TS 32.260 [32].

Table 6.1.6.2.8.1-1: IMS specified attribute of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------|------------------------|----------------|-------------|--|---------------|
| iMSChargingInformation | IMSChargingInformation | O _c | 0..1 | This field holds the IMS specific information. | IMS |

6.1.6.2.8.2 Type ChargingDataResponse

This clause is additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for IMS charging described in 3GPP TS 32.260 [32].

Table 6.1.6.2.8.2-1: IMS specified attribute of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
| | | | | | |

6.1.6.2.8.3 Type IMSChargingInformation

Table 6.1.6.2.8.3-1: Definition of type IMSChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------|----------------------|----------------|-------------|---|---------------|
| eventType | SIPEventType | O _C | 0..1 | This field holds the SIP Method, the content of the SIP "Event" header and the content of the SIP "expires" header when present in the SIP request. | |
| imsNodeFunctionality | IMSNodeFunctionality | O _M | 1 | This field contains the function of the IMS node. | |
| roleOfNode | RoleOfIMSNode | O _M | 1 | This field specifies whether the IMS node is serving the Originating or the Terminating party. | |
| userInformation | UserInformation | O _M | 1 | Group of user information. | |
| userLocationInfo | UserLocation | O _C | 0..1 | This field indicates details of where the UE is currently located (access-specific user location information). For | |
| ueTimeZone | TimeZone | O _C | 0..1 | This field holds the Time Zone of where the UE is located, if available where the UE currently resides. | |
| 3gppPSDataOffStatus | 3GPPPSDataOffStatus | O _C | 0..1 | This field holds the 3GPP Data off Status when UE's 3GPP Data Off status is Activated or Deactivated. | |
| isupCause | ISUPCause | O _C | 0..1 | This indicates the reason a circuit switch call was released. | |
| controlPlaneAddress | IMSAddress | O _C | 0..1 | This identifies the control plane IP address i.e., GGSN, PGW, or SMF, that handles one or more media component(s) of a IMS session. | |
| virNumber | E164 | O _C | 0..1 | This identifies the international E.164 address of the VLR serving the user. | |
| mscAddress | E164 | O _C | 0..1 | This identifies the international E.164 address of the MSC that generated the network call reference number. | |
| userSessionID | string | O _M | 1 | This field holds the session identifier. For a SIP session the <i>Session-ID</i> contains the SIP Call ID. When the AS acts as B2BUA, the incoming session is identified. | |
| outgoingSessionID | string | O _C | 0..1 | When the AS acts as B2BUA, the outgoing side session is identified by the Outgoing Session ID which contains the SIP Call ID. | |
| sessionPriority | IMSSessionPriority | O _C | 0..1 | This field contains the priority of the session. | |
| callingPartyAddresses | array(Uri) | O _M | 1..N | This field holds the addresses (SIP URI or Tel URI) URI of the party (Public User Identity or Public Service Identity) initiating a session or requesting a service. | |

| | | | | | |
|-------------------------------------|--------------------------------|----------------|------|---|--|
| calledPartyAddress | string | O _M | 1 | For SIP transactions, except for registration, this field holds the address of the party (Public User ID or Public Service ID) to whom the SIP transaction is posted. For registration transactions, this field holds the Public User ID under registration. | |
| numberPortabilityRoutingInformation | string | O _c | 0..1 | This field includes information on number portability after DNS/ENUM request from IMS node in the calling user's home network. | |
| carrierSelectRoutingInformation | string | O _c | 0..1 | This field includes information on carrier select after DNS/ENUM request from IMS node in the calling user's home network. | |
| alternateChargedPartyAddress | string | O _c | 0..1 | The address of an alternate party that is identified by the AS at session initiation and is charged in place of the calling party. | |
| requestedPartyAddress | array(string) | O _c | 1..N | For SIP transactions this field initially holds the address of the party (Public User ID or Public Service ID) to whom the SIP transaction was originally posted. This field is only present if different from the Called Party Address parameter. | |
| calledAssertedIdentities | array(string) | O _c | 1..N | The addresses of the final asserted identity. Present if the final asserted identity is available in the SIP 2xx response. | |
| calledIdentityChanges | array(CalledIdentityChange) | O _c | 1..N | Terminating identity address change and associated time stamp. | |
| associatedURI | array(Uri) | O _c | 1..N | This field holds a non-barred public user identity (SIP URI or Tel URI) associated to the public user identity under registration and is present for registration transactions. | |
| timeStamps | DateTime | O _c | 0..1 | This field holds either the time of the SIP Request or the time of the response to the SIP Request. | |
| applicationServerInformation | array(string) | O _c | 1..N | This field holds the SIP URI(s) of the AS(s) addressed during the session and the called party number (SIP URI, E.164), if an AS determines it. | |
| interOperatorIdentifier | array(InterOperatorIdentifier) | O _c | 1..N | This field holds the identification of the network neighbours (originating and terminating) as exchanged via SIP signalling if available. This field may occur several times. | |
| imsChargingIdentifier | string | O _M | 1 | This field holds the IMS Charging Identifier (ICID) as generated by a IMS node for a SIP session. | |

| | | | | | |
|---------------------------|------------------------------|----|------|---|--|
| relatedICID | string | Oc | 0..1 | This field holds the Related IMS charging identifier when the session is the target access leg in case of access transfer. | |
| relatedICIDGenerationNode | IMSAddress | Oc | 0..1 | This field holds the identifier of the server that generated the Related IMS charging identifier. | |
| transitIOList | array(string) | Oc | 1..N | This field holds the identification of the involved transit networks as exchanged via SIP signalling if available. This field may occur several times. When received from the AS, each occurrence of this field represents transit networks inbound to or outbound from the S-CSCF. | |
| earlyMediaDescription | array(EarlyMediaDescription) | Oc | 1..N | This field holds session and media parameters related to media components set to active during the SIP session establishment and before a final successful or unsuccessful SIP answer to the initial SIP INVITE request is received. Once a media component is set to active, subsequent status changes shall be registered. Since several SDP negotiations may occur during the SIP session establishment, this field may occur several times. | |
| sdpSessionDescription | array(string) | Oc | 1..N | This field holds the content of an "attribute-line" (i=, c=, b=, k=, a=, etc.) related to a session. | |
| sdpMediaComponents | array(SDPMediaComponent) | Oc | 1..N | This is a grouped field comprising several sub-fields associated with one media component. Since several media components may exist for a session in parallel these sub-fields may occur several times. | |
| servedPartyIPAddress | IMSAddress | Oc | 0..1 | This field holds the IP address of either the calling or called party, depending on whether the P-CSCF is in touch with the calling or the called party. | |
| serverCapabilities | ServerCapabilities | Oc | 0..1 | This field contains the server capabilities as described in 3GPP TS 29.229 [205]. | |
| trunkGroupID | TrunkGroupID | Oc | 0..1 | This field identifies the incoming and outgoing PSTN legs. | |
| bearerService | string | Oc | 0..1 | This field holds the used bearer service for the PSTN leg. | |
| imsServiceId | string | Oc | 0..1 | This field identifies the service the MRFC is hosting. For conferences the conference ID is used as the value of this parameter. | |
| messageBodies | array(MessageBody) | Oc | 1..N | This field holds information about the Message body, Content-Type, Content-Length, Content-Disposition and Originator if available. | |
| accessNetworkInformation | array(string) | Oc | 1..N | This field contains the content of the first P-header P-Access-Network-Info, if available. | |

| | | | | | |
|------------------------------------|----------------------------------|----|------|---|--|
| additionalAccessNetworkInformation | string | Oc | 0..1 | This field contains the content of an additional SIP P-header "P-Access-Network-Info", if available. | |
| cellularNetworkInformation | string | Oc | 0..1 | This field contains the content of one SIP "Cellular-Network-Info" header, when the UE supporting one or more cellular radio access technologies but using a non-cellular IP-CAN, such as untrusted WLAN access, provides this header field to relay information to its service provider about the radio cell identity of the cellular radio access network on which the UE most recently camped. | |
| accessTransferInformation | array(AccessTransferInformation) | Oc | 1..N | This field contains information related to the session transfer. | |
| accessNetworkInfoChange | array(AccessNetworkInfoChange) | Oc | 1..N | This field is a grouped field describing the subsequent SIP P-header "P-Access-Network-Info" changes and associated time stamp. | |
| imsCommunicationServiceID | string | Oc | 0..1 | This field contains the IMS communication service identifier if received in the P-Asserted-Service header in the SIP request for all applicable IMS nodes downstream from the S-CSCF serving the Originating party. This field contains the IMS communication service identifier if received in the "+g.3gpp.icsi-ref" header field parameter of the Feature-Caps header in the SIP response for all applicable IMS nodes upstream from the S-CSCF serving the Originating party. | |
| imsApplicationReferenceID | string | Oc | 0..1 | This field contains the IMS application reference identifier if received in the SIP Request. | |
| causeCode | Uint32 | Oc | 0..1 | This field contains the cause value. | |
| reasonHeader | array(string) | Oc | 1..N | This field contains SIP reason header included in BYE or CANCEL method, Reliability of this information is not guaranteed if the SIP or CANCEL is originated outside of the trust domain which is determined by the Operator on a "per parameter basis". Since several Reason Header may exist for a SIP message, these sub-fields may occur several times | |
| initialIMSChargingIdentifier | string | Oc | 0..1 | This field holds the Initial IMS charging identifier (ICID) as generated by the IMS node for the initial SIP session created for IMS service continuity. | |
| nniInformation | array(NNIInformation) | Oc | 1..N | This field holds information about the NNI used for interconnection and roaming. | |

| | | | | | |
|-----------------------------|---------------|----------------|------|---|--|
| fromAddress | string | O _M | 1 | Contains the information from the SIP From header. | |
| imsEmergencyIndication | boolean | O _C | 0..1 | This field indicates the registration is an emergency registration or the IMS session is an IMS emergency session | |
| imsVisitedNetworkIdentifier | string | O _C | 0..1 | Contains the information from the SIP P-Visited-Network-ID header. | |
| sipRouteHeaderReceived | string | O _C | 0..1 | Contains the information in the topmost route header in a received initial SIP INVITE or non-session related SIP MESSAGE request. | |
| sipRouteHeaderTransmitted | string | O _C | 0..1 | Contains the information in the route header representing the destination in a transmitted initial SIP INVITE or non-session related SIP MESSAGE request. | |
| tadIdentifier | TADIdentifier | O _C | 0..1 | This field indicates the type of access network (CS or PS) through which the session shall be terminated. | |
| fieldIdentifierList | string | O _C | 0..1 | This element contains one or more IM CN subsystem functional entity addresses and/or AS and application identifiers where the IM CN subsystem functional entity does create charging information for the related CDR of this IM CN subsystem functional entity. | |

6.1.6.2.8.4

Type SIPEventType

Table 6.1.6.2.8.4-1: Definition of type SIPEventType

| Attribute name | Data type | P | | Cardinality | Description | Applicability |
|----------------|-----------|----------------|--|-------------|--|---------------|
| sipMethod | string | O _C | | 0..1 | This field holds holds the name of the SIP Method (INVITE, UPDATE etc.). | |
| eventHeader | string | O _C | | 0..1 | This field holds the content of the "Event" header | |
| expiresHeader | Uint32 | O _C | | 0..1 | This field holds the content of the "Expires" header | |

6.1.6.2.8.5 Type ISUPCause

Table 6.1.6.2.8.5-1: Definition of type ISUPCause

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------|-------------|----------------|-------------|--|---------------|
| iSUPCauseLocation | Uint32 | O _c | 0..1 | This field identifies the network in which the event causing the call release. Values described in TS 29.078 [259]. | |
| iSUPCauseValue | Uint32 | O _c | 0..1 | This field identifies the reason a voice call service is released. Values described in TS 29.078 [259]. | |
| iSUPCauseDiagnostics | OctetString | O _c | 0..1 | This field holds the diagnostics field associated with the release of the voice call service. Values described in TS 29.078 [259]. | |

6.1.6.2.8.6 Type CalledIdentityChange

Table 6.1.6.2.8.6-1: Definition of type CalledIdentityChange

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|----------------|-------------|---|---------------|
| calledIdentity | string | O _c | 0..1 | This field holds the address (Public User ID: SIP URI, E.164, etc.) of the called party after a change. | |
| changeTime | DateTime | O _c | 0..1 | This field holds the time in UTC format when the change was registered. | |

6.1.6.2.8.7 Type InterOperatorIdentifier

Table 6.1.6.2.8.7-1: Definition of type InterOperatorIdentifier

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|----------------|-------------|---|---------------|
| originatingIOI | string | O _c | 0..1 | This field holds the Inter Operator Identifier (IOI) for the originating network as generated by the IMS node as described in RFC 7315 [405] and TS 24.229 [258]. | |
| terminatingIOI | string | O _c | 0..1 | This field holds the Inter Operator Identifier (IOI) for the terminating network as generated by the IMS node as described in RFC 7315 [405] and TS 24.229 [258]. | |

6.1.6.2.8.8 Type EarlyMediaDescription

Table 6.1.6.2.8.8-1: Definition of type EarlyMediaDescription

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------|--------------------------|----------------|-------------|---|---------------|
| sDPTimeStamps | SDPTimeStamps | O _c | 0..1 | This field holds the time of the SDP offer and the SDP answer. | |
| sDPMediaComponent | array(SDPMediaComponent) | O _c | 0..N | This field contains information about media used for a IMS session. | |
| sDPSessionDescription | array(string) | O _c | 0..N | This field holds the content of the SDP line (i=, c=, b=, k=, a=, etc.) in the session description, as described in RFC 8866 [407]. | |

6.1.6.2.8.9 Type SDPMediaComponent

Table 6.1.6.2.8.9-1: Definition of type SDPMediaComponent

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------------------|--------------------|----------------|-------------|--|---------------|
| sDPMediaName | string | O _c | 0..1 | This field holds the content of the SDP "m=" line in a media description, as described in RFC 8866 [407]. | |
| sDPMediaDescription | array(string) | O _c | 0..N | This field holds the content of SDP lines (i=, c=, b=, k=, a=, etc.) related to a media description, as described in RFC 8866 [407]. | |
| localGWInsertedIndication | boolean | O _c | 0..1 | This field indicates if the local GW (TrGW, IMS-AGW) is inserted or not for the SDP media component. Set to true if inserted. | |
| ipRealmDefaultIndication | boolean | O _c | 0..1 | This field indicates whether the IP realm used for the SDP media component is the default IP realm or not. Set to true if it is the default IP realm is used. | |
| transcoderInsertedIndication | boolean | O _c | 0..1 | This field indicates if a transcoder is inserted or not for the SDP media component. Set to true if it is inserted. | |
| mediaInitiatorFlag | MediaInitiatorFlag | O _c | 0..1 | This field indicates which party has requested the session modification. | |
| mediaInitiatorParty | string | O _c | 0..1 | This field it holds the address (SIP URI or Tel URI) of the party (Public User ID or Public Service ID) who initiates the media action. | |
| threeGPPChargingId | OctetString | O _c | 0..1 | This field contains a charging identifier. | |
| accessNetworkChargingIdentifierValue | OctetString | O _c | 0..1 | This field contains a charging identifier (e.g. GCID). | |
| sDPType | SDPType | O _c | 0..1 | This field holds information if the SDP media component was of type SDP offer or SDP answer | |

6.1.6.2.8.10 Type ServerCapabilities

Table 6.1.6.2.8.10-1: Definition of type ServerCapabilities

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------|---------------|----------------|-------------|--|---------------|
| mandatoryCapability | array(Uint32) | O _c | 0..N | This field can represent a single determined mandatory capability or a set of capabilities of an S-CSCF, as described in TS 29.228 [260] clause 6.7. | |
| optionalCapability | array(Uint32) | O _c | 0..N | This field can represent a single determined optional capability or a set of capabilities of an S-CSCF, as described in TS 29.228 [260] clause 6.7. | |
| serverName | array(string) | O _c | 0..N | This field contains a SIP-URL (as defined in IETF RFC 3261 [406] and IETF RFC 3986 [404]), used to identify a SIP server (e.g. S-CSCF name). | |

6.1.6.2.8.11 Type TrunkGroupID

Table 6.1.6.2.8.11-1: Definition of type TrunkGroupID

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------|-----------|----------------|-------------|--|---------------|
| incomingTrunkGroupID | string | O _c | 0..1 | This field identifies the incoming PSTN leg. | |
| outgoingTrunkGroupID | string | O _c | 0..1 | This field identifies the outgoing PSTN leg. | |

6.1.6.2.8.12 Type MessageBody

Table 6.1.6.2.8.12-1: Definition of type MessageBody

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------|---------------------|----------------|-------------|--|---------------|
| contentType | string | M | 0..1 | This field holds the media type (e.g. application/sdp, text/html) of the message-body, as described in RFC 3261 [406]. | |
| contentLength | Uint32 | M | 0..1 | This field holds the size of the message-body, as described in RFC 3261 [406]. | |
| contentDisposition | string | O _c | 0..1 | This field indicates how the message body, or a message body part is to be interpreted (e.g. session, render), as described in RFC 3261 [406]. | |
| originator | OriginatorPartyType | O _c | 0..1 | This field indicates the originating party of the message body. | |

6.1.6.2.8.13 Type AccessTransferInformation

Table 6.1.6.2.8.13-1: Definition of type AccessTransferInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------------------|--------------------|----------------|-------------|--|---------------|
| accessTransferType | AccessTransferType | O _c | 0..1 | This field indicates which type of transfer occurred for IMS service continuity. | |
| accessNetworkInformation | array(OctetString) | O _c | 0..N | This field indicates one instance of the SIP P-header "P-Access-Network-Info". | |
| cellularNetworkInformation | OctetString | O _c | 0..1 | This field indicates one instance of the SIP header "Cellular-Network-Info". | |
| interUETransfer | UETransferType | O _c | 0..1 | This field contains information about type of the transfer. If this AVP is not present, this means that the type of transfer is Intra-UE transfer. | |
| userEquipmentInfo | Pei | O _c | 0..1 | This field contains the identity and capability of the terminal the subscriber is using. | |
| instanceId | string | O _c | 0..1 | This field contains a URN generated by the device that uniquely identifies a specific device amongst all other devices. | |
| relatedIMSChargingIdentifier | string | O _c | 0..1 | This field holds the Related IMS Charging Identifier (ICID) as generated by the Enhanced MSC Server or the P-CSCF for the target access leg of an SRVCC access transfer. | |
| relatedIMSChargingIdentifierNode | IMSAddress | O _c | 0..1 | This field holds the identifier of the Enhanced MSC Server or the P-CSCF that generated the Related IMS Charging Identifier (ICID). | |
| changeTime | DateTime | O _c | 0..1 | This field holds the time in UTC format when the change was registered. | |

6.1.6.2.8.14 Type AccessNetworkInfoChange

Table 6.1.6.2.8.14-1: Definition of type AccessNetworkInfoChange

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------------|--------------------|----------------|-------------|--|---------------|
| accessNetworkInformation | array(OctetString) | O _c | 0..N | This field indicates one instance of the SIP P-header "P-Access-Network-Info". | |
| cellularNetworkInformation | OctetString | O _c | 0..1 | This field indicates one instance of the SIP header "Cellular-Network-Info". | |
| changeTime | DateTime | O _c | 0..1 | This field holds the time in UTC format when the change was registered. | |

6.1.6.2.8.15 Type NNInformation

Table 6.1.6.2.8.15-1: Definition of type NNInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------|---------------------|----------------|-------------|---|---------------|
| sessionDirection | NNISessionDirection | O _c | 0..1 | This field indicates whether the NNI is used for an inbound or outbound service request on the control plane in case of interconnection and roaming. | |
| nNIType | NNIType | O _c | 0..1 | This field indicates whether the type of used NNI is non-roaming, roaming without loopback routing or roaming with loopback routing | |
| relationshipMode | NNIRelationshipMode | O _c | 0..1 | This field indicates whether the other functional entity (e.g. contact point of the neighbouring network) is regarded as part of the same trust domain. | |
| neighbourNodeAddress | IMSAddress | O _c | 0..1 | This field holds the control plane IP address of the neighbouring network contact point that handles the service request in case of interconnection and roaming | |

6.1.6.2.8.16 Void

6.1.6.2.8.17 Type SDPTimeStamps

Table 6.1.6.2.8.17-1: Definition of type SDPTimeStamps

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------|-----------|----------------|-------------|---|---------------|
| sDPOfferTimestamp | DateTime | O _c | 0..1 | This field holds the time in UTC format of the SDP offer. | |
| sDPAnswerTimestamp | DateTime | O _c | 0..1 | This field holds the time in UTC format of the response to the SDP offer. | |

6.1.6.2.8.18 Type IMSAddress

Table 6.1.6.2.8.18-1: Definition of type IMSAddress

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|----------------|-------------|-------------------------|---------------|
| ipv4Addr | Ipv4Addr | O _c | 0..1 | IPv4 address (NOTE) | |
| ipv6Addr | Ipv6Addr | O _c | 0..1 | IPv6 address (NOTE) | |
| e164 | E164 | O _c | 0..1 | E.164 address (NOTE) | |

NOTE: At least one of these IEs shall be present.

6.1.6.2.9 Announcement Specified Data Type

6.1.6.2.9.1 Type MultipleUnitInformation

This clause is additional attributes of the type MultipleUnitInformation defined in clause 6.1.6.2.1.8 for announcement described in 3GPP TS 32.281 [34].

Table 6.1.6.2.9-1: Announcement specified attribute of type MultipleUnitInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------|-------------------------|----------|-------------|---|---------------|
| announcementInformation | AnnouncementInformation | Optional | 0..1 | This field contains the announcement related information. | Announcement |

6.1.6.2.9.2 Type AnnouncementInformation

Table 6.1.6.2.9.2-1: Definition of type AnnouncementInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------------|------------------------------|----------------|-------------|---|---------------|
| announcementIdentifier | Uint32 | O _M | 1 | the announcement to be played. | |
| announcementReference | Uri | O _M | 1 | the reference to where information regarding the announcement can be found, this can be a URI or URL. | |
| variableParts | array(VariablePart) | O _C | 0..N | the list of elements specifying each variable part to be played. | |
| timeToPlay | DurationSec | O _C | 0..1 | the announcement to be played at the specified time before granted time units are exhausted. If the value is set to zero, the announcement is to be played at time when time quota is exhausted. If the field is not present, it indicates that the announcement is to be played immediately. | |
| quotaConsumptionIndicator | QuotaConsumptionIndicator | O _C | 0..1 | an indicates whether the granted quota is to be consumed during announcement setup and played or not. If the field is not present, the quota consumption is receiver dependent. | |
| announcementPriority | Uint32 | O _C | 0..1 | the priority when multiple announcement information blocks are provided in a single message with the same timeToPlay indicator, where zero is the highest priority. If the field is not present or several have the same priority, the order is receiver dependent. | |
| playToParty | PlayToParty | O _C | 0..1 | the party served or remote, to which the announcement is to be played. If the field is not present, it is to be played to served. | |
| announcementPrivacyIndicator | AnnouncementPrivacyIndicator | O _C | 0..1 | indicates if the announcement is private not. If the field is not present, it is private. | |
| language | Language | O _C | 0..1 | a language tag of the announcement to be played. If the field is not present, the language is receiver dependent. | |

6.1.6.2.9.3 Type VariablePart

Table 6.1.6.2.9.3-1: Definition of type VariablePart

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------|------------------|----------------|-------------|---|---------------|
| variablePartType | VariablePartType | M | 1 | the type of the variable part i.e., how the value is to be interpreted. | |
| variablePartValue | string | M | 1..N | the variable part to be played. | |
| variablePartOrder | Uint32 | O _C | 0..1 | The order in which the variable part shall be played, where zero is the first. If the field is not present or several have the same priority, the order is receiver dependent. | |

6.1.6.2.10 MMTel Specified Data Type

6.1.6.2.10.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.4.1.2.1 for MMTel charging described in 3GPP TS 32.275 [33].

Table 6.1.6.2.10.1-1: IMS specified attribute of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|--------------------------|----------------|-------------|--|---------------|
| mMTelChargingInformation | MMTelChargingInformation | O _C | 0..1 | This field holds the MMTel specific information. | IMS |

6.1.6.2.10.2 Type ChargingDataResponse

This clause is additional attributes of the type ChargingDataResponse defined in clause 6.4.1.2.2 for MMTel charging described in 3GPP TS 32.275 [33].

Table 6.1.6.2.10.2-1: IMS specified attribute of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
| | | | | | |

6.1.6.2.10.3 Type MMTelChargingInformation

Table 6.1.6.2.10.3-1: Definition of type MMTelChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------|----------------------|----------------|-------------|---|---------------|
| supplementaryServices | SupplementaryService | O _M | 1..N | This field holds the associated supplementary services. It can be present multiple times as necessary to present the parallel activity of the different supplementary services. | |

6.1.6.2.10.4 Type SupplementaryService

Table 6.1.6.2.10.4-1: Definition of type SupplementaryService

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|--------------------------|----------------|-------------|---|---------------|
| supplementaryServiceType | SupplementaryServiceType | O _M | 1 | This field identifies the type of supplementary service. | |
| supplementaryServiceMode | SupplementaryServiceMode | O _C | 0..1 | This field provides the mode for CDIV, CB and ECT supplementary services | |
| numberOfDivisions | Uint32 | O _C | 0..1 | This field holds the and holds the number of diversions related to a CDIV service. | |
| associatedPartyAddress | string | O _C | 0..1 | This field holds the address (SIP URI or Tel URI) of the user, the supplementary service is provided to: - the "forwarding party" for CDIV - the "transferor" for ECT - the "pilot identity" for FA - the "initiator party" for 3PTY. | |
| conferenceId | string | O _C | 0..1 | This field holds the conference ID. | |
| participantActionType | ParticipantActionType | O _C | 0..1 | This field holds the participant's action type during the conference, see TS 24.605 [102]. | |
| changeTime | DateTime | O _C | 0..1 | This field holds the UTC time indicating the moment when the conference participant has an action (e.g., creating the conference, joining in the conference, being invited into the conference, and quitting the conference). | |
| numberOfParticipants | Uint32 | O _C | 0..1 | This field holds for the - initial request the number of invited parties - interim / update request the number of parties who are currently attached in the session. | |
| cUGInformation | OctetString | O _C | 0..1 | This field holds the "CUG Interlock Code" which identifies CUG membership within the network. | |

6.1.6.2.11 5G ProSe Specified Data Type

6.1.6.2.11.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.5.2.2 for 5G ProSe charging described in TS 32.277[35].

Table 6.1.6.2.11.1-1: 5G ProSe Specified attribute of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|--------------------------|----------------|-------------|---|---------------|
| proseChargingInformation | ProSeChargingInformation | O _M | 0..1 | This field holds the 5G ProSe specific information. | ProSe |

6.1.6.2.11.2 Type ChargingDataResponse

This clause is additional attributes of the type ChargingDataResponse defined in clause 6.5.2.2 for 5G ProSe charging described in TS 32.277[35].

Table 6.1.6.2.11.2-1: 5G ProSe Specified attribute of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
| | | | | | |

6.1.6.2.11.3 Type UsedUnitContainer

Table 6.1.6.2.11.3-1: 5G ProSe Specified portion of type UsedUnitContainer

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|--------------------------|----------------|-------------|--|---------------|
| pC5Container Information | PC5Container Information | O _C | 0..1 | This field holds the PC5 container information | ProSe |

6.1.6.2.11.4 Type PC5ContainerInformation

This clause is additional portion of the type PC5ContainerInformation defined in clause 6.5.2.2 for 5G ProSe charging described in TS 32.277[35].

Table 6.1.6.2.11.4-1: 5G ProSe Specified portion of type PC5ContainerInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------------|--------------------------------|----------------|-------------|---|---------------|
| coverageInfoList | array (CoverageInfo) | O _C | 0..N | This IE provides information on the coverage information. | |
| radioParameter SetInfoList | array (RadioParameter SetInfo) | O _C | 0..N | This IE provides information on a radio parameter set configured in the UE for direct communication use | |
| transmitterInfoList | array (TransmitterInfo) | O _C | 0..N | This IE provides information on a transmitter detected for direct communication | |
| timeOfFirstTransmission | DateTime | O _C | 0..1 | This IE holds the time in UTC format for the first packet transmitted | |
| timeOfFirstReception | DateTime | O _C | 0..1 | This IE holds the time in UTC format for the first packet received. | |

6.1.6.2.11.5 Type CoverageInfo

Table 6.1.6.2.11.5-1: 5G ProSe Specified portion of type CoverageInfo

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|---------------------|----------------|-------------|--|---------------|
| coverageStatus | boolean | O _C | 0..1 | Whether the UE is served by NG-RAN or not | |
| changeTime | DateTime | O _C | 0..1 | The time when the coverage status changed to its current state. | |
| locationInfo | array(LocationInfo) | O _C | 0..N | It provides UE location Information. When in NG-RAN coverage, additionally includes a list of location changes | |

6.1.6.2.11.6 Type RadioParameterSetInfo

This clause is additional portion of the type RadioParameterSetInfo defined in clause 6.5.2.2 for 5G ProSe charging described in TS 32.277[35].

Table 6.1.6.2.11.6-1: 5G ProSe Specified portion of type RadioParameterSetInfo

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------|--------------------|----------------|-------------|---|---------------|
| radioParameterSetValues | array(OctetString) | O _C | 0..N | It provides the radio parameter set configured in the UE for direct communication. The format of the value is according to the SL-Preconfiguration data type. | |
| changeTimestamp | DateTime | O _C | 0..1 | The time when associated time stamp of when Radio Parameters became active. | |

6.1.6.2.11.7 Type TransmitterInfo

This clause is additional portion of the type TransmitterInfo defined in clause 6.5.2.2 for 5G ProSe charging described in TS 32.277[35].

Table 6.1.6.2.11.7-1: 5G ProSe Specified portion of type TransmitterInfo

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------|-----------|----------------|-------------|-------------------------------|---------------|
| proseSourceIPAddress | IpAddr | O _C | 0..1 | Source IP address of ProSe UE | |

6.1.6.2.11.8 Type ProseChargingInformation

Table 6.1.6.2.11.8-1: Definition of type ProseChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------------|----------------------|----------------|-------------|---|---------------|
| announcingPlmnID | PlmnId | O _C | 0..1 | PLMN identity of the serving PLMN which signalled the carrier frequency. | |
| announcingUeHplmnIdentifier | PlmnId | O _M | 0..1 | PLMN identity of HPLMN for announcing UE. | |
| announcingUeVplmnIdentifier | PlmnId | O _C | 0..1 | PLMN identity of VPLMN for announcing UE | |
| monitoringUeHplmnIdentifier | PlmnId | O _C | 0..1 | PLMN identity of HPLMN for monitoring UE. | |
| monitoringUeVplmnIdentifier | PlmnId | O _C | 0..1 | PLMN identity of VPLMN for monitoring UE. | |
| discovererUeHplmnIdentifier | PlmnId | O _M | 0..1 | PLMN identity of Discoverer UE HPLMN. | |
| discovererUeVplmnIdentifier | PlmnId | O _C | 0..1 | PLMN identity of Discoverer UE VPLMN. | |
| discovereeUeHplmnIdentifier | PlmnId | O _C | 0..1 | PLMN identity of Discoveree UE HPLMN. | |
| discovereeUeVplmnIdentifier | PlmnId | O _C | 0..1 | PLMN identity of Discoveree UE VPLMN. | |
| monitoredPlmnIdentifier | PlmnId | O _C | 0..1 | Monitored PLMN ID in Match_Report request | |
| proseApplicationID | string | O _C | 0..1 | The identities used for ProSe Direct Discovery, identifying application related information for the ProSe-enabled UE | |
| applicationID | string | O _C | 0..1 | The identifier a specific 3rd party application. | |
| applicationSpecificDataList | array(Octet String) | O _C | 0..N | This IE contains a data block provided by the application in the UE as specified in clause 11.3.3 of TS 24.334 [308] | |
| proseFunctionality | ProseFunctionality | O _C | 0..1 | This IE holds the ProSe functionality UE is requesting | |
| proseEventType | ProseEventType | O _C | 0..1 | This IE holds the event which triggers the charging message delivery | |
| directDiscoveryModel | DirectDiscoveryModel | O _C | 0..1 | This IE holds the model of the Direct Discovery used by the UE. | |
| validityPeriod | integer | O _C | 0..1 | Time interval during which user is authorized for using ProSe Direct Discovery | |
| roleOfUE | RoleOfUE | O _C | 0..1 | Role of the UE using ProSe | |
| proseRequestTimestamp | DateTime | O _C | 0..1 | The time when ProSe Request is received from UE. | |
| pC3ProtocolCause | integer | O _C | 0..1 | This IE holds the particular reason why a DISCOVERY_REQUEST or Match_Report messages from the UE have been rejected by the 5G DDNMF in PC3 interface. | |
| monitoringUEIdentifier | Supi | O _M | 0..1 | Identifier of the party who initiate monitor/match report | |
| requestedPLMNIdentifier | PlmnId | O _C | 0..1 | The PLMN identifier of the user who is targeted in proximity request. | |
| timeWindow | integer | O _C | 0..1 | The time interval in minutes during which a proximity request is valid. | |
| rangeClass | RangeClass | O _C | 0..1 | A range class for the first proximity request. | |
| proximityAlertIndication | Boolean | O _C | 0..1 | Indication of whether proximity alert has been sent before proximity request cancellation. | |
| proximityAlertTimestamp | DateTime | O _C | 0..1 | The time stamp when proximity alert is sent, to indicate two UEs are in proximity. | |

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------------|--------------------------------|----------------|-------------|--|---------------|
| proximityCancellationTimestamp | DateTime | O _C | 0..1 | The time stamp when proximity request cancellation is requested. | |
| relayIPAddress | IpAddr | O _C | 0..1 | The IP address UE used as ProSe UE-to-Network Relay UE address | |
| proseUEToNetworkRelayUEID | string | O _C | 0..1 | A link layer identifier that uniquely represents the ProSe UE-to-Network Relay UE | |
| proseDestinationLayer2ID | string | O _C | 0..1 | The identifier of a link-layer that identifies a device or a group of devices that are recipients of ProSe communication frames. | |
| pFIContainerInformation | array(pFIContainerInformation) | O _C | 0..N | This field holds the PFI data container information | |
| transmissionDataContainer | array(PC5DataContainer) | O _C | 0..N | The container associated to a trigger conditions | |
| receptionDataContainer | array(PC5DataContainer) | O _C | 0..N | This field holds the container associated to a trigger conditions | |

6.1.6.2.11.9 Type PFICContainerInformation

This clause is additional portion of the type PFICContainerInformation defined in clause 6.5.2.2 for 5G ProSe charging described in TS 32.277[35].

Table 6.1.6.2.11.9-1: 5G ProSe Specified portion of type PFICContainerInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------------------|--------------------|----------------|-------------|---|---------------|
| pFI | Qfi | O _M | 0..1 | PC5 QoS flow Identifier (PFI) | |
| reportTime | DateTime | O _M | 1 | the UTC time indicating time stamp when the QFI data container was closed | |
| timeofFirstUsage | DateTime | O _C | 0..1 | the UTC time indicating time stamp for the first IP packet to be transmitted and mapped to the PFI container | |
| timeofLastUsage | DateTime | O _C | 0..1 | the UTC time indicating time stamp for the last IP packet to be transmitted and mapped to the PFI container. | |
| qoSInformation | QoSData | O _C | 0..1 | the PC5 QoS applied to PFI container. In case gbrUI or gbrDI are present for GBR QoS flow, the GBR targets are "GUARANTEED", otherwise, are " NOT_GUARANTEED". | |
| qoSCharacteristics | QoSCharacteristics | O _C | 0..1 | Map of PC5 QoS characteristics for non standard PQIs and non-preconfigured PQIs. | |
| userLocationInformation | UserLocation | O _C | 0..1 | provides information on the location | |
| uetimeZone | TimeZone | O _C | 0..1 | UE Time Zone the UE is currently located | |
| presenceReportingAreaInformation | map(PresenceInfo) | O _C | 0..N | the Presence Reporting Area status of UE during the PFI container interval. | |

6.1.6.2.11.10 Type PC5DataContainer

Table 6.1.6.2.11.10-1: 5G ProSe Specified portion of type PC5DataContainer

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------------|-------------------------|----------------|-------------|--|---------------|
| localSequenceNumber | string | O _C | 0..1 | The sequence number of the Direct Communication data container | |
| changeTime | DateTime | O _C | 0..1 | The time when the container is closed and reported due to ProSe charging condition change. | |
| coverageStatus | boolean | O _C | 0..1 | Whether UE is served by NG-RAN or not | |
| userLocationInformation | UserLocation | O _C | 0..1 | The location of the UE | |
| dataVolume | UInt64 | O _C | 0..1 | This field holds the amount of volume transmitted or received | |
| changeCondition | string | O _C | 0..1 | ProSe specific reason for closing the container | |
| usageInfoReportSN | string | O _C | 0..1 | The sequence number of usage information report, which is used to generate the container. | |
| radioResourcesId | RadioResourcesIndicator | O _C | 0..1 | This IE identifies whether the operator-provided radio resources or the configured radio resources were used for ProSe direct communication. | |
| radioFrequency | string | O _C | 0..1 | This IE identifies the radio frequency used for ProSe direct communication as specified in clause 9.3 of TS 38.331 [307] | |
| pC5RadioTechnology | string | O _M | 0..1 | The PC5 radio technology used by UE | |

6.1.6.2.12 Edge computing domain charging specified data type

6.1.6.2.12.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for edge computing domain charging described in TS 32.257 [36].

Table 6.1.6.2.12.1-1: Edge computing domain specified attribute of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|--|----------------|-------------|--|---------------|
| eASID | string | O _M | 0..1 | This field holds the EAS ID. | EdgeComputing |
| eDNID | string | O _M | 0..1 | This field holds the DN of EdgeDataNetwork MOI. | EdgeComputing |
| eASProvider Identifier | string | O _M | 0..1 | This field holds the identifier of the ASP that provides the EAS. | EdgeComputing |
| edgeInfrastructureUsageChargingInformation | EdgeInfrastructureUsageChargingInformation | O _M | 0..1 | This field holds the edge enabling infrastructure resource usage charging specific information. | EdgeComputing |
| eASDeploymentChargingInformation | EASDeploymentChargingInformation | O _M | 0..1 | This field holds the EAS deployment charging specific information. | EdgeComputing |
| directEdgeEnablingServiceChargingInformation | NEFChargingInformation | O _M | 0..1 | This field holds the charging information the edge enabling services directly provided by EES, only used if structured charging information is required. | EdgeComputing |
| exposedEdgeEnablingServiceChargingInformation | NEFChargingInformation | O _M | 0..1 | This field may hold the charging information of the edge enabling services exposed. | EdgeComputing |

Editor’s note: all attribute names and data types are FFS dependent TS 24.558 [311] and TS 29.558 [309] release.

6.1.6.2.12.2 Type ChargingDataResponse

This clause specifies additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for edge computing domain charging described in TS 32.257 [36].

Table 6.1.6.2.12.2-1: Edge computing domain specified attribute of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|-------------|---------------|
| | | | | | |

6.1.6.2.12.3 Type EdgeInfrastructureUsageChargingInformation

Table 6.1.6.2.12.3-2: Definition of type EdgeInfrastructureUsageChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------|-----------|----------------|-------------|---|---------------|
| meanVirtualCPUUsage | Float | O _c | 0..1 | This field holds the information of mean virtual CPU usage for the EAS, see VR.VCpuUsageMean in clause 5.7.1.1.1 of TS 28.552 [263]. | |
| meanVirtualMemoryUsage | Float | O _c | 0..1 | This field holds the information of mean virtual memory usage for the EAS, see VR.VMemoryUsageMean in clause 5.7.1.2.1 of TS 28.552 [263]. | |
| meanVirtualDiskUsage | Float | O _c | 0..1 | This field holds the information of mean virtual disk usage for the EAS, see VR.VDiskUsageMean in clause 5.7.1.2.1 of TS 28.552 [263]. | |
| measuredInBytes | Uint64 | O _c | 0..1 | This field holds the measurement of number of incoming bytes received by the EAS, See DataVolum.InBytesEAS in clause 5.7.2.1 of TS 28.552 [263] | |
| measuredOutBytes | Uint64 | O _c | 0..1 | This field holds the measurement of number of outgoing bytes transmitted from the EAS, see DataVolum.OutBytesEAS in clause 5.7.2.2 of TS 28.552 [263] | |
| durationStartTime | DateTime | O _c | 0..1 | This field holds the start time of the collection period, see TS 28.550 [262]. | |
| durationEndTime | DateTime | O _c | 0..1 | This field holds the end time of the collection period, see TS 28.550 [262]. | |

6.1.6.2.12.4 Type EASDeploymentChargingInformation

Table 6.1.6.2.12.4-2: Definition of type DirectEdgeEnablingServiceChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------------|---------------------|----------------|-------------|---|---------------|
| eEASDeploymentRequirements | EASRequirements | O _c | 0..1 | This field holds the EAS Deployment Requirements, see TS 28.538 [310], including the Required EAS Serving Location, Software Image Info, Affinity Anti Affinity and Service Continuity. | |
| ICMEventType | ManagementOperation | O _c | 0..1 | This field holds the management operation notification for LCM event. See clause 11.1.1 in TS 28.532 [253] | |
| ICMStartTime | DateTime | O _M | 0..1 | This field holds the start time of the EAS LCM process, see Start Time in clause 8.3.6.5 Type measJobInfo-ResourceType in TS 28.550 [262]. | |
| ICMEndTime | DateTime | O _M | 0..1 | This field holds the end time of the EAS LCM process, see Stop Time in clause 8.3.6.5 Type measJobInfo-ResourceType in TS 28.550 [262]. | |

6.1.6.2.12.5 Type EASRequirements

Table 6.1.6.2.12.5-1: Definition of type EASRequirements

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------------------|----------------------|----------------|-------------|---|---------------|
| requiredEASServingLocation | ServingLocation | O _c | 1 | The location where the EAS service should be available (see clause 6.3.2 of TS 28.538 [310]). | |
| softwareImageInfo | SoftwareImageInfo | O _c | 1 | The software image information. | |
| affinityAntiAffinity | AffinityAntiAffinity | O _c | 1 | The affinity and anti-requirements of the EAS with other EAS on the same EDN. | |
| serviceContinuity | Boolean | O _c | 1 | Indicates if the service continuity is required by the EAS. If the value is TRUE, the EAS will be deployed with an EES supporting service continuity. | |
| virtualResource | VirtualResource | O _c | 1 | The virtual resource requirements of an EAS. | |

6.1.6.3 Simple data types and enumerations

6.1.6.3.1 Introduction

This subclause defines simple data types and enumerations that can be referenced from data structures defined in the previous subclauses.

6.1.6.3.2 Simple data types

The simple data types defined in table 6.1.6.3.2-1 shall be supported.

Table 6.1.6.3.2-1: Simple data types

| Type Name | Type Definition | Description | Applicability |
|------------------------------|-----------------|---|---------------|
| Diagnostics | integer | A more detailed cause value from SMF | |
| IPFilterRule | string | Filter rules corresponding to services | |
| N2ConnectionMessageType | integer | N2 message type received by the AMF | |
| LocationReportingMessageType | integer | Location reporting message type | |
| Language | string | Language tag as defined in RFC 5646 [408]. | |
| OctetString | string | This field is encoded as a octet string in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F". The most significant character representing the most significant bits shall appear first in the string. Pattern: '^[A-Fa-f0-9]+\$' | |
| E164 | string | This field is encoded as a TBCD-string, see TS 29.002 [261]. Pattern: '^[A-Fa-f0-9]+\$' | |

6.1.6.3.3 Enumeration: NotificationType

Table 6.1.6.3.3-1: Enumeration NotificationType

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| REAUTHORIZATION | This value is used to indicate re-authorization. | |
| ABORT_CHARGING | This value is used to indicate termination of charging for PDU session. | |

6.1.6.3.4 Enumeration: NodeFunctionality

Table 6.1.6.3.4-1: Enumeration NodeFunctionality

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| SMF | This field identifies that NF is a SMF. | |
| AMF | This field identifies that NF is a AMF. | |
| SMSF | This field identifies that NF service consumer is a SMSF. | |
| PGW_C_SMF | This field identifies that NF is a SMF+PGW-C. | |
| NEF | This field identifies that NF is a NEF. | |
| SGW | This field identifies that node is an SGW, only applicable for interworking with EPC. | |
| I_SMF | This field identifies that node is an I-SMF, only applicable for PDU session served by SMF + I-SMF. | ETSUN |
| ePDG | This field identifies that node is an ePDG, only applicable for interworking with EPC/ePDG. | 5GIEPC_CH |
| CEF | This field identifies that NF is a CEF. | |
| MnS_Producer | This field identifies that NF is a MnS Producer | |
| SGSN | This field identifies that node is an SGSN, only applicable when SMF+PGW-C serves GERAN/UTRAN access. | TEI17_NIESGU |
| V_SMF | This field identifies that node is a V-SMF, may be used instead of SMF in roaming scenarios. | |
| 5G_DDNMF | This field identifies that NF is a 5G DDNMF | 5G ProSe |
| IMS_Node | This field identifies that NF is an IMS Node. A further breakdown of IMS Node type may be available in IMS Charging Information | IMS |
| EES | This field identifies that NF is an EES. | EdgeComputing |
| PCF | This field identifies that NF is PCF. Only applicable for API Target Network Function | |
| UDM | This field identifies that NF is UDM. Only applicable for API Target Network Function | |
| UPF | This field identifies that NF is UPF. Only applicable for API Target Network Function | |

6.1.6.3.5 Enumeration: ChargingCharacteristicsSelectionMode

Table 6.1.6.3.5-1: Enumeration ChargingCharacteristicsSelectionMode

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| HOME_DEFAULT | the subscriber belongs to the same PLMN as the SMF | |
| ROAMING_DEFAULT | the subscriber belongs to same PLMN and the AMF belongs to a different PLMN | |
| VISITING_DEFAULT | the subscriber belongs to a different PLMN | |

6.1.6.3.6 Enumeration: TriggerType

Table 6.1.6.3.6-1: Enumeration TriggerType

| Enumeration value | Description | Applicability |
|-----------------------------|---|---------------|
| QUOTA_THRESHOLD | the quota threshold has been reached | |
| QHT | the quota holding time specified in a previous response has been hit (i.e. the quota has been unused for that period of time) | |
| FINAL | a service normal termination has occurred. | |
| QUOTA_EXHAUSTED | the quota has been exhausted | |
| VALIDITY_TIME | the credit authorization lifetime provided from CHF has expired | |
| OTHER_QUOTA_TYPE | usage reporting of the particular quota type indicated in the used unit container where it appears is that, for a multi-dimensional quota, one reached a trigger condition and the other quota is being reported. | |
| FORCED_REAUTHORISATION | a Server initiated re-authorization procedure, i.e. receipt of notify service operation | |
| UNIT_COUNT_INACTIVITY_TIMER | the unit count inactivity timer has expired | |
| ABNORMAL_RELEASE | a service abnormal termination has occurred. | |
| QOS_CHANGE | In request message, this value is used to indicate that QoS change has happened. Any of elements of QoSData may result in QoS change. In response message, this value is used to indicate that a change of authorized QoS shall cause the service consumer to ask for a re-authorization of the associated quota. | |
| VOLUME_LIMIT | Volume limit has been reached. | |
| TIME_LIMIT | Time limit has been reached | |
| EVENT_LIMIT | Event limit has been reached | |
| PLMN_CHANGE | PLMN has been changed. For IMS this could be indicated by a SIP MESSAGE with a change of PLMN ID during an ongoing call. | |
| USER_LOCATION_CHANGE | In request message, this value is used to indicate that User location has been changed. The change in location information that triggered reporting is included. In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota | |
| RAT_CHANGE | In request message, this value is used to indicate that RAT type has been changed. In response message, this value is used to indicate that a change in the radio access technology shall cause the service consumer to ask for a re-authorization of the associated quota | |
| SESSION_AMBR_CHANGE | In request message, this value is used to indicate that Session AMBR has been changed. In response message, this value is used to indicate that a change in the session AMBR shall cause the service consumer to ask for a re-authorization of the associated quota. | |

| | | |
|--|---|-----------|
| GFBR_GUARANTEED_STATUS_CHANGE | In request message, this value is used to indicate that GFBR targets for the indicated SDFs are changed ("NOT_GUARANTEED" or "GUARANTEED" again). In response message, this value is used to indicate that a NF Consumer (CTF) needs to ensure requesting the notification from the access network and that a change in the GFBR targets shall cause the service consumer to ask for a re-authorization of the associated quota. | |
| UE_TIMEZONE_CHANGE | In request message, this value is used to indicate that UE timezone has been changed. In response message, this value is used to indicate that a change in the time zone where the end user is located shall cause the service consumer to ask for a re-authorization of the associated quota. | |
| TARIFF_TIME_CHANGE | Tariff time change has happened. | |
| MAX_NUMBER_OF_CHANGES_IN_CHARGING_CONDITIONS | Max number of change has been reached | |
| MANAGEMENT_INTERVENTION | Management intervention | |
| CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA | In request message, this value is used to indicate that Change of UE presence in PRA has happened. In response message, this value is used to indicate a request of reporting the event that the user enters/leaves the area(s) as indicated in the presenceReportingArea Attribute | |
| CHANGE_OF_3GPP_PS_DATA_OFF_STATUS | In request message, this value is used to indicate that Change of 3GPP PS Data off status has happened. In response message, this value is used to indicate that a change in the 3GPP PS Data off status shall cause the service consumer to ask for a re-authorization of the associated quota | |
| SERVING_NODE_CHANGE | A serving node (e.g., AMF) change in the NF Consumer | |
| REMOVAL_OF_UPF | A used UPF is removed | |
| ADDITION_OF_UPF | A new UPF is added. | |
| INSERTION_OF_ISMF | A new I-SMF is inserted | ETSUN |
| REMOVAL_OF_ISMF | A used I-SMF is removed | ETSUN |
| CHANGE_OF_ISMF | A used I-SMF is removed, and a new I-SMF is inserted | ETSUN |
| START_OF_SERVICE_DATA_FLOW | A Service Data Flow has started | |
| HANDOVER_CANCEL | The handover is cancelled. | |
| HANDOVER_START | The handover is start. | |
| HANDOVER_COMPLETE | The handover is completed. | |
| ECGI_CHANGE | In request message, this value is used to indicate that ECGI has been changed. In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota | 5GIEPC_CH |
| TAI_CHANGE | In request message, this value is used to indicate that TAI has been changed. In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota | 5GIEPC_CH |
| ADDITION_OF_ACCESS | Addition of access to the MA PDU session | ATSSS |
| REMOVAL_OF_ACCESS | Removal of access to the MA PDU session | ATSSS |

| | | |
|--------------------------------|--|------------------|
| START_OF_SDF_ADDITIONAL_ACCESS | Start of service data flow on additional access in a MA PDU session | ATSSS |
| REDUNDANT_TRANSMISSION_CHANGE | In request message, this value is used to indicate whether redundant transmission has been activated or not. In response message, this value is used to indicate that a change for the redendant transmission shall cause the service consumer to ask for a re-authorization and reporting. | URLLC |
| CGI_SAI_CHANGE | In request message, this value is used to indicate that CGI-SAI has been changed. In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota | TEI17_NIES GU |
| RAI_CHANGE | In request message, this value is used to indicate that RAI has been changed. In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota | TEI17_NIES GU |
| VSMF_CHANGE | In initial request message, this value is used to indicate a new V-SMF is inserted during the mobility procedure. In terminate request message, this value is used to indicate a used V-SMF is removed during mobility procedure. | |

6.1.6.3.7 Enumeration: FinalUnitAction

Table 6.1.6.3.7-1: Enumeration FinalUnitAction

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| TERMINATE | The service consumer should terminate the service session. | |
| REDIRECT | The service consumer should redirect the user to the address specified in the redirectServerAddress attribute. | |
| RESTRICT_ACCESS | The service consumer should restrict the user access according to the IP packet filters defined in the restrictionFilterRule attribute or according to the IP packet filters identified by the filterId attribute. | |

6.1.6.3.8 Enumeration: RedirectAddressType

Table 6.1.6.3.8-1: Enumeration RedirectAddressType

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| IPV4 | the redirect server address is IPV4. | |
| IPV6 | the redirect server address is IPV6. | |
| URL | the redirect server address is URL. | |
| URI | the redirect server address is URI. String providing an URI formatted according to IETF RFC 3261 [406]. | |

6.1.6.3.9 Enumeration: TriggerCategory

Table 6.1.6.3.9-1: Enumeration TriggerCategory

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| IMMEDIATE_REPORT | chargeable events for which, when occurring, the charging data generated by the NF Consumer triggers a Charging Event towards the CHF. | |
| DEFERRED_REPORT | chargeable events for which, when occurring, the charging data generated by the NF Consumer, does not trigger a Charging Event towards the CHF . | |

6.1.6.3.10 Enumeration: QuotaManagementIndicator

Table 6.1.6.3.10-1: Enumeration QuotaManagementIndicator

| Enumeration value | Description | Applicability |
|----------------------------|------------------------------------|---------------|
| ONLINE_CHARGING | quota management control | |
| OFFLINE_CHARGING | without quota management control | |
| QUOTA_MANAGEMENT_SUSPENDED | quota management control suspended | CHFCQM |

6.1.6.3.11 Enumeration: FailureHandling

Table 6.1.6.3.11-1: Enumeration FailureHandling

| Enumeration value | Description | Applicability |
|---------------------|--|---------------|
| TERMINATE | the service shall only be granted for as long as there is a connection between NF consumer and the CHF. | |
| CONTINUE | the NF consumer should re-send and continue the request to an alternative server in the case of transport temporary failures, provided that a failover procedure is supported in the CHF and the NF consumer, and that an alternative server is available. Otherwise, the service SHOULD be granted, even if charging data request can't be delivered. | |
| RETRY_AND_TERMINATE | the NF consumer should re-send the request to an alternative server in the case of transport temporary failures, provided that a failover procedure is supported in the CHF and NF consumer, and that an alternative server is available. Otherwise, the service should not be granted when the charging data request can't be delivered. | |

6.1.6.3.12 Enumeration: SessionFailover

Table 6.1.6.3.12-1: Enumeration SessionFailover

| Enumeration value | Description | Applicability |
|------------------------|--|---------------|
| FAILOVER_NOT_SUPPORTED | The Nchf_ConvergedCharging messages could not be moved to an alternative destination in the case of communication failure. This is the default behaviour if the attribute is not present in the response. | |
| FAILOVER_SUPPORTED | The Nchf_ConvergedCharging messages should be moved to an alternative destination in the case of communication failure. | |

6.1.6.3.13 Enumeration: 3GPPPSDataOffStatus

Table 6.1.6.3.13-1: Enumeration 3GPPPSDataOffStatus

| Enumeration value | Description | Applicability |
|-------------------|--------------------------------------|---------------|
| ACTIVE | 3GPP PS data off status is active. | |
| INACTIVE | 3GPP PS data off status is inactive. | |

6.1.6.3.14 Enumeration: ResultCode

Table 6.1.6.3.14-1: Enumeration ResultCode

| Enumeration value | Description | Applicability |
|---------------------------------|--|---------------|
| SUCCESS | The CHF grants the service to the end-user. This applies to the rating group. | |
| END_USER_SERVICE_DENIED | The CHF denies the service request due to end-user service restrictions or limitations related to the end-user. If the request contained used units they shall be deducted, if applicable. This applies to the rating group. | |
| QUOTA_MANAGEMENT_NOT_APPLICABLE | The CHF determines that the service can be granted to the end user without quota management control and used units shall be reported. This applies to the rating group. | |
| QUOTA_LIMIT_REACHED | The CHF denies the service request since the end user's account could not cover the requested service. If the request contained used units they shall be deducted, if applicable. This applies to the rating group. | |
| END_USER_SERVICE_REJECTED | The CHF denies the service request in order to terminate the service for which credit is requested. This applies to the rating group. | |
| RATING_FAILED | The CHF determines that the service cannot be rated due to insufficient rating input, incorrect parameter combination or unrecognized parameter, or parameter value. This applies to the rating group. | |
| QUOTA_MANAGEMENT | The CHF determines that the quota management control can temporarily be suspended. This applies to the rating group. | CHFCQM |

6.1.6.3.15 Enumeration: PartialRecordMethod

Table 6.1.6.3.15-1: Enumeration PartialRecordMethod

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| DEFAULT | Default method used for partial records | |
| INDIVIDUAL | Individual methods used for partial records | |

6.1.6.3.16 Enumeration: RoamerInOut

The enumeration RoamerInOut indicates whether the user is an in-bound or out-bound roamer.

Table 6.1.6.3.16-1: Enumeration RoamerInOut

| Enumeration value | Description | Applicability |
|-------------------|-------------------|---------------|
| IN_BOUND | In-bound roamer. | |
| OUT_BOUND | Out-bound roamer. | |

6.1.6.3.17 Void

6.1.6.3.18 Enumeration: SMMessageType

Table 6.1.6.3.18-1: Enumeration SMMessageType

| Enumeration value | Description | Applicability |
|--------------------|--|---------------|
| SUBMISSION | The SMS message type is submission. | |
| DELIVERY_REPORT | The SMS message type is delivery report. | |
| SM_SERVICE_REQUEST | The SMS message type is SMS service request. | |
| DELIVERY | The SMS message type is delivery or "to deliver" | |

6.1.6.3.19 Enumeration: SMPriority

Table 6.1.6.3.19-1: Enumeration SMPriority

| Enumeration value | Description | Applicability |
|-------------------|-----------------|---------------|
| LOW | low priority | |
| NORMAL | normal priority | |
| HIGH | high priority | |

6.1.6.3.20 Enumeration: DeliveryReportRequested

Table 6.1.6.3.20-1: Enumeration DeliveryReportRequested

| Enumeration value | Description | Applicability |
|-------------------|---------------------------------------|---------------|
| YES | Delivey report is requested. | |
| NO | The delivery report is not requested. | |

6.1.6.3.21 Enumeration: InterfaceType

Table 6.1.6.3.21-1: Enumeration InterfaceType

| Enumeration value | Description | Applicability |
|-------------------------|---|---------------|
| UNKNOWN | Interface type is unknown. | |
| MOBILE_ORIGINATING | Interface type is mobile originated. | |
| MOBILE_TERMINATING | Interface type is mobile terminated. | |
| APPLICATION_ORIGINATING | Interface type is application originated. | |
| APPLICATION_TERMINATION | Interface type is application terminated. | |

6.1.6.3.22 Enumeration: ClassIdentifier

Table 6.1.6.3.22-1: Enumeration ClassIdentifier

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| PERSONAL | The class identifier is personal. | |
| ADVERTISEMENT | The class identifier is advertisement. | |
| INFORMATIONAL | The class identifier is informational. | |
| AUTO | The class identifier is auto. | |

6.1.6.3.23 Enumeration: SMAddressType

Table 6.1.6.3.23-1: Enumeration SMAddressType

| Enumeration value | Description | Applicability |
|------------------------|---|---------------|
| EMAIL_ADDRESS | The carried address type is EMAIL. | |
| MSISDN | The carried address type is MSISDN. | |
| IPV4_ADDRESS | The carried address type is IPv4. | |
| IPV6_ADDRESS | The carried address type is IPv6. | |
| NUMERIC_SHORTCODE | The carried address type is numeric shortcode. | |
| ALPHANUMERIC_SHORTCODE | The carried address type is alphanumeric shortcode. | |
| OTHER | The carried address type is other. | |
| IMSI | The carried address type is IMSI | |

6.1.6.3.24 Enumeration: SMAddresseeType

Table 6.1.6.3.24-1: Enumeration SMAddresseeType

| Enumeration value | Description | Applicability |
|-------------------|----------------------------|---------------|
| TO | The addressee type is TO. | |
| CC | The addressee type is CC. | |
| BCC | The addressee type is BCC. | |

6.1.6.3.25 Enumeration: SMSServiceType

Table 6.1.6.3.25-1: Enumeration SMSServiceType

| Enumeration value | Description | Applicability |
|---|--|---------------|
| VAS4SMS_SHORT_MESSAGE_CONTENT_PROCESSING | The type of SM service is VAS4SMS short message content processing. | |
| VAS4SMS_SHORT_MESSAGE_FORWARDING | The type of SM service is VAS4SMS short message forwarding. | |
| VAS4SMS_SHORT_MESSAGE_FORWARDING_MULTIPLE_SUBSCRIPTIONS | The type of SM service is VAS4SMS short message forwarding multiple subscriptions. | |
| VAS4SMS_SHORT_MESSAGE_FILTERING | The type of SM service is VAS4SMS short message filtering. | |
| VAS4SMS_SHORT_MESSAGE_RECEIPT | The type of SM service is VAS4SMS short message receipt. | |
| VAS4SMS_SHORT_MESSAGE_NETWORK_STORAGE | The type of SM service is VAS4SMS short message network storage. | |
| VAS4SMS_SHORT_MESSAGE_TO_MULTIPLE_DESTINATIONS | The type of SM service is VAS4SMS short message to multiple destinations. | |
| VAS4SMS_SHORT_MESSAGE_VIRTUAL_PRIVATE_NETWORK(VPN) | The type of SM service is VAS4SMS short message virtual private network. | |
| VAS4SMS_SHORT_MESSAGE_AUTO_REPLY | The type of SM service is VAS4SMS short message auto reply. | |
| VAS4SMS_SHORT_MESSAGE_PERSONAL_SIGNATURE | The type of SM service is VAS4SMS short message personal signature. | |
| VAS4SMS_SHORT_MESSAGE_DEFERRED_DELIVERY | The type of SM service is VAS4SMS short message deferred delivery. | |

6.1.6.3.26 Enumeration: ReplyPathRequested

Table 6.1.6.3.26-1: Enumeration ReplyPathRequested

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| NO_REPLY_PATH_SET | The reply SM to an original SM was requested to follow the same path. | |
| REPLY_PATH_SET | The reply SM to an original SM was not requested to follow the same path. | |

6.1.6.3.27 Enumeration: DnnSelectionMode

Table 6.1.6.3.27-1: Enumeration DnnSelectionMode

| Enumeration value | Description |
|-----------------------|---|
| "VERIFIED" | UE or network provided DNN, subscription verified |
| "UE_DNN_NOT_VERIFIED" | UE provided DNN, subscription not verified |
| "NW_DNN_NOT_VERIFIED" | Network provided DNN, subscription not verified |

6.1.6.3.28 Enumeration: EventType

Table 6.1.6.3.28-1: Enumeration EventType

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| IEC | This value is used to indicate immediate event charging. | |
| PEC | This value is used to indicate post event charging. | |

6.1.6.3.29 Enumeration: MICOModeIndication

Table 6.1.6.3.29-1: Enumeration MICOModeIndication

| Enumeration value | Description | Applicability |
|-------------------|--------------------|---------------|
| "MICO_MODE" | MICO Mode used | |
| "NO_MICO_MODE" | MICO Mode not used | |

6.1.6.3.30 Enumeration: RegistrationMessageType

Table 6.1.6.3.30-1: Enumeration RegistrationMessageType

| Enumeration value | Description | Applicability |
|-------------------|------------------------------|---------------|
| "INITIAL" | Initial registration | |
| "MOBILITY" | Mobility registration update | |
| "PERIODIC" | Periodic registration update | |
| "EMERGENCY" | Emergency registration | |
| "DEREGISTRATION" | Deregistration | |

6.1.6.3.31 Enumeration: SmsIndication

Table 6.1.6.3.31-1: Enumeration SmsIndication

| Enumeration value | Description | Applicability |
|---------------------|-------------------------------|---------------|
| "SMS_SUPPORTED" | SMS over NAS is supported | |
| "SMS_NOT_SUPPORTED" | SMS over NAS is Not supported | |

6.1.6.3.32 Enumeration: APIDirection

Table 6.1.6.3.32-1: Enumeration APIDirection

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| INVOCATION | Indicates an API invocation from an AF. | |
| NOTIFICATION | Indicates a notification to an AF. | |

6.1.6.3.33 Enumeration: ManagementOperation

Table 6.1.6.3.33-1: Enumeration ManagementOperation

| Enumeration value | Description | Applicability |
|------------------------|--|---------------|
| CREATE_MOI | createMOI management operation | |
| MODIFY_MOI_ATTR | modifyMOIAttributes management operation | |
| DELETE_MOI | deleteMOI management operation | |
| NOTIFY_MOI_CREATION | notifyMOICreation management operation notification | |
| NOTIFY_MOI_ATTR_CHANGE | notifyMOIAttributeValueChanges management operation notification | |
| NOTIFY_MOI_DELETION | notifyMOIDeletion management operation notification | |

6.1.6.3.34 Enumeration: ManagementOperationStatus

Table 6.1.6.3.34-1: Enumeration ManagementOperationStatus

| Enumeration value | Description | Applicability |
|---------------------|--------------------------------|---------------|
| OPERATION_SUCCEEDED | Management operation succeeded | |
| OPERATION_FAILED | Management operation failed | |

6.1.6.3.35 Enumeration: IMSNodeFunctionality

Table 6.1.6.3.35-1: Enumeration IMSNodeFunctionality

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| AS | This field identifies that NF is a AS. | |
| MRFC | This field identifies that NF is a MRFC. | |
| IMS_GWF | This field identifies that NF is a IMS-GWF. | |

6.1.6.3.36 Enumeration: RedundantTransmissionType

Table 6.1.6.3.36-1: Enumeration RedundantTransmissionType

| Enumeration value | Description | Applicability |
|-----------------------------|---|---------------|
| NON_TRANSMISSION | Transmission without redundancy | |
| END_TO_END_USER_PLANE_PATHS | Dual Connectivity based end to end Redundant User Plane Paths | |
| N3_N9 | Redundant transmission on N3/N9 interfaces | |
| TRANSPORT_LAYER | Redundant transmission at transport layer | |

6.1.6.3.37 Enumeration: RoleOfIMSNode

Table 6.1.6.3.37-1: Enumeration RoleOfIMSNode

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| ORIGINATING | The node is applying an originating role, serving the calling party. | |
| TERMINATING | The node is applying a terminating role, serving the called party. | |
| FORWARDING | The node is applying a originating role, serving the forwarding party. | |

6.1.6.3.38 Enumeration: IMSSessionPriority

Table 6.1.6.3.38-1: Enumeration IMSSessionPriority

| Enumeration value | Description | Applicability |
|--|--|---------------|
| PRIORITY_0 | Mapped from the value received by the CSCF. (NOTE 1) | |
| PRIORITY_1 | Mapped from the value received by the CSCF. (NOTE 1) | |
| PRIORITY_2 | Mapped from the value received by the CSCF. (NOTE 1) | |
| PRIORITY_3 | Mapped from the value received by the CSCF. (NOTE 1) | |
| PRIORITY_4 | Mapped from the value received by the CSCF. (NOTE 1) | |
| NOTE 1: The mapping from TS 24.229 [258] table A.162 is operator specific. | | |
| NOTE 2: PRIORITY_0 is the highest priority. | | |

6.1.6.3.39 Enumeration: MediaInitiatorFlag

Table 6.1.6.3.39-1: Enumeration MediaInitiatorFlag

| Enumeration value | Description | Applicability |
|--------------------------------------|--|---------------|
| CALLED_PARTY | The called party initiated the modification. (NOTE 1) | |
| CALLING_PARTY | The calling party initiated the modification. | |
| UNKNOWN | It's unknown who initiated the modification. | |
| NOTE 1: The default is called party. | | |

6.1.6.3.40 Enumeration: SDPType

Table 6.1.6.3.40-1: Enumeration LocalGWInsertedIndication

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| OFFER | The SDP media component was of type SDP offer. | |
| ANSWER | The SDP media component was of type SDP answer. | |

6.1.6.3.41 Enumeration: OriginatorPartyType

Table 6.1.6.3.41-1: Enumeration OriginatorPartyType

| Enumeration value | Description | Applicability |
|-------------------|--------------------------------------|---------------|
| CALLING | The calling party is the originator. | |
| CALLED | The called party is the originator | |

6.1.6.3.42 Enumeration: AccessTransferType

Table 6.1.6.3.42-1: Enumeration AccessTransferType

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| PS_TO_CS | Transferred from packet switched to circuit switched. | |
| CS_TO_PS | Transferred from circuit switched to packet switched | |
| PS_TO_PS | Transferred from packet switched to packet switched | |
| CS_TO_CS | Transferred from circuit switched to circuit switched | |

6.1.6.3.43 Enumeration: UETransferType

Table 6.1.6.3.43-1: Enumeration UETransferType

| Enumeration value | Description | Applicability |
|-------------------|-----------------------------------|---------------|
| INTRA_UE | The type of transfer is intra-UE. | |
| INTER_UE | The type of transfer is inter-UE. | |

6.1.6.3.44 Enumeration: NNISessionDirection

Table 6.1.6.3.44-1: Enumeration NNISessionDirection

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| INBOUND | NNI is used for an inbound service request. | |
| OUTBOUND | NNI is used for an outbound service request. | |

6.1.6.3.45 Enumeration: NNIType

Table 6.1.6.3.45-1: Enumeration NNIType

| Enumeration value | Description | Applicability |
|---------------------|---|---------------|
| NON_ROAMING | Type of used NNI is non-roaming. | |
| ROAMING_NO_LOOPBACK | Type of used NNI is roaming without loopback routing. | |
| ROAMING_LOOPBACK | Type of used NNI is roaming with loopback routing. | |

6.1.6.3.46 Enumeration: NNIRelationshipMode

Table 6.1.6.3.46-1: Enumeration NNIRelationshipMode

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| TRUSTED | Is regarded as part of the same trust domain. | |
| NON_TRUSTED | Is not regarded as part of the same trust domain. | |

6.1.6.3.47 Enumeration: TADIdentifier

Table 6.1.6.3.47-1: Enumeration TADIdentifier

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| CS | The session shall be terminated in a circuit switched access network. | |
| PS | The session shall be terminated in a packet switched access network. | |

6.1.6.3.48 Enumeration: VariablePartType

Table 6.1.6.3.48-1: Enumeration VariablePartType

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| INTEGER | Indicates that the value are digits, which shall be announced as a single number, up to 10 digits. | |
| NUMBER | Indicates that the value are digits, which shall be announced as individual digits, up to 24 digits | |
| TIME | Indicates that the value is a time of day in the form of HHMM. | |
| DATE | Indicates that the value is a date in the form of YYYYMMDD. | |
| CURRENCY | Indicates that the value is monetary in the form of AAAAAABB, where AAAAAA is the inter part and BB is the decimal part. | |

6.1.6.3.49 Enumeration: QuotaConsumptionIndicator

Table 6.1.6.3.49-1: Enumeration QuotaConsumptionIndicator

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| QUOTA_NOT_USED | Indicates that the granted quota is not to be consumed during announcement setup and played. | |
| QUOTA_IS_USED | Indicates that the granted quota is to be consumed during announcement setup and played. | |

6.1.6.3.50 Enumeration: PlayToParty

Table 6.1.6.3.50-1: Enumeration PlayToParty

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| SERVED | Indicates that the announcement is to be played to the served party. | |
| REMOTE | Indicates that the announcement is to be played to the remote party. | |

6.1.6.3.51 Enumeration: AnnouncementPrivacyIndicator

Table 6.1.6.3.51-1: Enumeration AnnouncementPrivacyIndicator

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| NOT_PRIVATE | Indicates that the announcement can be all parties i.e., not only the PlayToParty. | |
| PRIVATE | Indicates that the announcement is to be played only to the PlayToParty. | |

6.1.6.3.52 Enumeration: SupplementaryServiceType

Table 6.1.6.3.52-1: Enumeration SupplementaryServiceType

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| OIP | Indicates originating identification presentation. | |
| OIR | Indicates originating identification restriction. | |
| TIP | Indicates terminating identification presentation. | |
| TIR | Indicates terminating identification restriction. | |
| HOLD | Indicates communication hold. | |
| CB | Indicates communication barring. | |
| CDIV | Indicates communication diversion. | |
| CW | Indicates communication waiting. | |
| MWI | Indicates message waiting indicator. | |
| CONF | Indicates conference. | |
| FA | Indicates flexible alerting. | |
| CCBS | Indicates completion of communication to busy subscriber. | |
| CCNR | Indicates completion of communications on no reply. | |
| MCID | Indicates malicious communication identification. | |
| CAT | Indicates customized alerting tone. | |
| CUG | Indicates closed user group. | |
| PNM | Indicates personal network management. | |
| CRS | Indicates customized ringing signal. | |
| ECT | Indicates explicit communication transfer, | |

6.1.6.3.53 Enumeration: SupplementaryServiceMode

Table 6.1.6.3.53-1: Enumeration SupplementaryServiceMode

| Enumeration value | Description | Applicability |
|-----------------------|---|---------------|
| CFU | Indicates communication forwarding unconditional. | |
| CFB | Indicates communication forwarding busy. | |
| CFNR | Indicates communication forwarding no reply. | |
| CFNL | Indicates communication forwarding not logged in. | |
| CD | Indicates communication deflection. | |
| CFNRC | Indicates communication forwarding on subscriber not reachable. | |
| ICB | Indicates incoming call barring. | |
| OCB | Indicates outgoing call barring. | |
| ACR | Indicates anonymous communication rejection. | |
| BLIND_TRANSFER | Indicates blind transfer. | |
| CONSULTATIVE_TRANSFER | Indicates consultative transfer. | |

6.1.6.3.54 Enumeration: ParticipantActionType

Table 6.1.6.3.54-1: Enumeration ParticipantActionType

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| CREATE | Indicates creating the conference. | |
| JOIN | Indicates joining in the conference. | |
| INVITE_INTRO | Indicates being invited into the conference. | |
| QUIT | Indicates quitting the conference. | |

6.1.6.3.55 Enumeration: TrafficForwardingWay

Table 6.1.6.3.55-1: Enumeration TrafficForwardingWay

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| N6 | Indicates the traffic is forwarded via N6. | |
| N19 | Indicates the traffic is forwarded via N19. | |
| LOCAL_SWITCH | Indicates the traffic is forwarded via local switching way. | |

6.1.6.3.56 Enumeration: ProseFunctionality

Table 6.1.6.3.56 -1: Enumeration ProseFunctionality

| Enumeration value | Description | Applicability |
|----------------------|--|---------------|
| DIRECT_DISCOVERY | Indicates the UE is requesting for ProSe direct discovery. | |
| DIRECT_COMMUNICATION | Indicates the UE is requesting for ProSe direct communication. | |

6.1.6.3.57 Enumeration: ProseEventType

Table 6.1.6.3.57 -1: Enumeration ProseEventType

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| ANNOUNCING | Indicates the ProSe ProSe charging announcing event. | |
| MONITORING | Indicates the ProSe ProSe charging monitoring event. | |
| MATCH_REPORT | Indicates the ProSe ProSe charging match report event. | |

6.1.6.3.58 Enumeration: DirectDiscoveryModel

Table 6.1.6.3.58 -1: Enumeration DirectDiscoveryModel

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| MODEL_A | Indicates model A of the Direct Discovery used by the UE | |
| MODEL_B | Indicates model B of the Direct Discovery used by the UE. | |

6.1.6.3.59 Enumeration: RoleOfUE

Table 6.1.6.3.59 -1: Enumeration RoleOfUE

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| ANNOUNCING_UE | Indicates role of the UE using ProSe for announcing. | |
| MONITORING_UE | Indicates role of the UE using ProSe for monitoring. | |
| REQUESTOR_UE | Indicates role of the UE using ProSe for sending request. | |
| REQUESTED_UE | Indicates role of the UE using ProSe for receive request. | |

6.1.6.3.60 Enumeration: RangeClass

Table 6.1.6.3.60 -1: Enumeration RangeClass

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| RESERVED | This value is reserved | |
| 50_METER | Indicates a range class for a specific proximity request in 50m | |
| 100_METER | Indicates a range class for a specific proximity request in 100m | |
| 200_METER | Indicates a range class for a specific proximity request in 200m | |
| 500_METER | Indicates a range class for a specific proximity request in 500m | |
| 1000_METER | Indicates a range class for a specific proximity request in 1000m | |
| UNUSED | Indicates a range class not used. | |

6.1.6.3.61 Enumeration: RadioResourcesIndicator

Table 6.1.6.3.61 -1: Enumeration RadioResourcesIndicator

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| OPERATOR_PROVIDED | Indicates the operator-provided radio resources for direct communication. | |
| CONFIGURED | Indicates the configured radio resources for direct communication. | |

6.1.6.4 Data types describing alternative data types or combinations of data types

None.

6.1.6.5 Binary data

None.

6.1.7 Error handling

6.1.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [299].

For the Nchf_ConvergedCharging API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [2]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [299] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [299]. In addition, the requirements in the following clauses shall apply.

6.1.7.2 Protocol Errors

There are no additional protocol errors applicable for the Nchf_ConvergedCharging API compared to the Protocol Error Handling specified in clause 5.2.7.2 of 3GPP TS 29.500 [299].

6.1.7.3 Application errors

The application errors defined for the Nchf_ConvergedCharging API are listed in table 6.1.7.3-1. The CHF shall include in the HTTP status code a "ProblemDetails" data structure with the "cause" attribute indicating the application error as listed in table 6.1.7.3-1. The common application errors defined in the table 5.2.7.2-1 in 3GPP TS 29.500 [7] may also be used for the Nchf_ConvergedCharging service.

Table 6.1.7.3-1: Application errors

| Application Error | HTTP status code | Description |
|---------------------------|------------------|--|
| CHARGING_FAILED | 400 Bad Request | The HTTP request is rejected because the set of session or subscriber information needed by the CHF for charging or CDR creation is incomplete or erroneous or not available e.g., rating_group, subscriber information. |
| RE_AUTHORIZATION_FAILED | 400 Bad Request | The HTTP request is rejected because the set of information needed by the CTF to report the usage is incomplete or erroneous or not available. |
| CHARGING_NOT_APPLICABLE | 403 Forbidden | The HTTP request is rejected by the CHF since it has been determined that the service can be allowed to the end user without any charging or CDR creation. |
| USER_UNKNOWN | 404 Not Found | The HTTP request is rejected because the end user specified in the request cannot be served by the CHF. |
| END_USER_REQUEST_DENIED | 403 Forbidden | The HTTP request denied by the CHF due to restrictions or limitations related to the end-user. |
| QUOTA_LIMIT_REACHED | 403 Forbidden | The HTTP request denied by the CHF because the end user's account could not cover the requested service. If the request contained used units they are deducted, if applicable. |
| END_USER_REQUEST_REJECTED | 403 Forbidden | The HTTP request rejected by the CHF due to end-user restrictions or limitations. |

6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Nchf_ConvergedCharging API. They shall be negotiated using the extensibility mechanism defined in subclause 6.6 of 3GPP TS 29.500 [299].

Table 6.1.8-1: Supported Features

| Feature number | Feature Name | Description |
|----------------|------------------------|---|
| 1 | CHFQCQM | CHF-controlled quota management i.e. support for temporary offline |
| 2 | AF_Charging_Identifier | Indicates the support of long character strings as charging identifiers. |
| 3 | 5GIEPC_CH | 5GS interworking with EPC |
| 4 | ATSSS | This feature indicates support of Access Traffic Steering, Switching, Splitting (ATSSS). |
| 5 | ETSUN | This feature indicates support of Enhancing Topology of SMF and UPF in 5G Networks (ETSUN). |
| 6 | EnhancedDiagnostics | Support the enhanced diagnostics |
| 7 | AMF_subs_PRA | PRA(s) subscription by CHF in AMF |
| 8 | FilterRuleList | Support of multiple filter rules in the final unit indication |
| 9 | TEI17_NIESGU | This feature indicates support of GERAN/UTRAN access |
| 10 | IMS | This feature indicates support of IMS. |
| 11 | QoSMonitoring | This feature indicates support of QoS Monitoring |
| 12 | Announcement | This feature indicates support of announcements. |
| 13 | 5GLAN | This feature indicates support of 5G LAN-type services. |
| 14 | URLLC | This feature indicates support of URLLC. |
| 15 | NotifyInfoResponse | This feature indicates support of response with information for a notification. |
| 16 | ES4xx | Extended Support of HTTP 400, 403, 404 allowing use of either ChargingDataResponse or ProblemDetails in the response. |
| 17 | ES3xx | Extended Support of HTTP 307 and 308 redirections, an NF that does not support this feature does only support HTTP redirection as specified for 3GPP Release 15 and 16. |
| 18 | EdgeComputing | This feature indicates support of edge computing domain charging. |
| 19 | 5GSCIoT | This feature indicates support of 5GS control plane ClIoT optimization |
| 20 | SMF_Charging_Id | Indicates the support of strings as SMF charging identifiers. |
| 30 | ProSe | This feature indicates support of 5G ProSe. |

6.1.9 Usage of general functionalities in SBA

6.1.9.1 General

The functionalities specified for Service Based Architecture in clause 6 of TS 29.500 [299], may be supported. Any deviation from or special usage of the specified functionalities are described in this clause.

6.1.9.2 Extensibility Mechanisms

The information elements sent on the Nchf_ConvergedCharging API can be extensible with vendor-specific data.

The only JSON data types that can be extended, by defining additional members, are JSON objects; simple data types (and arrays of items of simple data types) cannot be extended in this way. The charging vendor-specific extensions use the extensibility mechanism defined in clause 6.6 of TS 29.500 [299].

6.2 Nchf_OfflineOnlyCharging Service API

6.2.1 Introduction

The APIs defined in this clause implement the service operation defined in clause 5.3.2.

The Nchf_OfflineOnlyCharging service shall use the Nchf_OfflineOnlyCharging API.

The request URI used in each HTTP request from the NF service consumer towards the CHF shall have the structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

{apiRoot}/{apiName}/{apiVersion}/{apiSpecificResourceUriPart}

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The {apiName} shall be "Nchf_OfflineOnlyCharging".
- The {apiVersion} shall be "v1".
- The {apiSpecificResourceUriPart} shall be set as described in clause 6.2.3.

6.2.2 Usage of HTTP

See clause 6.1.2 in this document.

6.2.3 Resources

6.2.3.1 Overview

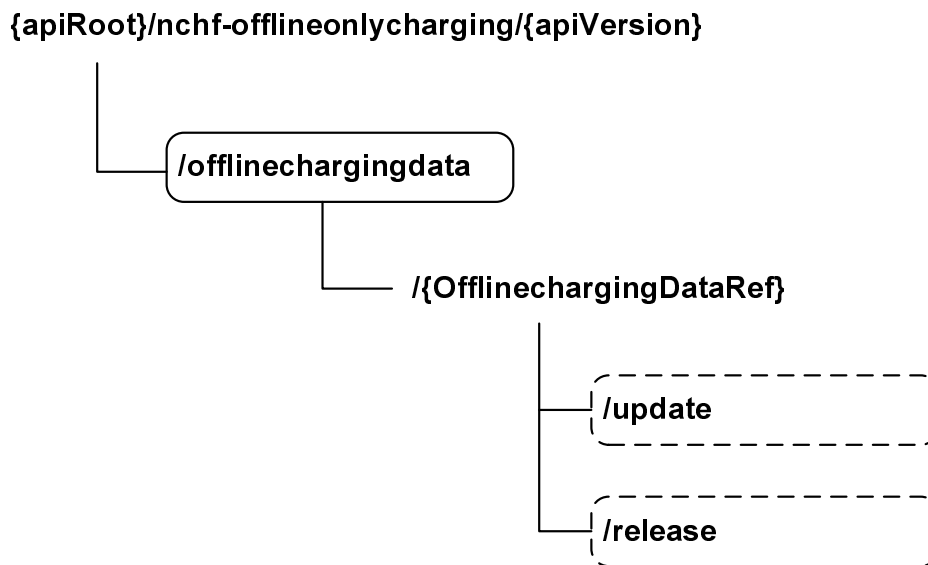


Figure 6.2.3.1-1: Resource URI structure of the Nchf_OfflineOnlyCharging API

Offline Only Charging Data Ref is a unique identifier for an offline only charging data resource in a PLMN. It's created in CHF when CHF receives a Nchf_OfflineOnlyCharging_Create request and provided to NF (CTF) in the Location header field in the Nchf_OfflineOnlyCharging_Create response. The NF (CTF) shall use the Offline Only Charging Data Ref received in subsequent requests to the CHF for the same charging data resource.

Table 6.2.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.2.3.1-1: Resources and methods overview

| Resource name | Resource URI | HTTP method or custom operation | Description | Corresponding service operation |
|---------------------------------------|---|---------------------------------|---|----------------------------------|
| Offline Only Charging Data | {apiRoot}/nchf-offlineonlycharging/{apiVersion}/offlinechargingdata | POST | Create a new Offline Only Charging Data resource | Nchf_OfflineOnlyCharging_Create |
| Individual Offline Only Charging Data | {apiRoot}/nchf-offlineonlycharging/{apiVersion}/offlinechargingdata/{OfflinechargingDataRef}/update | update (POST) | Update an existing Offline Only Charging Data resource. | Nchf_OfflineOnlyCharging_Update |
| | {apiRoot}/nchfofflineonlycharging/v1/offlinechargingdata/{OfflinechargingDataRef}/release | release (POST) | Update and release an existing Offline Only Charging Data resource. | Nchf_OfflineOnlyCharging_Release |

6.2.3.2 Resource: Charging Data

6.2.3.2.1 Description

Offline Only Charging Data resource represents a collection of the different offline only charging data resources created by the CHF for offline only charging as defined in 3GPP TS 32.290 [58].

6.2.3.2.2 Resource Definition

Resource URI: {apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata

This resource shall support the resource URI variables defined in table 6.2.3.2.2-1.

Table 6.2.3.2.2-1: Resource URI variables for this resource

| Name | Definition |
|---------|------------------|
| apiRoot | See clause 6.2.1 |

6.2.3.2.3 Resource Standard Methods

6.2.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.2.3.2.3.1-1.

Table 6.2.3.2.3.1-1: URI query parameters supported by the POST method on this resource

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| n/a | | | | |

This method shall support the request data structures specified in table 6.2.3.2.3.1-2 and the response data structures and response codes specified in table 6.2.3.2.3.1-3.

Table 6.2.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|---------------------|---|-------------|---|
| ChargingDataRequest | M | 1 | Parameters to create a new Offline Only Charging Data resource. |

Table 6.2.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|---------------------------|--|
| ChargingDataResponse | M | 1 | 201 Created | The creation of an Offline Only Charging Data resource is confirmed and a representation of that resource is returned. The Offline Only Charging Data resource which is created and returned successfully. The representation of created resource is identified via Location header field in the 201 response. |
| | | | 307 Temporary Redirect | (NOTE 2) |
| ChargingDataResponse | M | 1 | 400 Bad Request | (NOTE 2) |
| ChargingDataResponse | M | 1 | 403 Forbidden | (NOTE 2) |
| ChargingDataResponse | M | 1 | 404 Not Found | (NOTE 2) |
| | M | 1 | 405 Method Not Allowed | (NOTE 2) |
| | M | 1 | 408 Request Timeout | (NOTE 2) |
| | M | 1 | 500 Internal Server Error | (NOTE 2) |
| | M | 1 | 503 Service Unavailable | (NOTE 2) |
| | M | 1 | 508 Gateway Timeout | (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply. | | | | |
| NOTE 2: Failure cases are described in clause 6.2.7. | | | | |

6.2.3.2.4 Resource Custom Operations

None.

6.2.3.3 Resource: Individual Offline Only Charging Data

6.2.3.3.1 Description

Individual Offline Only Charging Data resource represents an offline only charging data resource created in the CHF.

6.2.3.3.2 Resource Definition

Resource URI: **{apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata/{OfflineChargingDataRef}**

This resource shall support the resource URI variables defined in table 6.2.3.3.2-1.

Table 6.2.3.3.2-1: Resource URI variables for this resource

| Name | Definition |
|------------------------|---|
| apiRoot | See clause 6.2.1 |
| OfflineChargingDataRef | Offline only charging data resource reference assigned by the CHF during the Nchf_OfflineOnlyCharging_Create operation, |

6.2.3.3.3 Resource Standard Methods

None.

6.2.3.3.4 Resource Custom Operations

6.2.3.3.4.1 Overview

Table 6.2.3.3.4.1-1: Custom operations

| Custom operation URI | Mapped HTTP method | Description |
|---|--------------------|---|
| {apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata/{OfflineChargingDataRef}/update | POST | Update an existing Offline Only Charging Data resource. |
| {apiRoot}/nchf-offlinecharging/v1/offlinechargingdata/{OfflineChargingDataRef}/release | POST | Update and release an existing Offline Only Charging Data resource. |

6.2.3.3.4.2 Operation: update

6.2.3.3.4.2.1 Description

This operation updates an existing Offline Only Charging Data resource.

6.2.3.3.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.3.3.4.2.2-1 and the response data structures and response codes specified in table 6.2.3.3.4.2.2-2.

Table 6.2.3.3.4.2.2-1: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|---------------------|---|-------------|--|
| ChargingDataRequest | M | 1 | Parameters to modify an existing Offline Only Charging Data resource matching the OfflineChargingDataRef according to the representation in the OfflineChargingData. The request URI is the representation in the Location header field in the 201 response of resource creation. |

Table 6.2.3.3.4.2.2-2: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|---------------------------|--|
| ChargingDataResponse | M | 1 | 200 OK | The modification of an Offline Only Charging Data resource is confirmed and a representation of that resource is returned. The Offline Only Charging Data resource which is modified and returned successfully. |
| | | | 307 Temporary Redirect | (NOTE 2) |
| ChargingDataResponse | M | 1 | 400 Bad Request | (NOTE 2) |
| ChargingDataResponse | M | 1 | 403 Forbidden | (NOTE 2) |
| ChargingDataResponse | M | 1 | 404 Not Found | (NOTE 2) |
| | M | 1 | 405 Method Not Allowed | (NOTE 2) |
| | M | 1 | 408 Request Timeout | (NOTE 2) |
| | M | 1 | 500 Internal Server Error | (NOTE 2) |
| | M | 1 | 503 Service Unavailable | (NOTE 2) |
| | M | 1 | 508 Gateway Timeout | (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply. | | | | |
| NOTE 2: Failure cases are described in clause 6.2.7. | | | | |

6.2.3.3.4.3 Operation: release

6.2.3.3.4.3.1 Description

This operation update and release an existing charging session

6.2.3.3.4.3.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.3.3.4.3.2-1 and the response data structures and response codes specified in table 6.2.3.3.4.3.2-2.

Table 6.2.3.3.4.3.2-1: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|---------------------|---|-------------|---|
| ChargingDataRequest | M | 1 | Parameters to modify and then release the Offline Only Charging Data resource matching the OfflineChargingDataRef according to the representation in the OfflineChargingData. The request URI is the representation in the Location header field in the 201 response of resource creation. |

Table 6.2.3.3.4.3.2-2: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|----------------|---|
| n/a | M | 1 | 204 No Content | Successful case: The Offline Only Charging Data resource matching the OfflineChargingDataRef is modified and then released. |
| ChargingDataResponse | M | 1 | 404 Not Found | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [299] also apply. | | | | |
| NOTE 2: Failure cases are described in clause 6.2.7. | | | | |

6.2.4 Custom Operations without associated resources

None.

6.2.5 Data Model

6.2.5.1 General

This clause specifies the application data model supported by the API.

The Nchf_OfflineOnlyCharging Service API allows the NF consumer to consume the offline only charging service from the CHF as defined in 3GPP TS 32.290 [58].

Table 6.2.5.1-1 specifies the data types defined for the OfflineOnlyCharging service based interface protocol.

Table 6.2.5.1-1: Nchf_ OfflineOnlyCharging specific Data Types

| Data type | Clause defined | Description | Applicability |
|----------------------|----------------------------|---|---------------|
| ChargingDataRequest | 6.2.5.2.1.1 6.2.5.2.2.1 | Describes the attributes of Charging Data Request to CHF for initial, update and termination of the charging session. | |
| ChargingDataResponse | 6.2.5.2.1.2 6.2.5.2.2.2 | Describes the attributes of Charging Data Response from CHF on charging session initial, update and termination. | |

The data types specified in Table 6.1.6.1-2 of this document are applied and re-used by the Nchf_OfflineOnlyCharging service based interface protocol.

6.2.5.2 Structured data types

6.2.5.2.1 Common Data Type

6.2.5.2.1.1 Type ChargingDataRequest

Table 6.2.5.2.1.1-1: Definition of type ChargingDataRequest

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------------------|--------------------------|----------------|-------------|--|---------------|
| subscriberIdentifier | SubscriberIdentifier | O _M | 0..1 | Identifier of the subscriber that uses the requested service. | |
| nfConsumerIdentification | NFConsumerIdentification | M | 1 | This is a grouped field which contains a set of information identifying the NF consumer of the charging service. | |
| invocationTimeStamp | DateTime | M | 1 | The time at which the request is send | |
| invocationSequenceNumber | Uint32 | M | 1 | This field contains the sequence number of the charging service invocation by the NF consumer ,i.e. the order of charging data requests. The sequence number in charging data request [initial] starts from 1, and increased by 1 for subsequent charging data request. It is allowed to start from 0 for backwards compatibility. | |
| serviceSpecificationInformation | String | O _C | 0..1 | Identifies service specific document that applies to the request, e.g. the service specific document ('middle tier' TS) and 3GPP release the service specific document is based upon. | |
| multipleUnitUsage | array(MultipleUnitUsage) | O _C | 0..N | This field contains the parameters for usage reporting. | |
| triggers | array(Trigger) | O _C | 0..N | This field identifies the event(s) triggering the request. | |

6.2.5.2.1.2 Type ChargingDataResponse

Table 6.2.5.2.1.2-1: Definition of type ChargingDataResponse

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------------|------------------|----------------|-------------|--|---------------|
| invocationTimestamp | DateTime | M | 1 | This field holds the timestamp of the charging service response from the CHF. | |
| invocationResult | InvocationResult | O _C | 1 | This field holds the result code in case of unsuccessful charging service invocation by the NF consumer | |
| invocationSequenceNumber | UInt32 | M | 1 | This field contains the sequence number of the charging service invocation by the NF consumer. The same value of the sequence number received in the request should be used in the response | |
| sessionFailover | SessionFailover | O _C | 0..1 | This field indicates whether alternative CHF is supported for ongoing charging service failover handling by NF consumer. | |
| triggers | array(Trigger) | O _C | 0..N | This field identifies the chargeable event(s) supplied by CHF to override/activate the existing chargeable event(s) in NF consumer. The presence of the triggers attribute without any triggerType is used by CHF to disable all the triggers. | |

6.2.5.2.1.3 Type MultipleUnitUsage

Table 6.2.5.2.1.3-1: Definition of type MultipleUnitUsage

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------|--------------------------|----------------|-------------|---|---------------|
| ratingGroup | RatingGroup | M | 1 | The identifier of a rating group. | |
| usedUnitContainer | array(UsedUnitContainer) | O _C | 0..N | This field contains the amount of used non-monetary service units measured. | |

6.2.5.2.1.4 Type UsedUnitContainer

Table 6.2.5.2.1.4-1: Definition of type UsedUnitContainer

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------|-----------------|----------------|-------------|--|---------------|
| serviceId | ServiceId | O _C | 0..1 | This field identity of the used service | |
| triggers | array (Trigger) | O _C | 0..N | This field specifies the reason for usage reporting for one or more types of unit associated to the rating group. | |
| triggerTimestamp | DateTime | O _C | 0..1 | This field holds the timestamp when the reporting trigger occur. | |
| time | Uint32 | O _C | 0..1 | This field holds the amount of requested time. | |
| totalVolume | Uint64 | O _C | 0..1 | This field holds the amount of requested volume in both uplink and downlink directions. | |
| uplinkVolume | Uint64 | O _C | 0..1 | This field holds the amount of requested volume in uplink direction. | |
| downlinkVolume | Uint64 | O _C | 0..1 | This field holds the amount of requested volume in downlink direction. | |
| serviceSpecific Units | Uint64 | O _C | 0..1 | This field holds the amount of used service specific units. | |
| eventTimestamps | Array(DateTime) | O _C | 0..N | This field holds the timestamps of the event reported in the Service Specific Unit s, if the reported units are event based | |
| localSequenceNumber | integer | M | 1 | holds the Used Unit sequence number, i.e. the order when charging event occurs. It increased by 1 for each Used Unit generation. | |

6.2.5.2.1.5 Type Trigger

Table 6.2.5.2.1.5-1: Definition of type Trigger

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------|-----------------|----------------|-------------|--|---------------|
| triggerType | TriggerType | O _C | 0..1 | the events whose occurrence lead to charging event is issued towards the CHF | |
| triggerCategory | TriggerCategory | M | 1 | This field indicates whether the charging data generated by the NF consumer for the trigger lead to a Charging Event towards the CHF immediately or not. | |
| timeLimit | DurationSec | O _C | 0..1 | Time limit if trigger type is "Expiry of data time limit" | |
| volumeLimit64 | Uint64 | O _C | 0..1 | Volume limit if trigger type is "Expiry of data volume limit". | |
| eventLimit | Uint32 | O _C | 0..1 | Event limit if trigger type is "Expiry of data event limit" | |
| maxNumberOfccc | Uint32 | O _C | 0..1 | Maximum number if trigger type is "Max nb of number of charging condition changes" | |

6.2.5.2.2 5G Data Connectivity Specified Data Type

6.2.5.2.2.1 Type ChargingDataRequest

The additional attributes of the type ChargingDataRequest defined in clause 6.2.5.2.1.1 for 5G data connectivity charging see table 6.1.6.2.2.1-1.

6.2.5.2.2.2 Type ChargingDataResponse

The additional attributes of the type ChargingDataResponse defined in clause 6.2.5.2.1.2 for 5G data connectivity charging see table 6.1.6.2.2.2-1.

6.2.5.2.2.3 Type MultipleUnitUsage

The additional attributes of the type MultipleUnitUsage defined in clause 6.2.5.2.1.3 for 5G data connectivity charging see table 6.1.6.2.2.3-1.

6.2.5.2.2.4 Type UsedUnitContainer

The additional attributes of the type UsedUnitContainer defined in clause 6.2.5.2.1.4 for 5G data connectivity charging see table 6.1.6.2.2.5-1.

6.2.5.2.2.5 Type PDUSessionChargingInformation

The additional attributes of the Type PDUSessionChargingInformation for 5G data connectivity charging see table 6.1.6.2.2.6-1.

6.2.5.2.2.6 Type UserInformation

The additional attributes of the Type UserInformation for 5G data connectivity charging see table 6.1.6.2.2.7-1.

6.2.5.2.2.7 Type PDUSessionInformation

The additional attributes of the Type PDUSessionInformation for 5G data connectivity charging see table 6.1.6.2.2.8-1.

6.2.5.2.2.8 Type PDUContainerInformation

The additional attributes of the Type PDUContainerInformation for 5G data connectivity charging see table 6.1.6.2.2.9-1.

6.2.5.2.2.9 Type NetworkSlicingInfo

The additional attributes of the Type NetworkSlicingInfo for 5G data connectivity charging see table 6.1.6.2.2.10-1.

6.2.5.2.2.10 Type PDUAddress

The additional attributes of the Type PDUAddress for 5G data connectivity charging see table 6.1.6.2.2.11-1.

6.2.5.2.2.11 Type ServingNetworkFunctionID

The additional attributes of the Type ServingNetworkFunctionID for 5G data connectivity charging see table 6.1.6.2.2.12-1.

6.2.5.2.2.12 Type RoamingQBCInformation

The additional attributes of the Type RoamingQBCInformation for 5G data connectivity charging see table 6.1.6.2.2.13-1.

6.2.5.2.2.13 Type MultipleQFIcontainer

The additional attributes of the Type MultipleQFIcontainer for 5G data connectivity charging see table 6.1.6.2.2.14-1.

6.2.5.2.2.14 Type RoamingChargingProfile

The additional attributes of the Type RoamingChargingProfile for 5G data connectivity charging see table 6.1.6.2.2.15-1.

6.2.5.2.2.15 Type QFIContainerInformation

The additional attributes of the Type QFIContainerInformation for 5G data connectivity charging see table 6.1.6.2.2.16-1.

6.2.5.2.2.16 Type RANSecondaryRATUsageReport

The additional attributes of the Type RANSecondaryRATUsageReport for 5G data connectivity charging see table 6.1.6.2.2.17-1.

6.2.5.2.2.17 Type QosFlowsUsageReport

The additional attributes of the Type QosFlowsUsageReport for 5G data connectivity charging see table 6.1.6.2.2.18-1.

6.2.5.3 Simple data types and enumerations

6.2.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.2.5.3.2 Simple data types

The simple data types are the same as definitions in table 6.1.6.3.2-1.

6.2.5.3.3 Enumeration: ChargingCharacteristicsSelectionMode

The Enumeration ChargingCharacteristicsSelectionMode is the same as definition in table 6.1.6.3.5-1.

6.2.5.3.4 Enumeration: NodeFunctionality

Table 6.2.5.3.4-1: Enumeration NodeFunctionality

| Enumeration value | Description | Applicability |
|--------------------------|---|----------------------|
| SMF | This field identifies that NF is a SMF. | |
| I_SMF | This field identifies that node is an I-SMF, only applicable for PDU session served by SMF + I-SMF. | |

6.2.5.3.5 Enumeration: TriggerType

Table 6.2.5.3.5-1: Enumeration TriggerType

| Enumeration value | Description | Applicability |
|--|---|---------------|
| FINAL | a service termination has happened | |
| ABNORMAL_RELEASE | PDU session has abnormal released. | |
| QOS_CHANGE | In request message, this value is used to indicate that QoS change has happened. Any of elements of QoSData may result in QoS change. | |
| VOLUME_LIMIT | Volume limit has been reached. | |
| TIME_LIMIT | Time limit has been reached | |
| EVENT_LIMIT | Event limit has been reached | |
| PLMN_CHANGE | PLMN has been changed. | |
| USER_LOCATION_CHANGE | In request message, this value is used to indicate that User location has been changed. The change in location information that triggered reporting is included. | |
| RAT_CHANGE | In request message, this value is used to indicate that RAT type has been changed. | |
| SESSION_AMBR_CHANGE | In request message, this value is used to indicate that Session AMBR has been changed. | |
| UE_TIMEZONE_CHANGE | In request message, this value is used to indicate that UE timezone has been changed. | |
| TARIFF_TIME_CHANGE | Tariff time change has happened. | |
| MAX_NUMBER_OF_CHANGES_IN_CHARGING_CONDITIONS | Max number of change has been reached | |
| MANAGEMENT_INTERVENTION | Management intervention | |
| CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA | In request message, this value is used to indicate that Change of UE presence in PRA has happened. In response message, this value is used to indicate a request of reporting the event that the user enters/leaves the area(s) as indicated in the presenceReportingArea Attribute | |
| CHANGE_OF_3GPP_PS_DATA_OFF_STATUS | In request message, this value is used to indicate that Change of 3GPP PS Data off status has happened. | |
| SERVING_NODE_CHANGE | A serving node (e.g., AMF) change in the NF Consumer | |
| REMOVAL_OF_UPF | A used UPF is removed | |
| ADDITION_OF_UPF | A new UPF is added. | |
| INSERTION_OF_ISMF | A new I-SMF is inserted | |
| REMOVAL_OF_ISMF | A used I-SMF is removed | |
| CHANGE_OF_ISMF | A used I-SMF is removed, and a new I-SMF is inserted | |
| START_OF_SERVICE_DATA_FLOW | A service data flow has started | |
| GFBR_GUARANTEED_STATUS_CHANGE | In request message, this value is used to indicate that GFBR targets for the indicated SDFs are changed ("NOT_GUARANTEED" or "GUARANTEED" again). In response message, this value is used to indicate that a NF Consumer (CTF) needs to ensure requesting the notification from the access network and that a change in the GFBR targets shall cause the service consumer to ask for a re-authorization of the associated quota. | |
| HANDOVER_CANCEL | The handover is cancelled. | |
| HANDOVER_START | The handover is started. | |
| HANDOVER_COMPLETE | The handover is complete. | |
| ADDITION_OF_ACCESS | Addition of access to the MA PDU session | ATSSS |
| REMOVAL_OF_ACCESS | Removal of access to the MA PDU session | ATSSS |
| START_OF_SDF_ADDITIONAL_ACCESS | Start of service data flow on additional access in a MA PDU session | ATSSS |

6.2.5.3.6 Enumeration: ResultCode

Table 6.2.5.3.6-1: Enumeration ResultCode

| Enumeration value | Description | Applicability |
|-------------------|-------------------------------|---------------|
| SUCCESS | The CHF opens or updates CDR. | |

6.2.5.3.7 Enumeration: 3GPPPSDataOffStatus

The Enumeration 3GPPPSDataOffStatus is the same as definition in table 6.1.6.3.13-1.

6.2.5.3.8 Enumeration: PartialRecordMethod

The Enumeration PartialRecordMethod is the same as definition in table 6.1.6.3.15-1.

6.2.5.3.9 Enumeration: RoamerInOut

The Enumeration RoamerInOut is the same as definition in table 6.1.6.3.16-1.

6.2.5.3.10 Void

6.2.6 Error handling

6.2.6.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [299].

For the Nchf_OfflineOnlyCharging API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [2]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [299] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [299]. In addition, the requirements in the following clauses shall apply.

6.2.6.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the Nchf_OfflineOnlyCharging API compared to the Protocol Error Handling specified in clause 5.2.7.2 of 3GPP TS 29.500 [299].

6.2.6.3 Application errors

The application errors defined for the Nchf_OfflineOnlyCharging API are listed in table 6.2.6.3-1. The CHF shall include in the HTTP status code a "ProblemDetails" data structure with the "cause" attribute indicating the application error as listed in table 6.2.6.3-1. The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [299] may also be used for the Nchf_OfflineOnlyCharging service.

Table 6.1.7.3-1: Application errors

| Application Error | HTTP status code | Description |
|-------------------|------------------|--|
| CHARGING_FAILED | 400 Bad Request | The HTTP request is rejected because the set of session or subscriber information needed by the CHF for charging or CDR creation is incomplete, erroneous, or not available. (E.g. Rating Group, subscriber information) |

6.2.7 Feature negotiation

The optional features in table 6.2.7-1 are defined for the Nchf_OfflineOnlyCharging API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [299].

Table 6.2.7-1: Supported Features

| Feature number | Feature Name | Description |
|----------------|-----------------|--|
| 4 | ATSSS | This feature indicates support of Access Traffic Steering, Switching, Splitting (ATSSS). |
| 20 | SMF_Charging_Id | Indicates the support of strings as SMF charging Identifiers |

7 Bindings of CDR field, Information Element and Resource Attribute

7.0 General

This clause aims to describe the mapping between the Service Charging Information element, Resource Attribute and CDR field for 5G charging.

Table 7.1-1 and 7.2-1 describes the mapping of the Information Element, Resource Attribute and CDR field of CHF-CDR for 5G charging.

7.1 Bindings of common CDR field, Information Element and Resource Attribute

Table 7.1-1: Bindings of common CDR field, Information Element and Resource Attribute

| Information Element | CDR Field | Resource Attribute |
|-----------------------------------|--|--|
| Session Identifier | Charging Session Identifier | /{ChargingDataRef }/ or /{OfflineChargingDataRef}/ |
| | | ChargingDataRequest |
| Subscriber Identifier | Subscriber Identifier | /subscriberIdentifier |
| Charging Id | Charging Id | /chargingId |
| Invocation Timestamp | - | /invocationTimeStamp |
| Invocation Sequence Number | - | /invocationSequenceNumber |
| Retransmission Indicator | - | /retransmissionIndicator |
| One-time Event | - | /oneTimeEvent |
| NF Consumer Identification | NF Information | /nfConsumerIdentification |
| NF Name | NF Name | /nfConsumerIdentification/nFName |
| NF Address | NF Address | /nfConsumerIdentification/nFIPv4Address /nfConsumerIdentification/nFIPv6Address /nfConsumerIdentification/nFFqdn |
| NF PLMN ID | NF PLMN ID | /nfConsumerIdentification/nFPLMNID |
| NF Functionality | NF Functionality | /nfConsumerIdentification/nodeFunctionality |
| Notify URI | | /notifyUri |
| Service Specification Information | Service Specification Information | /serviceSpecificationInfo |
| Multiple Unit Usage | List of Multiple Unit Usage | /multipleUnitUsage |
| Rating Group | Rating Group | /multipleUnitUsage/ratingGroup |
| Requested Unit | - | /multipleUnitUsage/requestedUnit |
| Time | - | /multipleUnitUsage/requestedUnit/time |
| Total Volume | - | /multipleUnitUsage/requestedUnit/totalVolume |
| Uplink Volume | - | /multipleUnitUsage/requestedUnit/uplinkVolume |
| Downlink Volume | - | /multipleUnitUsage/requestedUnit/downlinkVolume |
| Service Specific Units | - | /multipleUnitUsage/requestedUnit/serviceSpecificUnits |
| Used Unit Container | Used Unit Container | /multipleUnitUsage/usedUnitContainer |
| Service Identifier | Service Identifier | /multipleUnitUsage/usedUnitContainer/serviceId |
| Quota management Indicator | Quota management Indicator Quota management Indicator Ext | /multipleUnitUsage/usedUnitContainer/quotaManagementIndicator |
| Triggers | Triggers | /multipleUnitUsage/usedUnitContainer/triggers |
| Trigger Timestamp | Trigger Timestamp | /multipleUnitUsage/usedUnitContainer/triggerTimestamp |
| Time | Time | /multipleUnitUsage/usedUnitContainer/time |
| Total Volume | Total Volume | /multipleUnitUsage/usedUnitContainer/totalVolume |
| Uplink Volume | Uplink Volume | /multipleUnitUsage/usedUnitContainer/uplinkVolume |
| Downlink Volume | Downlink Volume | /multipleUnitUsage/usedUnitContainer/downlinkVolume |
| Service Specific Unit | Service Specific Unit | /multipleUnitUsage/usedUnitContainer/serviceSpecificUnits |
| Event Time Stamps | Event Time Stamps | /multipleUnitUsage/usedUnitContainer/eventTimeStamps |
| Local Sequence Number | Local Sequence Number | /multipleUnitUsage/usedUnitContainer/localSequenceNumber |
| Triggers | Triggers | /triggers |
| | | ChargingDataResponse |
| Invocation Timestamp | | /invocationTimeStamp |
| Invocation Sequence Number | | /invocationSequenceNumber |
| Session Failover | - | /sessionFailover |
| Triggers | - | /triggers |
| Multiple Unit Information | - | /multipleUnitInformation |
| Result Code | - | /multipleUnitInformation |
| Rating Group | - | /multipleUnitInformation/ratingGroup |
| Granted Unit | - | /multipleUnitInformation/grantedUnit |
| Tariff Time Change | - | /multipleUnitInformation/grantedUnit/tariffTimeChange |
| Time | - | /multipleUnitInformation/grantedUnit/time |

| | | |
|------------------------|---|---|
| Total Volume | - | /multipleUnitInformation/grantedUnit/totalVolume |
| Uplink Volume | - | /multipleUnitInformation/grantedUnit/uplinkVolume |
| Downlink Volume | - | /multipleUnitInformation/grantedUnit/downlinkVolume |
| Service Specific Units | - | /multipleUnitInformation/grantedUnit/serviceSpecificUnits |
| Triggers | - | /multipleUnitInformation/triggers |
| Validity Time | - | /multipleUnitInformation/validityTime |
| Quota Holding Time | - | /multipleUnitInformation/quotaHoldingTime |
| Final Unit Indication | - | /multipleUnitInformation/finalUnitIndication |
| Time Quota Threshold | - | /multipleUnitInformation/timeQuotaThreshold |
| Volume Quota Threshold | - | /multipleUnitInformation/volumeQuotaThreshold |
| Unit Quota Threshold | - | /multipleUnitInformation/unitQuotaThreshold |
| Invocation Result | - | /invocationResult |
| Invocation Result code | - | /invocationResult/error/cause |
| Failed parameter | - | /invocationResult/error/invalidParams |
| Failure Handling | - | /invocationResult/failureHandling |

7.2 Bindings for 5G data connectivity

Table 7.2-1: Bindings of 5G data connectivity CDR field, Information Element and Resource Attribute

| Information Element | CDR Field | Resource Attribute |
|---------------------------------------|---------------------------------------|---|
| | | ChargingDataRequest |
| Supported Features | - | /supportedFeatures |
| Multiple Unit Usage | List of Multiple Unit Usage | /multipleUnitUsage |
| UPF ID | UPF ID | /multipleUnitUsage/uPFID |
| Multi-homed PDU address | Multi-homed PDU address | /multipleUnitUsage/multiHomedPDUAddress |
| Used Unit Container | Used Unit Container | /multipleUnitUsage/usedUnitContainer |
| PDU Container Information | PDU Container Information | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation |
| Time of First Usage | Time of First Usage | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/timeOfFirstUsage |
| | Time of Last Usage | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/timeOfLastUsage |
| | QoS Information | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/qoSInformation |
| | QoS Characteristics | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/qoSCharacteristics |
| AF Charging Identifier | AF Charging Identifier | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/afChargingIdentifier |
| AF Charging Id String | AF Charging Id String | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/afChargingIdString |
| User Location Information | User Location Information | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/userLocationInformation |
| UE Time Zone | UE Time Zone | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/ueTimeZone |
| RAT Type | RAT Type | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/rATType |
| Serving Network Function ID | Serving Network Function ID | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/servingNodeID |
| Presence Reporting Area Information | Presence Reporting Area Information | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/presenceReportingAreaInformation |
| 3GPP PS Data Off Status | 3GPP PS Data Off Status | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/3gppPSDataOffStatus |
| MA PDU Steering functionality | MA PDU Steering functionality | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/mAPDUSteeringFunctionality |
| MA PDU Steering mode | MA PDU Steering mode | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/mAPDUSteeringMode |
| Sponsor Identity | Sponsor Identity | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/sponsorIdentity |
| Application Service Provider Identity | Application Service Provider Identity | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/applicationServiceProviderIdentity |
| Charging Rule Base Name | Charging Rule Base Name | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/chargingRuleBaseName |
| Traffic Forwarding Way | Traffic Forwarding Way | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/trafficForwardingWay |
| QoS Monitoring Report | QoS Monitoring Report | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/qoSMonitoringReport |
| PDU Session Charging Information | PDU Session Charging Information | /pDUSessionChargingInformation |
| Charging Id | Charging Id | /pDUSessionChargingInformation/chargingId |
| SMF Charging Id | SMF Charging Id | /pDUSessionChargingInformation/smfChargingId |
| Home Provided ChargingId | Home Provided ChargingId | /pDUSessionChargingInformation/homeProvidedChargingId |
| SMF Home Provided ChargingId | SMF Home Provided ChargingId | /pDUSessionChargingInformation/smfHomeProvidedChargingId |
| User Information | User Information | /pDUSessionChargingInformation/userInformation |
| User Identifier | User Identifier | /pDUSessionChargingInformation/userInformation/servedGPSI |
| User Equipment Info | User Equipment Info | /pDUSessionChargingInformation/userInformation/servedPEI |
| Unauthenticated Flag | Unauthenticated Flag | /pDUSessionChargingInformation/userInformation/unauthenticatedFlag |

| | | |
|-------------------------------------|-------------------------------------|--|
| Roamer In Out | Roamer In Out | /pDUSessionChargingInformation/userInformation/roamerInOut |
| User Location Info | User Location Info | /pDUSessionChargingInformation/userLocationInfo |
| User Location Time | | |
| MA PDU Non 3GPP User Location info | MA PDU Non 3GPP User Location info | /pDUSessionChargingInformation/mAPDUNon3GPPUserLocationInfo |
| Non 3GPP User Location Time | Non 3GPP User Location Time | /pDUSessionChargingInformation/non3GPPUserLocationTime |
| MA PDU Non 3GPP User Location Time | MA PDU Non 3GPP User Location Time | /pDUSessionChargingInformation/mAPDUNon3GPPUserLocationTime |
| UE Time Zone | UE Time Zone | /pDUSessionChargingInformation/uTimeZone |
| Presence Reporting Area Information | Presence Reporting Area Information | /pDUSessionChargingInformation/presenceReportingAreaInformation |
| PDU Session Information | PDU Session Information | /pDUSessionChargingInformation/pduSessionInformation |
| PDU Session ID | PDU Session ID | /pDUSessionChargingInformation/pduSessionInformation/pduSessionID |
| Network Slice Instance Identifier | Network Slice Instance Identifier | /pDUSessionChargingInformation/pduSessionInformation/networkSlicingInfo |
| PDU Type | PDU Type | /pDUSessionChargingInformation/pduSessionInformation/pduType |
| PDU Address | PDU Address | /pDUSessionChargingInformation/pduSessionInformation/pduAddress |
| PDU IPv4 Address | PDU IPv4 Address | /pDUSessionChargingInformation/pduSessionInformation/pduAddress/pduIPv4Address |
| PDU IPv6 Address with prefix | PDU IPv6 Address with prefix | /pDUSessionChargingInformation/pduSessionInformation/pduAddress/pduIPv6Addresswithprefix |
| PDU Address prefix length | PDU Address prefix length | /pDUSessionChargingInformation/pduSessionInformation/pduAddress/pduAddressprefixlength |
| IPv4 Dynamic Address Flag | IPv4 Dynamic Address Flag | /pDUSessionChargingInformation/pduSessionInformation/pduAddress/ipv4dynamicAddressFlag |
| IPv6 Dynamic Address Flag | IPv6 Dynamic Prefix Flag | pDUSessionChargingInformation/pduSessionInformation/pduAddress/ipv6dynamicPrefixFlag |
| | | /pDUSessionChargingInformation/pduSessionInformation/pduAddress/addIpv6AddrPrefixList |
| Additional PDU IPv6 Prefixes | Additional PDU IPv6 Prefixes | pDUSessionChargingInformation/pduSessionInformation/pduAddress/addIpv6AddrPrefixes |
| SSC Mode | SSC Mode | /pDUSessionChargingInformation/pduSessionInformation/sscMode |
| MA PDU session information | MA PDU session information | /pDUSessionChargingInformation/pduSessionInformation/mAPDUSessionInformation |
| MA PDU session indicator | MA PDU session indicator | /pDUSessionChargingInformation/pduSessionInformation/mAPDUSessionInformation/mAPDUSessionIndicator |
| ATSSS capability | ATSSS capability | /pDUSessionChargingInformation/pduSessionInformation/mAPDUSessionInformation/aTSSSCapability |
| SUPI PLMN ID | SUPI PLMN ID | /pDUSessionChargingInformation/pduSessionInformation/hPlmnId |
| Serving Network Function ID | Serving Network Function ID | /pDUSessionChargingInformation/pduSessionInformation/servingNetworkFunctionID |
| Serving CN PLMN ID | Serving CN PLMN ID | /pDUSessionChargingInformation/pduSessionInformation/servingCNPlmnId |
| RAT Type | RAT Type | /pDUSessionChargingInformation/pduSessionInformation/ratType |
| MA PDU Non 3GPP RAT Type | MA PDU Non 3GPP RAT Type | /pDUSessionChargingInformation/pduSessionInformation/mAPDUNon3GPPRATType |

| | | |
|---|---|---|
| Data Network Name Identifier | Data Network Name Identifier | /pDUSessionChargingInformation /pduSessionInformation/dnnid |
| DNN Selection Mode | DNN Selection Mode | /pDUSessionChargingInformation /pduSessionInformation/dnnselectionMode |
| Authorized QoS information | Authorized QoS Information | /pDUSessionChargingInformation /pduSessionInformation/authorized qoSInformation |
| Subscribed QoS Information | Subscribed QoS Information | /pDUSessionChargingInformation /pduSessionInformation/subscribedQoSInforma tion |
| Authorized Session-AMBR | Authorized Session-AMBR | /pDUSessionChargingInformation /pduSessionInformation/authorizedSessionAMB R |
| Subscribed Session-AMBR | Subscribed Session-AMBR | /pDUSessionChargingInformation /pduSessionInformation/subscribedSessionAM BR |
| Charging Characteristics | Charging Characteristics | /pDUSessionChargingInformation /pduSessionInformation/ chargingCharacteristics |
| Charging Characteristics Selection Mode | Charging Characteristics Selection Mode | /pDUSessionChargingInformation /pduSessionInformation/chargingCharacteristics SelectionMode |
| PDU session start Time | PDU session start Time | /pDUSessionChargingInformation /pduSessionInformation/startTime |
| PDU session stop Time | PDU session stop Time | /pDUSessionChargingInformation /pduSessionInformation/stopTime |
| Diagnostics | Diagnostics | /pDUSessionChargingInformation /pduSessionInformation/diagnostics |
| Enhanced Diagnostics | Enhanced Diagnostics | /pDUSessionChargingInformation /pduSessionInformation/enhancedDiagnostics |
| 3GPP PS Data Off Status | 3GPP PS Data Off Status | /pDUSessionChargingInformation /pduSessionInformation/3gppPSDataOffStatus |
| Session Stop Indicator | Session Stop Indicator | /pDUSessionChargingInformation /pduSessionInformation/sessionStopIndicator |
| Redundant Transmission Type | Redundant Transmission Type | /pDUSessionChargingInformation /pduSessionInformation/redundantTransmissio nType |
| PDU Session Pair ID | PDU Session Pair ID | /pDUSessionChargingInformation /pduSessionInformation/pDUSessionPairID |
| 5G LAN Type Service | 5G LAN Type Service | /pDUSessionChargingInformation /pduSessionInformation/5GLANTypeService |
| Internal Group Identifier | Internal Group Identifier | /pDUSessionChargingInformation /pduSessionInformation/5GLANTypeService/int ernalGroupIdentifier |
| Unit Count Inactivity Timer | - | /pDUSessionChargingInformation/unitCountIna ctivityTimer |
| RAN Secondary RAT Usage Report | RAN Secondary RAT Usage Report | /pDUSessionChargingInformation/rANSecondar yRATUsageReport |
| NG RAN Secondary RAT Type | NG RAN Secondary RAT Type | /pDUSessionChargingInformation/rANSecondar yRATUsageReport/rANSecondaryRATType |
| QoS Flows Usage Reports | QoS Flows Usage Reports | /pDUSessionChargingInformation/rANSecondar yRATUsageReport/qoSFlowsUsageReports |
| Roaming QBC information | Roaming QBC information | /roamingQBCInformation |
| Multiple QFI container | Multiple QFI container | /roamingQBCInformation/multipleQFIcontainer |
| Triggers | Triggers | /roamingQBCInformation/multipleQFIcontainer/t riggers |
| Trigger Timestamp | Trigger Timestamp | /roamingQBCInformation/multipleQFIcontainer/t riggerTimestamp |
| Time | Time | /roamingQBCInformation/multipleQFIcontainer/t ime |
| Total Volume | Total Volume | /roamingQBCInformation/multipleQFIcontainer/t otalVolume |
| Uplink Volume | Uplink Volume | /roamingQBCInformation/multipleQFIcontainer/ uplinkVolume |
| Downlink Volume | Downlink Volume | /roamingQBCInformation/multipleQFIcontainer/ downlinkVolume |

| | | |
|-------------------------------------|-------------------------------------|--|
| Local Sequence Number | Local Sequence Number | /roamingQBCInformation/multipleQFIcontainer/ ocalSequenceNumber |
| QFI Container information | QFI Container information | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation |
| QoS Flow Id | QoS Flow Id | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/qFI |
| Time of First Usage | Time of First Usage | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/ timeofFirstUsage |
| Time of Last Usage | Time of Last Usage | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/timeofLastUsage |
| QoS Information | QoS Information | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/qoSInformation |
| QoS Characteristics | QoS Characteristics | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/qoSCharacteristics |
| User Location Information | User Location Information | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/ userLocationInformation |
| UE Time Zone | UE Time Zone | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/uetimeZone |
| Presence Reporting Area Information | Presence Reporting Area Information | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/presenceReportingAreaInformation |
| RAT Type | RAT Type | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/rATType |
| Report Time | Report Time | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/reportTime |
| Serving Network Function ID | Serving Network Function ID | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/ servingNetworkFunctionID |
| 3GPP PS Data Off Status | 3GPP PS Data Off Status | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/3gppPSDataOffStatus |
| EPS bearer Charging Id | EPS bearer Charging Id | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/3gppChargingId |
| Diagnostics | Diagnostics | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/diagnostics |
| Enhanced Diagnostics | Enhanced Diagnostics | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/enhancedDiagnostics |
| UPF ID | UPF ID | /roamingQBCInformation/uPFID |
| Roaming Charging Profile | Roaming Charging Profile | /roamingQBCInformation/roamingChargingProfile |
| Trigger | Trigger | /roamingQBCInformationroamingChargingProfile/ trigger |
| Partial record method | Partial record method | /roamingQBCInformation/roamingChargingProfile/ partialRecordMethod |
| | | ChargingDataResponse |
| Supported Features | - | /supportedFeatures |
| Multiple Unit information | - | /multipleUnitInformation |
| UPF ID | - | /multipleUnitInformation/uPFID |
| PDU Session Charging Information | - | /pDUSessionChargingInformation |
| Presence Reporting Area Information | - | /pDUSessionChargingInformation/ presenceReportingAreaInformation |
| Unit Count Inactivity Timer | - | /pDUSessionChargingInformation/unitCountInactivityTimer |
| Roaming QBC information | - | /roamingQBCInformation |
| Roaming Charging Profile | - | /roamingQBCInformation/roamingChargingProfile |

7.3 Bindings for SMS charging

Table 7.3-1: Bindings of CDR field, Information Element and Resource Attribute for SMS charging

| Information Element | CDR Field | Resource Attribute |
|-----------------------------|-----------------------------|--|
| | | ChargingDataRequest |
| Invocation Timestamp | Event Timestamp | /invocationTimeStamp |
| SMS Charging Information | SMS Charging Information | /sMSChargingInformation |
| Originator Info | Originator Info | /sMSChargingInformation/originatorInfo |
| Originator SUPI | Originator SUPI | /sMSChargingInformation/originatorInfo/originatorSUPI |
| Originator GPSI | Originator GPSI | /sMSChargingInformation/originatorInfo/originatorGPSI |
| Originator Other Address | Originator Other Address | /sMSChargingInformation/originatorInfo/originatorOtherAddress |
| Originator Received Address | Originator Received Address | /sMSChargingInformation/originatorInfo/originatorReceivedAddress |
| Originator SCCP Address | Originator SCCP Address | /sMSChargingInformation/originatorInfo/originatorSCCPAddress |
| SM Originator Interface | SM Originator Interface | /sMSChargingInformation/originatorInfo/sMOriginatorInterface |
| SM Originator Protocol Id | SM Originator Protocol Id | /sMSChargingInformation/originatorInfo/sMOriginatorProtocolId |
| Recipient Info | Recipient Info | /sMSChargingInformation/recipientInfo |
| Recipient SUPI | Recipient SUPI | /sMSChargingInformation/recipientInfo/recipientSUPI |
| Recipient GPSI | Recipient GPSI | /sMSChargingInformation/recipientInfo/recipientGPSI |
| Recipient Other Address | Recipient Other Address | /sMSChargingInformation/recipientInfo/recipientOtherAddress |
| Recipient Received Address | Recipient Received Address | /sMSChargingInformation/recipientInfo/recipientReceivedAddress |
| Recipient SCCP Address | Recipient SCCP Address | /sMSChargingInformation/recipientInfo/recipientSCCPAddress |
| SM Destination Interface | SM Destination Interface | /sMSChargingInformation/recipientInfo/sMDestinationInterface |
| SM Recipient Protocol Id | SM Recipient Protocol Id | /sMSChargingInformation/recipientInfo/sMRecipientProtocolId |
| User Equipment Info | User Equipment Info | /sMSChargingInformation/userEquipmentInfo |
| Roamer In Out | Roamer In Out | /sMSChargingInformation/userEquipmentInfo/roamerInOut |
| User Location Info | User Location Info | /sMSChargingInformation/userLocationInfo |
| UE Time Zone | UE Time Zone | /sMSChargingInformation/ueTimeZone |
| RAT Type | RAT Type | /sMSChargingInformation/rATType |
| SMSC Address | SMSC Address | /sMSChargingInformation/sMSCAddress |
| SM Data Coding Scheme | SM Data Coding Scheme | /sMSChargingInformation/sMDataCodingScheme |
| SM Message Type | SM Message Type | /sMSChargingInformation/sMMessageType |
| SM Reply Path Requested | SM Reply Path Requested | /sMSChargingInformation/sMReplyPathRequested |
| SM User Data Header | SM User Data Header | /sMSChargingInformation/sMUserDataHeader |
| SM Status | SM Status | /sMSChargingInformation/sMStatus |
| SM Discharge Time | SM Discharge Time | /sMSChargingInformation/sMDischargeTime |
| Number of Messages Sent | Number of Messages Sent | /sMSChargingInformation/numberOfMessagesSent |
| SM Service Type | SM Service Type | /sMSChargingInformation/sMServiceType |
| SM Sequence Number | SM Sequence Number | /sMSChargingInformation/sMSequenceNumber |
| SMS result | SMS result | /sMSChargingInformation/sMSresult |
| Submission Time | Submission Time | /sMSChargingInformation/submissionTime |
| SM Priority | SM Priority | /sMSChargingInformation/sMPriority |
| Message Reference | Message Reference | /sMSChargingInformation/messageReference |
| Message Size | Message Size | /sMSChargingInformation/messageSize |
| Message Class | Message Class | /sMSChargingInformation/messageClass |
| Delivery Report Requested | Delivery Report Requested | /sMSChargingInformation/deliveryReportRequested |

| Information Element | CDR Field | Resource Attribute |
|---------------------|-----------|----------------------|
| | | ChargingDataResponse |
| - | - | - |

7.4 Bindings for 5G connection and mobility

Table 7.4-1: Bindings of 5G 5G connection and mobility CDR field, Information Element and Resource Attribute

| Information Element | CDR Field | Resource Attribute |
|------------------------------------|------------------------------------|--|
| | | ChargingDataRequest |
| AMF Identifier | AMF Identifier | /aMFId |
| Registration Charging Information | Registration Charging Information | /registrationChargingInformation |
| Registration message type | Registration message type | /registrationChargingInformation/registrationMessage type |
| User Information | User Information | /registrationChargingInformation/userInformation |
| User Identifier | User Identifier | /registrationChargingInformation/userInformation/servedGPSI |
| User Equipment Info | User Equipment Info | /registrationChargingInformation/userInformation/servedPEI |
| unauthenticatedFlag | unauthenticatedFlag | /registrationChargingInformation/userInformation/unauthenticatedFlag |
| Roamer In Out | Roamer In Out | /registrationChargingInformation/userInformation/roamerInOut |
| User Location Information | User Location Information | /registrationChargingInformation/userLocationinfo |
| PSCell Information | PSCell Information | /registrationChargingInformation/pSCellInformation |
| UE Time Zone | UE Time Zone | /registrationChargingInformation/uetimeZone |
| RAT Type | RAT Type | /registrationChargingInformation/rATType |
| 5GMM Capability | 5GMM Capability | /registrationChargingInformation/5gMMCapability |
| MICO Mode Indication | MICO Mode Indication | /registrationChargingInformation/mICOModeIndication |
| SMS Supported Indication | SMS Supported Indication | /registrationChargingInformation/smsIndication |
| TAI List | TAI List | /registrationChargingInformation/taiList |
| Service Area Restrictions | Service Area Restrictions | /registrationChargingInformation/serviceAreaRestriction |
| Requested NSSAI | Requested NSSAI | /registrationChargingInformation/requestedNSSAI |
| Allowed NSSAI | Allowed NSSAI | /registrationChargingInformation/allowedNssai |
| Rejected NSSAI | Rejected NSSAI | /registrationChargingInformation/rejectedNSSAI |
| NSSAI mapping list | NSSAI mapping list | /registrationChargingInformation/nSSAIMapList |
| AMF UE NGAP ID | AMF UE NGAP ID | /registrationChargingInformation/amfUeNgapId |
| RAN UE NGAP ID | RAN UE NGAP ID | /registrationChargingInformation/ranUeNgapId |
| RAN Node Id | RAN Node Id | /registrationChargingInformation/ranNodeId |
| N2 Connection Charging Information | N2 Connection Charging Information | /n2ConnectionChargingInformation |
| N2 Connection message type | N2 Connection message type | /n2ConnectionChargingInformation/n2ConnectionMessageType |
| User Information | User Information | /registrationChargingInformation/userInformation |
| User Identifier | User Identifier | /n2ConnectionChargingInformation/userInformation/servedGPSI |
| User Equipment Info | User Equipment Info | /n2ConnectionChargingInformation/userInformation/servedPEI |
| unauthenticatedFlag | unauthenticatedFlag | /n2ConnectionChargingInformation/userInformation/unauthenticatedFlag |
| Roamer In Out | Roamer In Out | /n2ConnectionChargingInformation/userInformation/roamerInOut |
| User Location Information | User Location Information | /n2ConnectionChargingInformation/userLocationinfo |
| PSCell Information | PSCell Information | /n2ConnectionChargingInformation/pSCellInformation |
| UE Time Zone | UE Time Zone | /n2ConnectionChargingInformation/uetimeZone |
| RAT Type | RAT Type | /n2ConnectionChargingInformation/rATType |
| AMF UE NGAP ID | AMF UE NGAP ID | /n2ConnectionChargingInformation/amfUeNgapId |
| RAN UE NGAP ID | RAN UE NGAP ID | /n2ConnectionChargingInformation/ranUeNgapId |

| | | |
|---|---|--|
| RAN Node Id | RAN Node Id | /n2ConnectionChargingInformation/ranNodeId |
| Mobility Restrictions | Mobility Restrictions | /n2ConnectionChargingInformation/restrictedRatList /n2ConnectionChargingInformation/forbiddenAreaList /n2ConnectionChargingInformation/serviceAreaRestriction /n2ConnectionChargingInformation/restrictedCnList |
| Allowed NSSAI | Allowed NSSAI | /n2ConnectionChargingInformation/allowedNssai |
| RRC Establishment Cause | RRC Establishment Cause | /n2ConnectionChargingInformation/rrcEstCause |
| Location Reporting Charging Information | Location Reporting Charging Information | /locationReportingChargingInformation |
| N2 Connection message type | N2 Connection message type | /locationReportingChargingInformation/n2ConnectionMessageType |
| User Information | User Information | /locationReportingChargingInformation/userInformation |
| User Identifier | User Identifier | /locationReportingChargingInformation/userInformation/servedGPSI |
| User Equipment Info | User Equipment Info | /locationReportingChargingInformation/userInformation/servedPEI |
| unauthenticatedFlag | unauthenticatedFlag | /locationReportingChargingInformation/userInformation/unauthenticatedFlag |
| Roamer In Out | Roamer In Out | /locationReportingChargingInformation/userInformation/roamerInOut |
| User Location Information | User Location Information | /locationReportingChargingInformation/userLocationInfo |
| PSCell Information | PSCell Information | locationReportingChargingInformation/pSCellInformation |
| UE Time Zone | UE Time Zone | /locationReportingChargingInformation/ueTimeZone |
| Presence Reporting Area Information | Presence Reporting Area Information | /locationReportingChargingInformation/presenceReportingAreaInformation |
| RAT Type | RAT Type | /locationReportingChargingInformation/rATType |
| | | ChargingDataResponse |
| Supported Features | - | /supportedFeatures- |
| Location Reporting Charging Information | - | /locationReportingChargingInformation |
| Location reporting message type | - | /locationReportingChargingInformation/locationReportingMessageType |
| Presence Reporting Area Information | - | /locationReportingChargingInformation/presenceReportingAreaInformation |

7.5 Bindings for Exposure Function Northbound API charging

Table 7.5-1: Bindings of CDR field, Information Element and Resource Attribute for Exposure Function Northbound API charging

| Information Element | CDR Field | Resource Attribute |
|-----------------------------------|-----------------------------------|--|
| | | ChargingDataRequest |
| Exposure Function API Information | Exposure Function API Information | /nEFChargingInformation |
| External Individual Identifier | External Individual Identifier | /nEFChargingInformation/externalIndividualIdentifier |
| External Individual Id List | External Individual Id List | /nEFChargingInformation/externalIndividualIdList |
| External Group Identifier | External Group Identifier | /nEFChargingInformation/externalGroupIdentifier |
| Internal Group Identifier | Internal Group Identifier | /nEFChargingInformation/groupIdentifier |
| API Direction | API Direction | /nEFChargingInformation/apiDirection |
| API Target Network Function | API Target Network Function | /nEFChargingInformation/apiTargetNetworkFunction |
| API Result Code | API Result Code | /nEFChargingInformation/apiResultCode |
| API Name | API Name | /nEFChargingInformation/apiName |
| API Reference | API Reference | /nEFChargingInformation/apiReference |
| API Content | API Content | /nEFChargingInformation/apiContent |
| | | ChargingDataResponse |
| - | - | - |

7.6 Bindings for NS performance and Analytics charging

Table 7.6-1: Bindings of CDR field, Information Element and Resource Attribute for NS performance and Analytics charging

| Information Element | CDR Field | Resource Attribute |
|--------------------------------------|--------------------------------------|--|
| | | ChargingDataRequest |
| Tenant Identifier | Tenant Identifier | /tenantIdentifier |
| Multiple Unit Usage | List of Multiple Unit Usage | /multipleUnitUsage |
| Used Unit Container | Used Unit Container | /multipleUnitUsage/usedUnitContainer |
| NSPA Container Information | NSPA Container Information | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation |
| Uplink Latency | Uplink Latency | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation/uplinkLatency |
| Downlink Latency | Downlink Latency | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation/downlinkLatency |
| Uplink Throughput | Uplink Throughput | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation/uplinkThroughput |
| Downlink Throughput | Downlink Throughput | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation/downlinkThroughput |
| Maximum packet loss rate UL | Maximum packet loss rate UL | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation/maximumPacketLossRateUL |
| Maximum packet loss rate DL | Maximum packet loss rate DL | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation/maximumPacketLossRateDL |
| Service Experience statistics data | Service Experience statistics data | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation/serviceExperienceStatisticsData |
| The number of PDU sessions | The number of PDU sessions | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation/theNumberOfPDUSessions |
| The number of Registered Subscribers | The number of Registered Subscribers | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation/theNumberOfRegisteredSubscribers |
| Load level | Load level | /multipleUnitUsage/usedUnitContainer/nSPAContainerInformation/loadLevel |
| NSPA Charging Information | NSPA Charging Information | /nSPAChargingInformation |
| Single NSSAI | Single NSSAI | /nSPAChargingInformation/singleNSSAI |
| | | ChargingDataResponse |
| - | - | - |

7.7 Bindings for NS Management charging

Table 7.7-1: Bindings of CDR field, Information Element and Resource Attribute for NS Management charging

| Information Element | CDR Field | Resource Attribute |
|---|---|---|
| | | ChargingDataRequest |
| Tenant Identifier | Tenant Identifier | /tenantIdentifier |
| MnS Consumer Identifier | MnS Consumer Identifier | /mnSConsumerIdentifier |
| NSM Charging information | NSM Charging information | /nSMChargingInformation |
| Management operation | Management operation | /nSMChargingInformation/managementOperation |
| Identifier of NetworkSlice Instance | Identifier of NetworkSlice Instance | /nSMChargingInformation/idNetworkSliceInstance |
| List of Service profile charging information | List of Service profile charging information | /nSMChargingInformation/listOfServiceProfileChargingInformation |
| Service Profile Id | Service Profile Id | /nSMChargingInformation/serviceProfileIdentifier |
| S-NSSAIs List | S-NSSAIs List | /nSMChargingInformation/sNSSAIsList |
| SST | SST | /nSMChargingInformation/sST |
| Latency | Latency | /nSMChargingInformation/latency |
| Availability | Availability | /nSMChargingInformation/availability |
| Resource Sharing Level | Resource Sharing Level | /nSMChargingInformation/resourceSharingLevel |
| Jitter | Jitter | /nSMChargingInformation/jitter |
| Reliability | Reliability | /nSMChargingInformation/reliability |
| Maximum Number of UEs | Maximum Number of UEs | /nSMChargingInformation/maximumNumberOfUEs |
| Coverage Area | Coverage Area | /nSMChargingInformation/coverageArea |
| UE Mobility Level | UE Mobility Level | /nSMChargingInformation/uEMobilityLevel |
| Delay Tolerance | Delay Tolerance | /nSMChargingInformation/delayToleranceIndicator |
| DL Throughput Per Slice | DL Throughput Per Slice | /nSMChargingInformation/dLThptPerSlice |
| DL Throughput Per UE | DL Throughput Per UE | /nSMChargingInformation/dLThptPerUE |
| UL Throughput Per Slice | UL Throughput Per Slice | /nSMChargingInformation/uLThptPerSlice |
| UL Throughput Per UE | UL Throughput Per UE | /nSMChargingInformation/uLThptPerUE |
| Max Number of PDU sessions | Max Number of PDU sessions | /nSMChargingInformation/maximumNumberOfPDUsessions |
| KPIs Monitoring list | KPIs Monitoring list | /nSMChargingInformation/kPIMonitoringList |
| Supported Access Technology | Supported Access Technology | /nSMChargingInformation/supportedAccessTechnology |
| V2X Communication Mode | V2X Communication Mode | /nSMChargingInformation/v2XCommunicationModelIndicator |
| Additional service profile charging information | Additional service profile charging information | /nSMChargingInformation/addServiceProfileInfo |
| Management operation status | Management operation status | /nSMChargingInformation/managementOperationStatus |
| Operational state | Operational state | /nSMChargingInformation/managementOperationalState |
| Administrative state | Administrative state | /nSMChargingInformation/managementAdministrativeState |
| | | ChargingDataResponse |
| - | - | - |

7.8 Bindings for IMS charging

Table 7.8-1: Bindings of CDR field, Information Element and Resource Attribute for IMS charging

| Information Element | CDR Field | Resource Attribute |
|---|------------------------------------|--|
| | | ChargingDataRequest |
| IMS Charging Information | IMS Charging Information | /iMSChargingInformation |
| Event Type | Event Type | /iMSChargingInformation/eventType |
| IMS Node Functionality | IMS Node Functionality | /iMSChargingInformation/iMSNodeFunctionality |
| Role of Node | Role of Node | /iMSChargingInformation/roleOfNode |
| User Information | - | /iMSChargingInformation/userInformation |
| User Identifier | User Identifier | /iMSChargingInformation/userInformation/serve dGPSI |
| User Equipment Info | User Equipment Info | /iMSChargingInformation/userInformation/serve dPEI |
| User Location Info | User Location Info | /iMSChargingInformation/userLocationInfo |
| UE Time Zone | UE Time Zone | /iMSChargingInformation/ueTimeZone |
| 3GPP PS Data Off Status | 3GPP PS Data Off Status | /iMSChargingInformation/3gppPSDataOffStatus |
| ISUP Cause | ISUP Cause | /iMSChargingInformation/isupCause |
| Serving Node Address | Control Plane Address | /iMSChargingInformation/controlPlaneAddress |
| VLR Number | VLR Number | /iMSChargingInformation/vlrNumber |
| MSC Address | MSC Address | /iMSChargingInformation/mscAddress |
| User Session ID | User Session ID | /iMSChargingInformation/userSessionID |
| Outgoing Session ID | Outgoing Session ID | /iMSChargingInformation/outgoingSessionID |
| Session Priority | Session Priority | /iMSChargingInformation/sessionPriority |
| Calling Party Addresses | Calling Party Addresses | /iMSChargingInformation/callingPartyAddresses |
| Called Party Address | Called Party Address | /iMSChargingInformation/calledPartyAddress |
| Number Portability Routing Information | Number Portability Routing | /iMSChargingInformation/numberPortabilityRout ingInformation |
| Carrier Select Routing Information | Carrier Select routing information | /iMSChargingInformation/carrierSelectRoutingIn formation |
| Alternate Charged Party Address | Alternate Charged Party Address | /iMSChargingInformation/alternateChargedPart yAddress |
| Requested Party Address | Requested Party Addresses | /iMSChargingInformation/requestedPartyAdre ss |
| Called Asserted Identities | Called Asserted Identities | /iMSChargingInformation/calledAssertedIdenti ties |
| Called Identity Change | Called Identity Changes | /iMSChargingInformation/calledIdentityChange/ calledIdentityChanges |
| Called Identity | Called Identity | /iMSChargingInformation/calledIdentityChange/ changeTime |
| Called Identity Change Time Stamp | Change Time | /iMSChargingInformation/calledIdentityChange |
| Associated URI | Associated URI | /iMSChargingInformation/associatedURI |
| Time Stamps | Time Stamps | /iMSChargingInformation/timeStamps |
| Application Server Information | Application Server Information | /iMSChargingInformation/applicationServerInfor mation |
| Inter Operator Identifier | Inter Operator Identifier | /iMSChargingInformation/interOperatorIdentifier |
| IMS Charging Identifier | IMS Charging Identifier | /iMSChargingInformation/imsChargingIdentifier |
| Related IMS Charging Identifier | Related ICID | /iMSChargingInformation/relatedICID |
| Related IMS Charging Identifier Generation Node | Related ICID Generation Node | /iMSChargingInformation/relatedICIDGeneratio nNode |
| Transit IOI List | Transit IOI List | /iMSChargingInformation/transitIOIList |
| Early Media Description | Early Media Description | /iMSChargingInformation/earlyMediaDescription |
| SDP Session Description | SDP Session Description | /iMSChargingInformation/sdpSessionDescriptio n |
| SDP Media Component | SDP Media Component | /iMSChargingInformation/sdpMediaComponent |
| Served Party IP Address | Served Party IP Address | /iMSChargingInformation/servedPartyIPAdres s |
| Server Capabilities | Server Capabilities | /iMSChargingInformation/serverCapabilities |
| Trunk Group ID | Trunk Group ID | /iMSChargingInformation/trunkGroupID |

| Information Element | CDR Field | Resource Attribute |
|---------------------------------------|---------------------------------------|--|
| Bearer Service | Bearer Service | /iMSChargingInformation/bearerService |
| Service Id | Service Id | /iMSChargingInformation/imsServiceId |
| Message Bodies | Message Bodies | /iMSChargingInformation/messageBodies |
| Access Network Information | Access Network Information | /iMSChargingInformation/accessNetworkInformation |
| Additional Access Network Information | Additional Access Network Information | /iMSChargingInformation/additionalAccessNetworkInformation |
| Cellular Network Information | Cellular Network Information | /iMSChargingInformation/cellularNetworkInformation |
| Access Transfer Information | Access Transfer Information | /iMSChargingInformation/accessTransferInformation |
| Access Network Info Change | Access Network Info Change | /iMSChargingInformation/accessNetworkInfoChange |
| IMS Communication Service ID | IMS Communication Service ID | /iMSChargingInformation/imsCommunicationServiceID |
| IMS Application Reference ID | IMS Application Reference ID | /iMSChargingInformation/imsApplicationReferenceID |
| Cause Code | Cause Code | /iMSChargingInformation/causeCode |
| Reason Header | Reason Header | /iMSChargingInformation/reasonHeader |
| Initial IMS Charging Identifier | Initial IMS Charging Identifier | /iMSChargingInformation/initialIMSChargingIdentifier |
| NNI Information | NNI Information | /iMSChargingInformation/nniInformation |
| From Address | From Address | /iMSChargingInformation/fromAddress |
| IMS Emergency Indication | IMS Emergency Indication | /iMSChargingInformation/imsEmergencyIndication |
| IMS Visited Network Identifier | IMS Visited Network Identifier | /iMSChargingInformation/imsVisitedNetworkIdentifier |
| SIP Route Header Received | SIP Route Header Received | /iMSChargingInformation/sipRouteHeaderReceived |
| SIP Route Header Transmitted | SIP Route Header Transmitted | /iMSChargingInformation/sipRouteHeaderTransmitted |
| TAD Identifier | TAD Identifier | /iMSChargingInformation/tadIdentifier |
| FE Identifier List | FE Identifier List | /iMSChargingInformation/felIdentifierList |
| | | ChargingDataResponse |

7.9 Bindings for 5G ProSe charging

Table 7.9-1: Bindings of 5G ProSe charging CDR field, Information Element and Resource Attribute

| Information Element | CDR Field | Resource Attribute |
|-------------------------------------|-------------------------------------|--|
| | | ChargingDataRequest |
| Supported Features | - | /supportedFeatures |
| Multiple Unit Usage | List of Multiple Unit Usage | /multipleUnitUsage |
| Used Unit Container | Used Unit Container | /multipleUnitUsage/usedUnitContainer |
| PC5 Container Information | PC5 Container Information | /multipleUnitUsage/usedUnitContainer/pC5ContainerInformation |
| Coverage Info | Coverage Info | /multipleUnitUsage/usedUnitContainer/pC5ContainerInformation/coverageInfo |
| Radio Parameter Set Info | Radio Parameter Set Info | /multipleUnitUsage/usedUnitContainer/pC5ContainerInformation/radioParameterSetInfo |
| Transmitter Info | Transmitter Info | /multipleUnitUsage/usedUnitContainer/pC5ContainerInformation/transmitterInfo |
| Time of First Transmission | Time of First Transmission | /multipleUnitUsage/usedUnitContainer/pC5ContainerInformation/timeOfFirstTransmission |
| Time of First Reception | Time of First Reception | /multipleUnitUsage/usedUnitContainer/pC5ContainerInformation/TimeOfFirstReception |
| ProSe Information | ProSe Information | /proSeInformation |
| Announcing PLMN ID | Announcing PLMN ID | /proSeInformation/announcingPlmnId |
| Announcing UE HPLMN Identifier | Announcing UE HPLMN Identifier | /proSeInformation/announcingUeHplmnId |
| Announcing UE VPLMN Identifier | Announcing UE VPLMN Identifier | /proSeInformation/announcingUeVplmnId |
| Monitoring UE HPLMN Identifier | Monitoring UE HPLMN Identifier | /proSeInformation/monitoringUeHplmnId |
| Monitoring UE VPLMN Identifier | Monitoring UE VPLMN Identifier | /proSeInformation/monitoringUeVplmnId |
| Discoverer UE HPLMN Identifier | Discoverer UE HPLMN Identifier | /proSeInformation/discovererUeHplmnId |
| Discoverer UE VPLMN Identifier | Discoverer UE VPLMN Identifier | /proSeInformation/discovererUeVplmnId |
| Discoveree UE HPLMN Identifier | Discoveree UE HPLMN Identifier | /proSeInformation/discovereeUeHplmnId |
| Discoveree UE VPLMN Identifier | Discoveree UE VPLMN Identifier | /proSeInformation/discovereeUeVplmnId |
| Monitored PLMN Identifier | Monitored PLMN Identifier | /proSeInformation/monitoredPlmnIdentifier |
| ProSe Application ID | ProSe Application ID | /proSeInformation/proseApplicationId |
| <u>Application ID</u> | <u>Application ID</u> | /proSeInformation/applicationId |
| Application Specific Data | Application Specific Data | /proSeInformation/applicationSpecificData |
| ProSe functionality | ProSe functionality | /proSeInformation/proseFunctionality |
| ProSe Event Type | ProSe Event Type | /proSeInformation/proseEventType |
| Direct Discovery Model | Direct Discovery Model | /proSeInformation/directDiscoveryModel |
| Validity Period | Validity Period | /proSeInformation/validityPeriod |
| Role of UE | Role of UE | /proSeInformation/roleOfUe |
| ProSe Request Timestamp | ProSe Request Timestamp | /proSeInformation/proseRequestTimestamp |
| PC3 Protocol Cause | PC3 Protocol Cause | /proSeInformation/pC3ProtocolCause |
| Monitoring UE Identifier | Monitoring UE Identifier | /proSeInformation/monitoringUEIdentifier |
| Requestor PLMN Identifier | Requestor PLMN Identifier | /proSeInformation/requestorPlmnIdentifier |
| Requested Application Layer User ID | Requested Application Layer User ID | /proSeInformation/requestedApplicationLayerUserId |
| Requested PLMN Identifier | Requested PLMN Identifier | /proSeInformation/requestedPlmnIdentifier |
| Time Window | Time Window | /proSeInformation/timeWindow |
| Range Class | Range Class | /proSeInformation/rangeClass |
| Proximity Alert Indication | Proximity Alert Indication | /proSeInformation/proximityAlertIndication |
| Proximity Alert Timestamp | Proximity Alert Timestamp | /proSeInformation/proximityAlertTimestamp |
| Proximity Cancellation Timestamp | Proximity Cancellation Timestamp | /proSeInformation/proximityCancellationTimestamp |
| Relay IP address | Relay IP address | /proSeInformation/relayIpAddress |
| ProSe UE-to-Network Relay UE ID | ProSe UE-to-Network Relay UE ID | /proSeInformation/proSeUeToNetworkRelayUeId |
| ProSe Destination Layer-2 ID | ProSe Destination Layer-2 ID | /proSeInformation/proSeDestinationLayer2Id |
| PFI Container Information | PFI Container Information | /proSeInformation/pFIContainerInformation |
| PC5 QoS Flow ID | PC5 QoS Flow ID | /proSeInformation/pFIContainerInformation/pC5QosFlowId |
| Time of First Usage | Time of First Usage | /proSeInformation/pFIContainerInformation/timeOfFirstUsage |

| | | |
|--|--|--|
| Time of Last Usage | Time of Last Usage | /proSeInformation/pFIContainerInformation/timeOfLastUsage |
| QoS Information | QoS Information | /proSeInformation/pFIContainerInformation/qoSInformation |
| QoS Characteristics | QoS Characteristics | /proSeInformation/pFIContainerInformation/qoSCharacteristics |
| User Location Information | User Location Information | /proSeInformation/pFIContainerInformation/userLocationInformation |
| UE Time Zone | UE Time Zone | /proSeInformation/pFIContainerInformation/ueTimeZone |
| Presence Reporting Area Information | Presence Reporting Area Information | /proSeInformation/pFIContainerInformation/presenceReportingAreaInformation |
| Report Time | Report Time | /proSeInformation/pFIContainerInformation/reportTime |
| Transmission Data Container | Transmission Data Container | /proSeInformation/transmissionDataContainer |
| Local Sequence Number | Local Sequence Number | /proSeInformation/transmissionDataContainer/localSequenceNumber |
| Change Time | Change Time | /proSeInformation/transmissionDataContainer/changeTime |
| Coverage status | Coverage status | /proSeInformation/transmissionDataContainer/coverageStatus |
| User Location Information | User Location Information | /proSeInformation/transmissionDataContainer/userLocationInformation |
| Data Volume Transmitted | Data Volume Transmitted | /proSeInformation/transmissionDataContainer/dataVolumeTransmitted |
| Change Condition | Change Condition | /proSeInformation/transmissionDataContainer/changeCondition |
| VPLMN Identifier | VPLMN Identifier | /proSeInformation/transmissionDataContainer/vplmnIdentifier |
| Usage Information Report Sequence Number | Usage Information Report Sequence Number | /proSeInformation/transmissionDataContainer/usageInformationReportSequenceNumber |
| Radio Resources Indicator | Radio Resources Indicator | /proSeInformation/transmissionDataContainer/radioResourcesIndicator |
| Radio Frequency | Radio Frequency | /proSeInformation/transmissionDataContainer/radioFrequency |
| PC5 Radio Technology | PC5 Radio Technology | /proSeInformation/transmissionDataContainer/pC5RadioTechnology |
| Reception Data Container | Reception Data Container | /proSeInformation/receptionDataContainer |
| Local Sequence Number | Local Sequence Number | /proSeInformation/receptionDataContainer/localSequenceNumber |
| Change Time | Change Time | /proSeInformation/receptionDataContainer/changeTime |
| Coverage Status | Coverage Status | /proSeInformation/receptionDataContainer/coverageStatus |
| User Location Information | User Location Information | /proSeInformation/receptionDataContainer/userLocationInformation |
| Data Volume Received | Data Volume Received | /proSeInformation/receptionDataContainer/dataReceived |
| Change Condition | Change Condition | /proSeInformation/receptionDataContainer/changeCondition |
| VPLMN Identifier | VPLMN Identifier | /proSeInformation/receptionDataContainer/vplmnIdentifier |
| Usage Information Report Sequence Number | Usage Information Report Sequence Number | /proSeInformation/receptionDataContainer/usageInformationReportSequenceNumber |
| Radio Resources Indicator | Radio Resources Indicator | /proSeInformation/receptionDataContainer/radioResourcesIndicator |
| Radio Frequency | Radio Frequency | /proSeInformation/receptionDataContainer/radioFrequency |
| PC5 Radio Technology | PC5 Radio Technology | /proSeInformation/receptionDataContainer/pC5RadioTechnology |
| | | ChargingDataResponse |

7.10 Bindings for Edge Computing domain charging

Table 7.10-1: Bindings of Edge Computing domain charging CDR field, Information Element and Resource Attribute

| Information Element | CDR Field | Resource Attribute |
|--|--|--|
| | | ChargingDataRequest |
| EAS ID | EAS ID | /eASID |
| EDN ID | EDN ID | /eDNID |
| EAS Provider Identifier | EAS Provider Identifier | /eASProviderIdentifier |
| Edge Enabling Infrastructure Resource Usage Charging Information | Edge Enabling Infrastructure Resource Usage Charging Information | /edgeInfrastructureUsageChargingInformation |
| Mean Virtual CPU Usage | Mean Virtual CPU Usage | /edgeInfrastructureUsageChargingInformation/meanVirtualCPUUsage |
| Mean Virtual Memory Usage | Mean Virtual Memory Usage | /edgeInfrastructureUsageChargingInformation/meanVirtualMemoryUsage |
| Mean Virtual Disk Usage | Mean Virtual Disk Usage | /edgeInfrastructureUsageChargingInformation/meanVirtualDiskUsage |
| Measured Incoming Bytes | Measured Incoming Bytes | /edgeInfrastructureUsageChargingInformation/measuredInBytes |
| Measured Outgoing Bytes | Measured Outgoing Bytes | /edgeInfrastructureUsageChargingInformation/measuredOutBytes |
| Duration Start Time | Duration Start Time | /edgeInfrastructureUsageChargingInformation/durationStartTime |
| Duration End Time | Duration End Time | /edgeInfrastructureUsageChargingInformation/durationEndTime |
| EAS Deployment Charging Information | EAS Deployment Charging Information | /eASDeploymentChargingInformation |
| EAS Deployment Requirements | EAS Deployment Requirements | /eASDeploymentChargingInformation/eASDeploymentRequirements |
| LCM Event Type | LCM Event Type | /eASDeploymentChargingInformation/ICMEventType |
| LCM Start Time | LCM Start Time | /eASDeploymentChargingInformation/ICMStartTime |
| LCM End Time | LCM End Time | /eASDeploymentChargingInformation/ICMEndTime |
| Direct Edge Enabling Service Charging Information | Exposure Function API Information | /nEFChargingInformation |
| Exposed Edge Enabling Service Charging Information | Exposure Function API Information | /nEFChargingInformation |
| | | ChargingDataResponse |

8 Security

Security aspects for service based interface shall be supported as specified in subclause 13 of 3GPP TS 33.501 [390].

As indicated in 3GPP TS 33.501 [390] and 3GPP TS 29.500 [299], the access to the Nchf_ConvergedCharging API and to the Nchf_OfflineOnlyCharging API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [403]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [305]) plays the role of the authorization server.

If OAuth2 authorization is used, an NF Service Consumer, prior to consuming services offered by the Nchf_ConvergedCharging API and by the Nchf_OfflineOnlyCharging API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [305], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nchf_ConvergedCharging service. The same principle applies for Nchf_OfflineOnlyCharging API.

The Nchf_ConvergedCharging API defines a single scope "nchf-convergedcharging" for the entire service, and it does not define any additional scopes at resource and operation level.

The Nchf_OfflineOnlyCharging API defines a single scope "nchf-offlineonlycharging" for the entire service, and it does not define any additional scopes at resource and operation level.

Annex A (normative): OpenAPI specification

A.1 General

The present Annex contains two OpenAPIs [500] specification of HTTP messages and content bodies used by the Nchf_ConvergedCharging API and Nchf_OfflineOnlyCharging API.

This Annex takes 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 1: 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 document are available on a repository (see 3GPP TS 29.501 [300] clause 5.3.1 and 3GPP TR 21.900 [101] clause 5B)).

A.2 Nchf_ConvergedCharging API

```
openapi: 3.0.0
info:
  title: Nchf_ConvergedCharging
  version: 3.1.7
  description: |
    ConvergedCharging Service © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI,
    TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: >
    3GPP TS 32.291 V17.10.0: Telecommunication management; Charging management;
    5G system, charging service; Stage 3.
  url: 'http://www.3gpp.org/ftp/Specs/archive/32_series/32.291/'
servers:
  - url: '{apiRoot}/nchf-convergedcharging/v3'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in subclause 4.4 of 3GPP TS 29.501.
security:
  - {}
  - oAuth2ClientCredentials:
    - nchf-convergedcharging
paths:
  /chargingdata:
    post:
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ChargingDataRequest'
      responses:
        '201':
          description: Created
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ChargingDataResponse'
        '400':
          description: Bad request
          content:
            application/problem+json:
              schema:
                oneOf:
                  - $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
                  - $ref: '#/components/schemas/ChargingDataResponse'
        '307':
          $ref: 'TS29571_CommonData.yaml#/components/responses/307'
```

```

'308':
  $ref: 'TS29571_CommonData.yaml#/components/responses/308'
'401':
  $ref: 'TS29571_CommonData.yaml#/components/responses/401'
'403':
  description: Forbidden
  content:
    application/problem+json:
      schema:
        oneOf:
          - $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
          - $ref: '#/components/schemas/ChargingDataResponse'
'404':
  description: Not Found
  content:
    application/problem+json:
      schema:
        oneOf:
          - $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
          - $ref: '#/components/schemas/ChargingDataResponse'
'405':
  $ref: 'TS29571_CommonData.yaml#/components/responses/405'
'408':
  $ref: 'TS29571_CommonData.yaml#/components/responses/408'
'410':
  $ref: 'TS29571_CommonData.yaml#/components/responses/410'
'411':
  $ref: 'TS29571_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29571_CommonData.yaml#/components/responses/413'
'500':
  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'
callbacks:
  chargingNotification:
    '{$request.body#/notifyUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ChargingNotifyRequest'
        responses:
          '200':
            description: OK.
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/ChargingNotifyResponse'
          '204':
            description: 'No Content, Notification was succesfull'
          '307':
            $ref: 'TS29571_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29571_CommonData.yaml#/components/responses/308'
          '400':
            description: Bad request
            content:
              application/problem+json:
                schema:
                  oneOf:
                    - $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
                    - $ref: '#/components/schemas/ChargingNotifyResponse'
            default:
              $ref: 'TS29571_CommonData.yaml#/components/responses/default'
'/chargingdata/{ChargingDataRef}/update':
  post:
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ChargingDataRequest'
  parameters:

```

```

- name: ChargingDataRef
  in: path
  description: a unique identifier for a charging data resource in a PLMN
  required: true
  schema:
    type: string
responses:
  '200':
    description: OK. Updated Charging Data resource is returned
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ChargingDataResponse'
  '307':
    $ref: 'TS29571_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29571_CommonData.yaml#/components/responses/308'
  '400':
    description: Bad request
    content:
      application/problem+json:
        schema:
          oneOf:
            - $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
            - $ref: '#/components/schemas/ChargingDataResponse'
  '401':
    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
  '403':
    description: Forbidden
    content:
      application/problem+json:
        schema:
          oneOf:
            - $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
            - $ref: '#/components/schemas/ChargingDataResponse'
  '404':
    description: Not Found
    content:
      application/problem+json:
        schema:
          oneOf:
            - $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
            - $ref: '#/components/schemas/ChargingDataResponse'
  '405':
    $ref: 'TS29571_CommonData.yaml#/components/responses/405'
  '408':
    $ref: 'TS29571_CommonData.yaml#/components/responses/408'
  '410':
    $ref: 'TS29571_CommonData.yaml#/components/responses/410'
  '411':
    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
'/chargingdata/{ChargingDataRef}/release':
  post:
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ChargingDataRequest'
    parameters:
      - name: ChargingDataRef
        in: path
        description: a unique identifier for a charging data resource in a PLMN
        required: true
        schema:
          type: string
    responses:
      '204':
        description: No Content.
      '307':

```

```

    $ref: 'TS29571_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29571_CommonData.yaml#/components/responses/308'
  '401':
    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
  '404':
    description: Not Found
    content:
      application/problem+json:
        schema:
          oneOf:
            - $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
            - $ref: '#/components/schemas/ChargingDataResponse'
  '410':
    $ref: 'TS29571_CommonData.yaml#/components/responses/410'
  '411':
    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nchf-convergedcharging: Access to the Nchf_ConvergedCharging API
  schemas:
    ChargingDataRequest:
      type: object
      properties:
        subscriberIdentifier:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
        tenantIdentifier:
          type: string
        chargingId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
        mnSConsumerIdentifier:
          type: string
        nfConsumerIdentification:
          $ref: '#/components/schemas/NFIdentification'
        invocationTimeStamp:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        invocationSequenceNumber:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
        retransmissionIndicator:
          type: boolean
        oneTimeEvent:
          type: boolean
        oneTimeEventType:
          $ref: '#/components/schemas/oneTimeEventType'
        notifyUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        serviceSpecificationInfo:
          type: string
        multipleUnitUsage:
          type: array
          items:
            $ref: '#/components/schemas/MultipleUnitUsage'
          minItems: 0
        triggers:
          type: array
          items:
            $ref: '#/components/schemas/Trigger'
          minItems: 0
        easid:
          type: string
        ednid:
          type: string

```

```

eASProviderIdentifier:
  type: string
amFId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/AmfId'
pDUSessionChargingInformation:
  $ref: '#/components/schemas/PDUSessionChargingInformation'
roamingQBCInformation:
  $ref: '#/components/schemas/RoamingQBCInformation'
sMSChargingInformation:
  $ref: '#/components/schemas/SMSChargingInformation'
nEFChargingInformation:
  $ref: '#/components/schemas/NEFChargingInformation'
registrationChargingInformation:
  $ref: '#/components/schemas/RegistrationChargingInformation'
n2ConnectionChargingInformation:
  $ref: '#/components/schemas/N2ConnectionChargingInformation'
locationReportingChargingInformation:
  $ref: '#/components/schemas/LocationReportingChargingInformation'
nSPACHargingInformation:
  $ref: '#/components/schemas/NSPACHargingInformation'
nSMChargingInformation:
  $ref: '#/components/schemas/NSMChargingInformation'
mMTelChargingInformation:
  $ref: '#/components/schemas/MMTelChargingInformation'
iMSChargingInformation:
  $ref: '#/components/schemas/IMSChargingInformation'
edgeInfrastructureUsageChargingInformation:
  $ref: '#/components/schemas/EdgeInfrastructureUsageChargingInformation'
eASDeploymentChargingInformation:
  $ref: '#/components/schemas/EASDeploymentChargingInformation'
directEdgeEnablingServiceChargingInformation:
  $ref: '#/components/schemas/NEFChargingInformation'
exposedEdgeEnablingServiceChargingInformation:
  $ref: '#/components/schemas/NEFChargingInformation'
proSeChargingInformation:
  $ref: '#/components/schemas/ProseChargingInformation'
required:
- nfConsumerIdentification
- invocationTimeStamp
- invocationSequenceNumber
ChargingDataResponse:
  type: object
  properties:
    invocationTimeStamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    invocationSequenceNumber:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    invocationResult:
      $ref: '#/components/schemas/InvocationResult'
    sessionFailover:
      $ref: '#/components/schemas/SessionFailover'
    supportedFeatures:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    multipleUnitInformation:
      type: array
      items:
        $ref: '#/components/schemas/MultipleUnitInformation'
      minItems: 0
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    pDUSessionChargingInformation:
      $ref: '#/components/schemas/PDUSessionChargingInformation'
    roamingQBCInformation:
      $ref: '#/components/schemas/RoamingQBCInformation'
    locationReportingChargingInformation:
      $ref: '#/components/schemas/LocationReportingChargingInformation'
  required:
- invocationTimeStamp
- invocationSequenceNumber
ChargingNotifyRequest:
  type: object
  properties:
    notificationType:
      $ref: '#/components/schemas/NotificationType'
    reauthorizationDetails:

```

```

    type: array
    items:
      $ref: '#/components/schemas/ReauthorizationDetails'
    minItems: 0
  required:
    - notificationType
ChargingNotifyResponse:
  type: object
  properties:
    invocationResult:
      $ref: '#/components/schemas/InvocationResult'
NFIdentification:
  type: object
  properties:
    nFName:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    nFIPv4Address:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    nFIPv6Address:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
    nFPLMNID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    nodeFunctionality:
      $ref: '#/components/schemas/NodeFunctionality'
    nFFqdn:
      type: string
  required:
    - nodeFunctionality
MultipleUnitUsage:
  type: object
  properties:
    ratingGroup:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatingGroup'
    requestedUnit:
      $ref: '#/components/schemas/RequestedUnit'
    usedUnitContainer:
      type: array
      items:
        $ref: '#/components/schemas/UsedUnitContainer'
      minItems: 0
    uPFID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    multihomedPDUAddress:
      $ref: '#/components/schemas/PDUAddress'
  required:
    - ratingGroup
InvocationResult:
  type: object
  properties:
    error:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    failureHandling:
      $ref: '#/components/schemas/FailureHandling'
Trigger:
  type: object
  properties:
    triggerType:
      $ref: '#/components/schemas/TriggerType'
    triggerCategory:
      $ref: '#/components/schemas/TriggerCategory'
    timeLimit:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    volumeLimit:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    volumeLimit64:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    eventLimit:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    maxNumberOfccc:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    tariffTimeChange:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  required:
    - triggerCategory
MultipleUnitInformation:
  type: object
  properties:
    resultCode:

```

```

    $ref: '#/components/schemas/ResultCode'
  ratingGroup:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RatingGroup'
  grantedUnit:
    $ref: '#/components/schemas/GrantedUnit'
  triggers:
    type: array
    items:
      $ref: '#/components/schemas/Trigger'
    minItems: 0
  validityTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  quotaHoldingTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  finalUnitIndication:
    $ref: '#/components/schemas/FinalUnitIndication'
  timeQuotaThreshold:
    type: integer
  volumeQuotaThreshold:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
  unitQuotaThreshold:
    type: integer
  uPFID:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
  announcementInformation:
    $ref: '#/components/schemas/AnnouncementInformation'
  required:
    - ratingGroup
  RequestedUnit:
    type: object
    properties:
      time:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      totalVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      uplinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      downlinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      serviceSpecificUnits:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
  UsedUnitContainer:
    type: object
    properties:
      serviceId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ServiceId'
      quotaManagementIndicator:
        $ref: '#/components/schemas/QuotaManagementIndicator'
      triggers:
        type: array
        items:
          $ref: '#/components/schemas/Trigger'
        minItems: 0
      triggerTimestamp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      time:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      totalVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      uplinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      downlinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      serviceSpecificUnits:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      eventTimeStamps:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        minItems: 0
      localSequenceNumber:
        type: integer
      pduContainerInformation:
        $ref: '#/components/schemas/PDUContainerInformation'
      nspacContainerInformation:
        $ref: '#/components/schemas/NSPACContainerInformation'
      pc5ContainerInformation:

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```
    $ref: '#/components/schemas/PC5ContainerInformation'
  required:
    - localSequenceNumber
  GrantedUnit:
    type: object
    properties:
      tariffTimeChange:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      time:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      totalVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      uplinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      downlinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      serviceSpecificUnits:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
  FinalUnitIndication:
    type: object
    properties:
      finalUnitAction:
        $ref: '#/components/schemas/FinalUnitAction'
      restrictionFilterRule:
        $ref: '#/components/schemas/IPFilterRule'
      restrictionFilterRuleList:
        type: array
        items:
          $ref: '#/components/schemas/IPFilterRule'
        minItems: 1
      filterId:
        type: string
      filterIdList:
        type: array
        items:
          type: string
        minItems: 1
      redirectServer:
        $ref: '#/components/schemas/RedirectServer'
    required:
      - finalUnitAction
  RedirectServer:
    type: object
    properties:
      redirectAddressType:
        $ref: '#/components/schemas/RedirectAddressType'
      redirectServerAddress:
        type: string
    required:
      - redirectAddressType
      - redirectServerAddress
  ReauthorizationDetails:
    type: object
    properties:
      serviceId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ServiceId'
      ratingGroup:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RatingGroup'
      quotaManagementIndicator:
        $ref: '#/components/schemas/QuotaManagementIndicator'
  PDUSessionChargingInformation:
    type: object
    properties:
      chargingId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
      sMFchargingId:
        type: string
      homeProvidedChargingId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
      sMFHomeProvidedChargingId:
        type: string
      userInformation:
        $ref: '#/components/schemas/UserInformation'
      userLocationInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      mAPDUNon3GPPUserLocationInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      non3GPPUserLocationTime:
```

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  mAPDUNon3GPPUserLocationTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  presenceReportingAreaInformation:
    type: object
    additionalProperties:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
    minProperties: 0
  ueTimeZone:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
  pduSessionInformation:
    $ref: '#/components/schemas/PDUSessionInformation'
  unitCountInactivityTimer:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  rANSecondaryRATUsageReport:
    $ref: '#/components/schemas/RANSecondaryRATUsageReport'
UserInformation:
  type: object
  properties:
    servedGPSI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    servedPEI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
    unauthenticatedFlag:
      type: boolean
    roamerInOut:
      $ref: '#/components/schemas/RoamerInOut'
PDUSessionInformation:
  type: object
  properties:
    networkSlicingInfo:
      $ref: '#/components/schemas/NetworkSlicingInfo'
    pduSessionID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
    pduType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
    sscMode:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ScsMode'
    hPlmnId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    servingNetworkFunctionID:
      $ref: '#/components/schemas/ServingNetworkFunctionID'
    ratType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
  mAPDUNon3GPPRATType:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
  dnnId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  dnnSelectionMode:
    $ref: '#/components/schemas/dnnSelectionMode'
  chargingCharacteristics:
    type: string
    pattern: '^([0-9a-fA-F]{1,4})$'
  chargingCharacteristicsSelectionMode:
    $ref: '#/components/schemas/ChargingCharacteristicsSelectionMode'
  startTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  stopTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  3gppPSDataOffStatus:
    $ref: '#/components/schemas/3GPPPSDataOffStatus'
  sessionStopIndicator:
    type: boolean
  pduAddress:
    $ref: '#/components/schemas/PDUAddress'
  diagnostics:
    $ref: '#/components/schemas/Diagnostics'
  authorizedQoSInformation:
    $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/AuthorizedDefaultQos'
  subscribedQoSInformation:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SubscribedDefaultQos'
  authorizedSessionAMBR:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
  subscribedSessionAMBR:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
  servingCNPlmnId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
  mAPDUSessionInformation:

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    $ref: '#/components/schemas/MAPDUSessionInformation'
  enhancedDiagnostics:
    $ref: '#/components/schemas/EnhancedDiagnostics5G'
  redundantTransmissionType:
    $ref: '#/components/schemas/RedundantTransmissionType'
  pduSessionPairID:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  cpCtoTOptimisationIndicator:
    type: boolean
  5GSCControlPlaneOnlyIndicator:
    type: boolean
  smallDataRateControlIndicator:
    type: boolean
  5GLANTypeService:
    $ref: '#/components/schemas/5GLANTypeService'
  required:
    - pduSessionID
    - dnnId
PDUContainerInformation:
  type: object
  properties:
    timeofFirstUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    timeofLastUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    qosInformation:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosData'
    qosCharacteristics:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'
    afChargingIdentifier:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
    afChargingIdString:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationChargingId'
    userLocationInformation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    ratType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    servingNodeID:
      type: array
      items:
        $ref: '#/components/schemas/ServingNetworkFunctionID'
      minItems: 0
    presenceReportingAreaInformation:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
      minProperties: 0
    3gppPSDataOffStatus:
      $ref: '#/components/schemas/3GPPPSDataOffStatus'
    sponsorIdentity:
      type: string
    applicationServiceProviderIdentity:
      type: string
    chargingRuleBaseName:
      type: string
    mAPDUSteeringFunctionality:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/SteeringFunctionality'
    mAPDUSteeringMode:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/SteeringMode'
    trafficForwardingWay:
      $ref: '#/components/schemas/TrafficForwardingWay'
    qosMonitoringReport:
      type: array
      items:
        $ref: '#/components/schemas/QosMonitoringReport'
      minItems: 0
NSPAContainerInformation:
  type: object
  properties:
    latency:
      type: integer
# Included for backwards compatibility, shall not be used
  uplinkLatency:
    type: integer
  downlinkLatency:
    type: integer

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```

    throughput:
      $ref: '#/components/schemas/Throughput'
# Included for backwards compatibility, shall not be used
    uplinkThroughput:
      $ref: '#/components/schemas/Throughput'
    downlinkThroughput:
      $ref: '#/components/schemas/Throughput'
    maximumPacketLossRate:
# Included for backwards compatibility, shall not be used
      type: string
    maximumPacketLossRateUL:
      type: integer
    maximumPacketLossRateDL:
      type: integer
    serviceExperienceStatisticsData:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/ServiceExperienceInfo'
    theNumberOfPDUSessions:
      type: integer
    theNumberOfRegisteredSubscribers:
      type: integer
    loadLevel:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NsiLoadLevelInfo'
NSPACHargingInformation:
  type: object
  properties:
    singleNSSAI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    required:
      - singleNSSAI
NetworkSlicingInfo:
  type: object
  properties:
    sNSSAI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    required:
      - sNSSAI
PDUAddress:
  type: object
  properties:
    pduIPv4Address:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    pduIPv6AddresswithPrefix:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
    pduAddressprefixlength:
      type: integer
    ipv4dynamicAddressFlag:
      type: boolean
    ipv6dynamicPrefixFlag:
      type: boolean
    addIpv6AddrPrefixes:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'
    addIpv6AddrPrefixList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'
ServingNetworkFunctionID:
  type: object
  properties:
    servingNetworkFunctionInformation:
      $ref: '#/components/schemas/NFIdentification'
    amfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AmfId'
    required:
      - servingNetworkFunctionInformation
RoamingQBCInformation:
  type: object
  properties:
    multipleQFIcontainer:
      type: array
      items:
        $ref: '#/components/schemas/MultipleQFIcontainer'
      minItems: 0
    uPFID:
# Included for backwards compatibility and
# can be included based on operators requirement
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    roamingChargingProfile:
      $ref: '#/components/schemas/RoamingChargingProfile'

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MultipleQFIcontainer:
  type: object
  properties:
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    triggerTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    time:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    totalVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    uplinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    downlinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    localSequenceNumber:
      type: integer
    qFIContainerInformation:
      $ref: '#/components/schemas/QFIContainerInformation'
  required:
    - localSequenceNumber
QFIContainerInformation:
  type: object
  properties:
    qFI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
    reportTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    timeofFirstUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    timeofLastUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    qosInformation:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosData'
    qosCharacteristics:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'
    userLocationInformation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    presenceReportingAreaInformation:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
      minProperties: 0
    rATType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    servingNetworkFunctionID:
      type: array
      items:
        $ref: '#/components/schemas/ServingNetworkFunctionID'
      minItems: 0
    3gppPSDataOffStatus:
      $ref: '#/components/schemas/3GPPPSDataOffStatus'
    3gppChargingId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
    diagnostics:
      $ref: '#/components/schemas/Diagnostics'
    enhancedDiagnostics:
      type: array
      items:
        type: string
  required:
    - reportTime
RoamingChargingProfile:
  type: object
  properties:
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    partialRecordMethod:
      $ref: '#/components/schemas/PartialRecordMethod'
SMSChargingInformation:

```

```

type: object
properties:
  originatorInfo:
    $ref: '#/components/schemas/OriginatorInfo'
  recipientInfo:
    type: array
    items:
      $ref: '#/components/schemas/RecipientInfo'
    minItems: 0
  userEquipmentInfo:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
  roamerInOut:
    $ref: '#/components/schemas/RoamerInOut'
  userLocationInfo:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
  ueTimeZone:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
  ratType:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
  smSCAddress:
    type: string
  smDataCodingScheme:
    type: integer
  smMessageType:
    $ref: '#/components/schemas/SMMMessageType'
  smReplyPathRequested:
    $ref: '#/components/schemas/ReplyPathRequested'
  smUserDataHeader:
    type: string
  smStatus:
    type: string
    pattern: '^[0-7]?[0-9a-fA-F]${}'
  smDischargeTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  numberOfMessagesSent:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  smServiceType:
    $ref: '#/components/schemas/SMSServiceType'
  smSequenceNumber:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  smSResult:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  submissionTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  smPriority:
    $ref: '#/components/schemas/SMPriority'
  messageReference:
    type: string
  messageSize:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  messageClass:
    $ref: '#/components/schemas/MessageClass'
  deliveryReportRequested:
    $ref: '#/components/schemas/DeliveryReportRequested'
OriginatorInfo:
  type: object
  properties:
    originatorSUPI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
    originatorGPSI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    originatorOtherAddress:
      $ref: '#/components/schemas/SMAddressInfo'
    originatorReceivedAddress:
      $ref: '#/components/schemas/SMAddressInfo'
    originatorSCCPAddress:
      type: string
    smOriginatorInterface:
      $ref: '#/components/schemas/SMInterface'
    smOriginatorProtocolId:
      type: string
RecipientInfo:
  type: object
  properties:
    recipientSUPI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
    recipientGPSI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'

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    recipientOtherAddress:
      $ref: '#/components/schemas/SMAddressInfo'
    recipientReceivedAddress:
      $ref: '#/components/schemas/SMAddressInfo'
    recipientSCCPAddress:
      type: string
    sMDestinationInterface:
      $ref: '#/components/schemas/SMInterface'
    sMrecipientProtocolId:
      type: string
  SMAddressInfo:
    type: object
    properties:
      sMaddressType:
        $ref: '#/components/schemas/SMAddressType'
      sMaddressData:
        type: string
      sMaddressDomain:
        $ref: '#/components/schemas/SMAddressDomain'
  RecipientAddress:
    type: object
    properties:
      recipientAddressInfo:
        $ref: '#/components/schemas/SMAddressInfo'
      sMaddresseeType:
        $ref: '#/components/schemas/SMAddresseeType'
  MessageClass:
    type: object
    properties:
      classIdentifier:
        $ref: '#/components/schemas/ClassIdentifier'
      tokenText:
        type: string
  SMAddressDomain:
    type: object
    properties:
      domainName:
        type: string
      3GPPIMSIMCCMNC:
        type: string
  SMInterface:
    type: object
    properties:
      interfaceId:
        type: string
      interfaceText:
        type: string
      interfacePort:
        type: string
      interfaceType:
        $ref: '#/components/schemas/InterfaceType'
  RANSecondaryRATUsageReport:
    type: object
    properties:
      rANSecondaryRATType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
      qosFlowsUsageReports:
        type: array
        items:
          $ref: '#/components/schemas/QosFlowsUsageReport'
  Diagnostics:
    type: integer
  IPFilterRule:
    type: string
  QosFlowsUsageReport:
    type: object
    properties:
      qFI:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
      startTimestamp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      endTimestamp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      uplinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      downlinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
  5GLANTypeService:
```

```

type: object
properties:
  internalGroupIdentifier:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
NEFChargingInformation:
type: object
properties:
  externalIndividualIdentifier:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
  externalIndividualIdList:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    minItems: 1
  externalGroupIdentifier:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalGroupId'
  groupIdentifier:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
  aPIDirection:
    $ref: '#/components/schemas/APIDirection'
  aPITargetNetworkFunction:
    $ref: '#/components/schemas/NFIdentification'
  APIResultCode:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  aPIName:
    type: string
  APIReference:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
  APIContent:
    type: string
required:
- aPIName
RegistrationChargingInformation:
type: object
properties:
  registrationMessagetype:
    $ref: '#/components/schemas/RegistrationMessageType'
  userInformation:
    $ref: '#/components/schemas/UserInformation'
  userLocationInfo:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
  pSCellInformation:
    $ref: '#/components/schemas/PSCellInformation'
  ueTimeZone:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
  rATType:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
  5GMMCapability:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
  miCOModeIndication:
    $ref: '#/components/schemas/MICOModeIndication'
  smsIndication:
    $ref: '#/components/schemas/SmsIndication'
  taiList:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Tai'
    minItems: 0
  serviceAreaRestriction:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ServiceAreaRestriction'
    minItems: 0
  requestedNSSAI:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    minItems: 0
  allowedNSSAI:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    minItems: 0
  rejectedNSSAI:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    minItems: 0

```



```
nSSAIMapList:
  type: array
  items:
    $ref: '#/components/schemas/NSSAIMap'
  minItems: 0
amfUeNgapId:
  type: integer
ranUeNgapId:
  type: integer
ranNodeId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/GlobalRanNodeId'
required:
- registrationMessagetype
PSCellInformation:
  type: object
  properties:
    nrcgi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ncgi'
    ecgi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ecgi'
NSSAIMap:
  type: object
  properties:
    servingSnssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    homeSnssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  required:
- servingSnssai
- homeSnssai
N2ConnectionChargingInformation:
  type: object
  properties:
    n2ConnectionMessageType:
      $ref: '#/components/schemas/N2ConnectionMessageType'
    userInformation:
      $ref: '#/components/schemas/UserInformation'
    userLocationInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    pSCellInformation:
      $ref: '#/components/schemas/PSCellInformation'
    uetimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    rATType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    amfUeNgapId:
      type: integer
    ranUeNgapId:
      type: integer
    ranNodeId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/GlobalRanNodeId'
    restrictedRatList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
      minItems: 0
    forbiddenAreaList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Area'
      minItems: 0
    serviceAreaRestriction:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ServiceAreaRestriction'
      minItems: 0
    restrictedCnList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/CoreNetworkType'
      minItems: 0
    allowedNSSAI:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      minItems: 0
    rrcEstCause:
      type: string
```

```

    pattern: '^[0-9a-fA-F]+$'
  required:
    - n2ConnectionMessageType
LocationReportingChargingInformation:
  type: object
  properties:
    locationReportingMessageType:
      $ref: '#/components/schemas/LocationReportingMessageType'
    userInformation:
      $ref: '#/components/schemas/UserInformation'
    userLocationInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    pSCellInformation:
      $ref: '#/components/schemas/PSCellInformation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    rATType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    presenceReportingAreaInformation:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
      minProperties: 0
  required:
    - locationReportingMessageType
N2ConnectionMessageType:
  type: integer
LocationReportingMessageType:
  type: integer
NSMChargingInformation:
  type: object
  properties:
    managementOperation:
      $ref: '#/components/schemas/ManagementOperation'
    idNetworkSliceInstance:
      type: string
    listOfServiceProfileChargingInformation:
      type: array
      items:
        $ref: '#/components/schemas/ServiceProfileChargingInformation'
      minItems: 0
    managementOperationStatus:
      $ref: '#/components/schemas/ManagementOperationStatus'
    managementOperationalState:
      $ref: 'TS28623_ComDefs.yaml#/components/schemas/OperationalState'
    managementAdministrativeState:
      $ref: 'TS28623_ComDefs.yaml#/components/schemas/AdministrativeState'
  required:
    - managementOperation
ServiceProfileChargingInformation:
  type: object
  properties:
    serviceProfileIdentifier:
      type: string
    sNSSAIIList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      minItems: 0
    sST:
      $ref: 'TS28541_NrNrm.yaml#/components/schemas/Sst'
    latency:
      type: integer
    availability:
      type: number
    resourceSharingLevel:
      $ref: 'TS28541_SliceNrm.yaml#/components/schemas/SharingLevel'
    jitter:
      type: integer
    reliability:
      type: string
    maxNumberOfUEs:
      type: integer
    coverageArea:
      type: string
# To be introduced once the reference to SliceNrm.yaml is resolved
#   uEMobilityLevel:
#     $ref: 'TS28541_SliceNrm.yaml#/components/schemas/MobilityLevel'

```

```

#       delayToleranceIndicator:
#       $ref: 'TS28541_SliceNrm.yaml#/components/schemas/Support'
dLThptPerSlice:
  $ref: '#/components/schemas/Throughput'
dLThptPerUE:
  $ref: '#/components/schemas/Throughput'
uLThptPerSlice:
  $ref: '#/components/schemas/Throughput'
uLThptPerUE:
  $ref: '#/components/schemas/Throughput'
maxNumberOfPDUsessions:
  type: integer
kPIMonitoringList:
  type: string
supportedAccessTechnology:
  type: integer
# To be introduced once the reference to SliceNrm.yaml is resolved
#       v2XCommunicationModeIndicator:
#       $ref: 'TS28541_SliceNrm.yaml#/components/schemas/Support'
addServiceProfileInfo:
  type: string
Throughput:
  type: object
  properties:
    guaranteedThpt:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
    maximumThpt:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
MAPDUSessionInformation:
  type: object
  properties:
    mAPDUSessionIndicator:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/MaPduIndication'
    atSSSCapability:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AtssscCapability'
EnhancedDiagnostics5G:
  $ref: '#/components/schemas/RanNasCauseList'
RanNasCauseList:
  type: array
  items:
    $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/RanNasRelCause'
QosMonitoringReport:
  description: Contains reporting information on QoS monitoring.
  type: object
  properties:
    ulDelays:
      type: array
      items:
        type: integer
      minItems: 0
    dlDelays:
      type: array
      items:
        type: integer
      minItems: 0
    rtDelays:
      type: array
      items:
        type: integer
      minItems: 0
AnnouncementInformation:
  type: object
  properties:
    announcementIdentifier:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    announcementReference:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    variableParts:
      type: array
      items:
        $ref: '#/components/schemas/VariablePart'
      minItems: 0
    timeToPlay:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    quotaConsumptionIndicator:
      $ref: '#/components/schemas/QuotaConsumptionIndicator'
    announcementPriority:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'

```

```

    playToParty:
      $ref: '#/components/schemas/PlayToParty'
    announcementPrivacyIndicator:
      $ref: '#/components/schemas/AnnouncementPrivacyIndicator'
    Language:
      $ref: '#/components/schemas/Language'
  VariablePart:
    type: object
    properties:
      variablePartType:
        $ref: '#/components/schemas/VariablePartType'
      variablePartValue:
        type: array
        items:
          type: string
        minItems: 1
      variablePartOrder:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    required:
      - variablePartType
      - variablePartValue
  Language:
    type: string
  MMTelChargingInformation:
    type: object
    properties:
      supplementaryServices:
        type: array
        items:
          $ref: '#/components/schemas/SupplementaryService'
        minItems: 1
  SupplementaryService:
    type: object
    properties:
      supplementaryServiceType:
        $ref: '#/components/schemas/SupplementaryServiceType'
      supplementaryServiceMode:
        $ref: '#/components/schemas/SupplementaryServiceMode'
      numberOfDiversion:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      associatedPartyAddress:
        type: string
      conferenceId:
        type: string
      participantActionType:
        $ref: '#/components/schemas/ParticipantActionType'
      changeTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      numberOfParticipants:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      cUGInformation:
        $ref: '#/components/schemas/OctetString'
  IMSChargingInformation:
    type: object
    properties:
      eventType:
        $ref: '#/components/schemas/SIPEventType'
      imsNodeFunctionality:
        $ref: '#/components/schemas/IMSNodeFunctionality'
      roleOfNode:
        $ref: '#/components/schemas/RoleOfIMSNode'
      userInformation:
        $ref: '#/components/schemas/UserInformation'
      userLocationInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      ueTimeZone:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
      3gppPSDataOffStatus:
        $ref: '#/components/schemas/3GPPPSDataOffStatus'
      isupCause:
        $ref: '#/components/schemas/ISUPCause'
      controlPlaneAddress:
        $ref: '#/components/schemas/IMSAddress'
      vlrNumber:
        $ref: '#/components/schemas/E164'
      mscAddress:
        $ref: '#/components/schemas/E164'
      userSessionID:

```

```
    type: string
  outgoingSessionID:
    type: string
  sessionPriority:
    $ref: '#/components/schemas/IMSSessionPriority'
  callingPartyAddresses:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    minItems: 1
  calledPartyAddress:
    type: string
  numberPortabilityRoutingInformation:
    type: string
  carrierSelectRoutingInformation:
    type: string
  alternateChargedPartyAddress:
    type: string
  requestedPartyAddress:
    type: array
    items:
      type: string
    minItems: 1
  calledAssertedIdentities:
    type: array
    items:
      type: string
    minItems: 1
  calledIdentityChanges:
    type: array
    items:
      $ref: '#/components/schemas/CalledIdentityChange'
    minItems: 1
  associatedURI:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    minItems: 1
  timeStamps:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  applicationServerInformation:
    type: array
    items:
      type: string
    minItems: 1
  interOperatorIdentifier:
    type: array
    items:
      $ref: '#/components/schemas/InterOperatorIdentifier'
    minItems: 1
  imsChargingIdentifier:
    type: string
  relatedICID:
    type: string
  relatedICIDGenerationNode:
    type: string
  transitIOIList:
    type: array
    items:
      type: string
    minItems: 1
  earlyMediaDescription:
    type: array
    items:
      $ref: '#/components/schemas/EarlyMediaDescription'
    minItems: 1
  sdpSessionDescription:
    type: array
    items:
      type: string
    minItems: 1
  sdpMediaComponent:
    type: array
    items:
      $ref: '#/components/schemas/SDPMediaComponent'
    minItems: 1
  servedPartyIPAddress:
    $ref: '#/components/schemas/IMSAddress'
```

```
serverCapabilities:
  $ref: '#/components/schemas/ServerCapabilities'
trunkGroupID:
  $ref: '#/components/schemas/TrunkGroupID'
bearerService:
  type: string
imsServiceId:
  type: string
messageBodies:
  type: array
  items:
    $ref: '#/components/schemas/MessageBody'
  minItems: 1
accessNetworkInformation:
  type: array
  items:
    type: string
  minItems: 1
additionalAccessNetworkInformation:
  type: string
cellularNetworkInformation:
  type: string
accessTransferInformation:
  type: array
  items:
    $ref: '#/components/schemas/AccessTransferInformation'
  minItems: 1
accessNetworkInfoChange:
  type: array
  items:
    $ref: '#/components/schemas/AccessNetworkInfoChange'
  minItems: 1
imsCommunicationServiceID:
  type: string
imsApplicationReferenceID:
  type: string
causeCode:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
reasonHeader:
  type: array
  items:
    type: string
  minItems: 1
initialIMSChargingIdentifier:
  type: string
nniInformation:
  type: array
  items:
    $ref: '#/components/schemas/NNIInformation'
  minItems: 1
fromAddress:
  type: string
imsEmergencyIndication:
  type: boolean
imsVisitedNetworkIdentifier:
  type: string
sipRouteHeaderReceived:
  type: string
sipRouteHeaderTransmitted:
  type: string
tadIdentifier:
  $ref: '#/components/schemas/TADIdentifier'
feIdentifierList:
  type: string
EdgeInfrastructureUsageChargingInformation:
  type: object
  properties:
    meanVirtualCPUUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
    meanVirtualMemoryUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
    meanVirtualDiskUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
    measuredInBytes:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    measuredOutBytes:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    durationStartTime:
```

```
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
  durationEndTime:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
EASDeploymentChargingInformation:
  type: object
  properties:
    eEASDeploymentRequirements:
      $ref: '#/components/schemas/EASRequirements'
    lCMEventType:
      $ref: '#/components/schemas/ManagementOperation'
    lCMStartTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    lCMEndTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

PC5ContainerInformation:
  type: object
  properties:
    coverageInfoList:
      type: array
      items:
        $ref: '#/components/schemas/CoverageInfo'
    radioParameterSetInfoList:
      type: array
      items:
        $ref: '#/components/schemas/RadioParameterSetInfo'
    transmitterInfoList:
      type: array
      items:
        $ref: '#/components/schemas/TransmitterInfo'
      minItems: 0
    timeOfFirstTransmission:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    timeOfFirstReception:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
CoverageInfo:
  type: object
  properties:
    coverageStatus:
      type: boolean
    changeTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    locationInfo:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      minItems: 0

RadioParameterSetInfo:
  type: object
  properties:
    radioParameterSetValues:
      type: array
      items:
        $ref: '#/components/schemas/OctetString'
      minItems: 0
    changeTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
TransmitterInfo:
  type: object
  properties:
    proseSourceIPAddress:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
    proseSourceL2Id:
      type: string
ProseChargingInformation:
  type: object
  properties:
    announcingPlmnID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    announcingUeHplmnIdentifier:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    announcingUeVplmnIdentifier:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    monitoringUeHplmnIdentifier:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    monitoringUeVplmnIdentifier:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
```

```

discovererUeHplmnIdentifier:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
discovererUeVplmnIdentifier:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
discovereeUeHplmnIdentifier:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
discovereeUeVplmnIdentifier:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
monitoredPlmnIdentifier:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
proseApplicationID:
  type: string
ApplicationID:
  type: string
applicationSpecificDataList:
  type: array
  items:
    type: string
  minItems: 0
proseFunctionality:
  $ref: '#/components/schemas/ProseFunctionality'
proseEventType:
  $ref: '#/components/schemas/ProseEventType'
directDiscoveryModel:
  $ref: '#/components/schemas/DirectDiscoveryModel'
validityPeriod:
  type: integer
roleOfUE:
  $ref: '#/components/schemas/RoleOfUE'
proseRequestTimestamp:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
pC3ProtocolCause:
  type: integer
monitoringUEIdentifier:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
requestedPLMNIIdentifier:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
timeWindow:
  type: integer
rangeClass:
  $ref: '#/components/schemas/RangeClass'
proximityAlertIndication:
  type: boolean
proximityAlertTimestamp:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
proximityCancellationTimestamp:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
relayIPAddress:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
proseUEToNetworkRelayUEID :
  type: string
proseDestinationLayer2ID:
  type: string
pFIContainerInformation:
  type: array
  items:
    $ref: '#/components/schemas/PFIContainerInformation'
  minItems: 0
transmissionDataContainer:
  type: array
  items:
    $ref: '#/components/schemas/PC5DataContainer'
  minItems: 0
receptionDataContainer:
  type: array
  items:
    $ref: '#/components/schemas/PC5DataContainer'
  minItems: 0
required:
  - aPIName

PFIContainerInformation:
  type: object
  properties:
    pFI:
      type: string
    reportTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

```



```
timeofFirstUsage:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
timeofLastUsage:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
qoSInformation:
  $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QoSData'
qoSCharacteristics:
  $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QoSCharacteristics'
userLocationInformation:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
uetimeZone:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
presenceReportingAreaInformation:
  type: object
  additionalProperties:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
  minProperties: 0

PC5DataContainer:
  type: object
  properties:
    localSequenceNumber:
      type: string
    changeTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    coverageStatus:
      type: boolean
    userLocationInformation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    dataVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    changeCondition:
      type: string
    radioResourcesId:
      $ref: '#/components/schemas/RadioResourcesId'
    radioFrequency:
      type: string
    pC5RadioTechnology:
      type: string

OctetString:
  type: string
  pattern: '^[0-9a-fA-F]+$'
E164:
  type: string
  pattern: '^[0-9a-fA-F]+$'
IMSAddress:
  type: object
  properties:
    ipv4Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    ipv6Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
    e164:
      $ref: '#/components/schemas/E164'
  anyOf:
    - required: [ ipv4Addr ]
    - required: [ ipv6Addr ]
    - required: [ e164 ]
ServingNodeAddress:
  type: object
  properties:
    ipv4Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    ipv6Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
  anyOf:
    - required: [ ipv4Addr ]
    - required: [ ipv6Addr ]
SIPEventType:
  type: object
  properties:
    sIPMethod:
      type: string
    eventHeader:
      type: string
    expiresHeader:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
```

```
ISUPCause:
  type: object
  properties:
    iSUPCauseLocation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    iSUPCauseValue:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    iSUPCauseDiagnostics:
      $ref: '#/components/schemas/OctetString'
CalledIdentityChange:
  type: object
  properties:
    calledIdentity:
      type: string
    changeTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
InterOperatorIdentifier:
  type: object
  properties:
    originatingIOI:
      type: string
    terminatingIOI:
      type: string
EarlyMediaDescription:
  type: object
  properties:
    sDPTimeStamps:
      $ref: '#/components/schemas/SDPTimeStamps'
    sDPMediaComponent:
      type: array
      items:
        $ref: '#/components/schemas/SDPMediaComponent'
      minItems: 0
    sDPSessionDescription:
      type: array
      items:
        type: string
      minItems: 0
SDPTimeStamps:
  type: object
  properties:
    sDPOfferTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    sDPAnswerTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
SDPMediaComponent:
  type: object
  properties:
    sDPMediaName:
      type: string
    sDPMediaDescription:
      type: array
      items:
        type: string
      minItems: 0
    localGWInsertedIndication:
      type: boolean
    ipRealmDefaultIndication:
      type: boolean
    transcoderInsertedIndication:
      type: boolean
    mediaInitiatorFlag:
      $ref: '#/components/schemas/MediaInitiatorFlag'
    mediaInitiatorParty:
      type: string
    threeGPPChargingId:
      $ref: '#/components/schemas/OctetString'
    accessNetworkChargingIdentifierValue:
      $ref: '#/components/schemas/OctetString'
    sDPType:
      $ref: '#/components/schemas/SDPType'
ServerCapabilities:
  type: object
  properties:
    mandatoryCapability:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
```

```

    minItems: 0
    optionalCapability :
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    minItems: 0
    serverName:
      type: array
      items:
        type: string
    minItems: 0
TrunkGroupID:
  type: object
  properties:
    incomingTrunkGroupID:
      type: string
    outgoingTrunkGroupID:
      type: string
MessageBody:
  type: object
  properties:
    contentType:
      type: string
    contentLength:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    contentDisposition:
      type: string
    originator:
      $ref: '#/components/schemas/OriginatorPartyType'
  required:
    - contentType
    - contentLength
AccessTransferInformation:
  type: object
  properties:
    accessTransferType:
      $ref: '#/components/schemas/AccessTransferType'
    accessNetworkInformation:
      type: array
      items:
        $ref: '#/components/schemas/OctetString'
      minItems: 0
    cellularNetworkInformation:
      $ref: '#/components/schemas/OctetString'
    interUETransfer:
      $ref: '#/components/schemas/UETransferType'
    userEquipmentInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
    instanceId:
      type: string
    relatedIMSChargingIdentifier:
      type: string
    relatedIMSChargingIdentifierNode:
      $ref: '#/components/schemas/IMSAddress'
    changeTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
AccessNetworkInfoChange:
  type: object
  properties:
    accessNetworkInformation:
      type: array
      items:
        $ref: '#/components/schemas/OctetString'
      minItems: 0
    cellularNetworkInformation:
      $ref: '#/components/schemas/OctetString'
    changeTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
NNIInformation:
  type: object
  properties:
    sessionDirection:
      $ref: '#/components/schemas/NNISessionDirection'
    nNIType:
      $ref: '#/components/schemas/NNIType'
    relationshipMode:
      $ref: '#/components/schemas/NNIRelationshipMode'
    neighbourNodeAddress:

```

```

    $ref: '#/components/schemas/IMSAddress'
EASRequirements:
  type: object
  properties:
    requiredEASServingLocation:
      $ref: 'TS28538_EdgeNrm.yaml#/components/schemas/ServingLocation'
    softwareImageInfo:
      $ref: 'TS28538_EdgeNrm.yaml#/components/schemas/SoftwareImageInfo'
    affinityAntiAffinity:
      $ref: 'TS28538_EdgeNrm.yaml#/components/schemas/AffinityAntiAffinity'
    serviceContinuity:
      type: boolean
    virtualResource:
      $ref: 'TS28538_EdgeNrm.yaml#/components/schemas/VirtualResource'
NotificationType:
  anyOf:
    - type: string
      enum:
        - REAUTHORIZATION
        - ABORT_CHARGING
    - type: string
NodeFunctionality:
  anyOf:
    - type: string
      enum:
        - AMF
        - SMF
        - SMS # Included for backwards compatibility, shall not be used
        - SMSF
        - PGW_C_SMF
        - NEFF # Included for backwards compatibility, shall not be used
        - SGW
        - I_SMF
        - ePDG
        - CEF
        - NEF
        - MnS_Producer
        - SGSN
        - V_SMF
        - 5G_DDNMF
        - IMS_Node
        - EES
        - PCF
        - UDM
        - UPF
    - type: string
ChargingCharacteristicsSelectionMode:
  anyOf:
    - type: string
      enum:
        - HOME_DEFAULT
        - ROAMING_DEFAULT
        - VISITING_DEFAULT
    - type: string
TriggerType:
  anyOf:
    - type: string
      enum:
        - QUOTA_THRESHOLD
        - QHT
        - FINAL
        - QUOTA_EXHAUSTED
        - VALIDITY_TIME
        - OTHER_QUOTA_TYPE
        - FORCED_REAUTHORISATION
        - UNUSED_QUOTA_TIMER # Included for backwards compatibility, shall not be used
        - UNIT_COUNT_INACTIVITY_TIMER
        - ABNORMAL_RELEASE
        - QOS_CHANGE
        - VOLUME_LIMIT
        - TIME_LIMIT
        - EVENT_LIMIT
        - PLMN_CHANGE
        - USER_LOCATION_CHANGE
        - RAT_CHANGE
        - SESSION_AMBR_CHANGE
        - UE_TIMEZONE_CHANGE
        - TARIFF_TIME_CHANGE

```

- MAX_NUMBER_OF_CHANGES_IN_CHARGING_CONDITIONS
- MANAGEMENT_INTERVENTION
- CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA
- CHANGE_OF_3GPP_PS_DATA_OFF_STATUS
- SERVING_NODE_CHANGE
- REMOVAL_OF_UPF
- ADDITION_OF_UPF
- INSERTION_OF_ISMF
- REMOVAL_OF_ISMF
- CHANGE_OF_ISMF
- START_OF_SERVICE_DATA_FLOW
- ECGI_CHANGE
- TAI_CHANGE
- HANDOVER_CANCEL
- HANDOVER_START
- HANDOVER_COMPLETE
- GFER_GUARANTEED_STATUS_CHANGE
- ADDITION_OF_ACCESS
- REMOVAL_OF_ACCESS
- START_OF_SDF_ADDITIONAL_ACCESS
- REDUNDANT_TRANSMISSION_CHANGE
- CGI_SAI_CHANGE
- RAI_CHANGE
- VSMF_CHANGE

- type: string

FinalUnitAction:

anyOf:

- type: string
- enum:
 - TERMINATE
 - REDIRECT
 - RESTRICT_ACCESS
- type: string

RedirectAddressType:

anyOf:

- type: string
- enum:
 - IPV4
 - IPV6
 - URL
 - URI
- type: string

TriggerCategory:

anyOf:

- type: string
- enum:
 - IMMEDIATE_REPORT
 - DEFERRED_REPORT
- type: string

QuotaManagementIndicator:

anyOf:

- type: string
- enum:
 - ONLINE_CHARGING
 - OFFLINE_CHARGING
 - QUOTA_MANAGEMENT_SUSPENDED
- type: string

FailureHandling:

anyOf:

- type: string
- enum:
 - TERMINATE
 - CONTINUE
 - RETRY_AND_TERMINATE
- type: string

SessionFailover:

anyOf:

- type: string
- enum:
 - FAILOVER_NOT_SUPPORTED
 - FAILOVER_SUPPORTED
- type: string

3GPPPSDataOffStatus:

anyOf:

- type: string
- enum:
 - ACTIVE
 - INACTIVE

```
- type: string
ResultCode:
  anyOf:
    - type: string
      enum:
        - SUCCESS
        - END_USER_SERVICE_DENIED
        - QUOTA_MANAGEMENT_NOT_APPLICABLE
        - QUOTA_LIMIT_REACHED
        - END_USER_SERVICE_REJECTED
        - USER_UNKNOWN #Included for backwards compatibility, shall not be used
        - RATING_FAILED
        - QUOTA_MANAGEMENT
    - type: string
PartialRecordMethod:
  anyOf:
    - type: string
      enum:
        - DEFAULT
        - INDIVIDUAL
    - type: string
RoamerInOut:
  anyOf:
    - type: string
      enum:
        - IN_BOUND
        - OUT_BOUND
    - type: string
SMMessageType:
  anyOf:
    - type: string
      enum:
        - SUBMISSION
        - DELIVERY_REPORT
        - SM_SERVICE_REQUEST
        - DELIVERY
    - type: string
SMPriority:
  anyOf:
    - type: string
      enum:
        - LOW
        - NORMAL
        - HIGH
    - type: string
DeliveryReportRequested:
  anyOf:
    - type: string
      enum:
        - YES
        - NO
    - type: string
InterfaceType:
  anyOf:
    - type: string
      enum:
        - UNKNOWN
        - MOBILE_ORIGINATING
        - MOBILE_TERMINATING
        - APPLICATION_ORIGINATING
        - APPLICATION_TERMINATING
    - type: string
ClassIdentifier:
  anyOf:
    - type: string
      enum:
        - PERSONAL
        - ADVERTISEMENT
        - INFORMATIONAL
        - AUTO
    - type: string
SMAddressType:
  anyOf:
    - type: string
      enum:
        - EMAIL_ADDRESS
        - MSISDN
        - IPV4_ADDRESS
```

```
- IPV6_ADDRESS
- NUMERIC_SHORTCODE
- ALPHANUMERIC_SHORTCODE
- OTHER
- IMSI
- type: string
SMAddresseeType:
anyOf:
- type: string
enum:
- TO
- CC
- BCC
- type: string
SMSServiceType:
anyOf:
- type: string
enum:
- VAS4SMS_SHORT_MESSAGE_CONTENT_PROCESSING
- VAS4SMS_SHORT_MESSAGE_FORWARDING
- VAS4SMS_SHORT_MESSAGE_FORWARDING_MULTIPLE_SUBSCRIPTIONS
- VAS4SMS_SHORT_MESSAGE_FILTERING
- VAS4SMS_SHORT_MESSAGE_RECEIPT
- VAS4SMS_SHORT_MESSAGE_NETWORK_STORAGE
- VAS4SMS_SHORT_MESSAGE_TO_MULTIPLE_DESTINATIONS
- VAS4SMS_SHORT_MESSAGE_VIRTUAL_PRIVATE_NETWORK(VPN)
- VAS4SMS_SHORT_MESSAGE_AUTO_REPLY
- VAS4SMS_SHORT_MESSAGE_PERSONAL_SIGNATURE
- VAS4SMS_SHORT_MESSAGE_DEFERRED_DELIVERY
- type: string
ReplyPathRequested:
anyOf:
- type: string
enum:
- NO_REPLY_PATH_SET
- REPLY_PATH_SET
- type: string
oneTimeEventType:
anyOf:
- type: string
enum:
- IEC
- PEC
- type: string
dnnSelectionMode:
anyOf:
- type: string
enum:
- VERIFIED
- UE_DNN_NOT_VERIFIED
- NW_DNN_NOT_VERIFIED
- type: string
APIDirection:
anyOf:
- type: string
enum:
- INVOCATION
- NOTIFICATION
- type: string
RegistrationMessageType:
anyOf:
- type: string
enum:
- INITIAL
- MOBILITY
- PERIODIC
- EMERGENCY
- DEREGISTRATION
- type: string
MICOModeIndication:
anyOf:
- type: string
enum:
- MICO_MODE
- NO_MICO_MODE
- type: string
SmsIndication:
anyOf:
```

```
- type: string
  enum:
    - SMS_SUPPORTED
    - SMS_NOT_SUPPORTED
- type: string
ManagementOperation:
  anyOf:
    - type: string
      enum:
        - CreateMOI #Included for backwards compatibility, shall not be used
        - ModifyMOIAttributes #Included for backwards compatibility, shall not be used
        - DeleteMOI #Included for backwards compatibility, shall not be used
        - CREATE_MOI
        - MODIFY_MOI_ATTR
        - DELETE_MOI
        - NOTIFY_MOI_CREATION
        - NOTIFY_MOI_ATTR_CHANGE
        - NOTIFY_MOI_DELETION
    - type: string
ManagementOperationStatus:
  anyOf:
    - type: string
      enum:
        - OPERATION_SUCCEEDED
        - OPERATION_FAILED
    - type: string
RedundantTransmissionType:
  anyOf:
    - type: string
      enum:
        - NON_TRANSMISSION
        - END_TO_END_USER_PLANE_PATHS
        - N3_N9
        - TRANSPORT_LAYER
    - type: string
VariablePartType:
  anyOf:
    - type: string
      enum:
        - INTEGER
        - NUMBER
        - TIME
        - DATE
        - CURRENCY
    - type: string
QuotaConsumptionIndicator:
  anyOf:
    - type: string
      enum:
        - QUOTA_NOT_USED
        - QUOTA_IS_USED
    - type: string
PlayToParty:
  anyOf:
    - type: string
      enum:
        - SERVED
        - REMOTE
    - type: string
AnnouncementPrivacyIndicator:
  anyOf:
    - type: string
      enum:
        - NOT_PRIVATE
        - PRIVATE
    - type: string
SupplementaryServiceType:
  anyOf:
    - type: string
      enum:
        - OIP
        - OIR
        - TIP
        - TIR
        - HOLD
        - CB
        - CDIV
        - CW
```



```
- MWI
- CONF
- FA
- CCBS
- CCNR
- MCID
- CAT
- CUG
- PNM
- CRS
- ECT
- type: string
SupplementaryServiceMode:
  anyOf:
    - type: string
      enum:
        - CFU
        - CFB
        - CFNR
        - CFNL
        - CD
        - CFNRC
        - ICB
        - OCB
        - ACR
        - BLIND_TRANSFER
        - CONSULTATIVE_TRANSFER
    - type: string
ParticipantActionType:
  anyOf:
    - type: string
      enum:
        - CREATE
        - JOIN
        - INVITE_INTRO
        - QUIT
    - type: string
TrafficForwardingWay:
  anyOf:
    - type: string
      enum:
        - N6
        - N19
        - LOCAL_SWITCH
    - type: string
IMSNodeFunctionality:
  anyOf:
    - type: string
      enum:
# The applicable IMS Nodes are MRFC, IMS-GWF (connected to S-CSCF using ISC) and SIP AS.
        - S_CSCF
        - P_CSCF
        - I_CSCF
        - MRFC
        - MGCF
        - BGCF
        - AS
        - IBCF
        - S-GW
        - P-GW
        - HSGW
        - E-CSCF
        - MME
        - TRF
        - TF
        - ATCF
        - PROXY
        - EPDG
        - TDF
        - TWAG
        - SCEF
        - IWK_SCEF
        - IMS_GWF
    - type: string
RoleOfIMSNode:
  anyOf:
    - type: string
      enum:
```

```
- ORIGINATING
- TERMINATING
- FORWARDING
- type: string
IMSSessionPriority:
  anyOf:
    - type: string
    enum:
      - PRIORITY_0
      - PRIORITY_1
      - PRIORITY_2
      - PRIORITY_3
      - PRIORITY_4
    - type: string
MediaInitiatorFlag:
  anyOf:
    - type: string
    enum:
      - CALLED_PARTY
      - CALLING_PARTY
      - UNKNOWN
    - type: string
SDPType:
  anyOf:
    - type: string
    enum:
      - OFFER
      - ANSWER
    - type: string
OriginatorPartyType:
  anyOf:
    - type: string
    enum:
      - CALLING
      - CALLED
    - type: string
AccessTransferType:
  anyOf:
    - type: string
    enum:
      - PS_TO_CS
      - CS_TO_PS
      - PS_TO_PS
      - CS_TO_CS
    - type: string
UETransferType:
  anyOf:
    - type: string
    enum:
      - INTRA_UE
      - INTER_UE
    - type: string
NNISessionDirection:
  anyOf:
    - type: string
    enum:
      - INBOUND
      - OUTBOUND
    - type: string
NNIType:
  anyOf:
    - type: string
    enum:
      - NON_ROAMING
      - ROAMING_NO_LOOPBACK
      - ROAMING_LOOPBACK
    - type: string
NNIRelationshipMode:
  anyOf:
    - type: string
    enum:
      - TRUSTED
      - NON_TRUSTED
    - type: string
TADIdentifier:
  anyOf:
    - type: string
    enum:
```

```

    - CS
    - PS
  - type: string
ProseFunctionality:
  anyOf:
    - type: string
      enum:
        - DIRECT_DISCOVERY
        - DIRECT_COMMUNICATION
    - type: string
ProseEventType:
  anyOf:
    - type: string
      enum:
        - ANNOUNCING
        - MONITORING
        - MATCH_REPORT
    - type: string
DirectDiscoveryModel:
  anyOf:
    - type: string
      enum:
        - MODEL_A
        - MODEL_B
    - type: string
RoleOfUE:
  anyOf:
    - type: string
      enum:
        - ANNOUNCING_UE
        - MONITORING_UE
        - REQUESTOR_UE
        - REQUESTED_UE
    - type: string
RangeClass:
  anyOf:
    - type: string
      enum:
        - RESERVED
        - 50_METER
        - 100_METER
        - 200_METER
        - 500_METER
        - 1000_METER
        - UNUSED
    - type: string
RadioResourcesId:
  anyOf:
    - type: string
      enum:
        - OPERATOR_PROVIDED
        - CONFIGURED
    - type: string

```

A.3 Nchf_OfflineOnlyCharging API

```

openapi: 3.0.0
info:
  title: Nchf_OfflineOnlyCharging
  version: 1.0.2
  description: |
    OfflineOnlyCharging Service
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: >
    3GPP TS 32.291 V17.0.0: Telecommunication management; Charging management;
    5G system, charging service; Stage 3.
  url: 'http://www.3gpp.org/ftp/Specs/archive/32_series/32.291/'
servers:
  - url: '{apiRoot}/nchf-offlineonlycharging/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in subclause 4.4 of 3GPP TS 29.501.
security:

```

```

- {}
- oAuth2ClientCredentials:
  - nchf-offlineonlycharging
paths:
  /offlinechargingdata:
    post:
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ChargingDataRequest'
      responses:
        '201':
          description: Created
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ChargingDataResponse'
        '400':
          description: Bad request
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        '403':
          description: Forbidden
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        '404':
          description: Not Found
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '410':
          $ref: 'TS29571_CommonData.yaml#/components/responses/410'
        '411':
          $ref: 'TS29571_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29571_CommonData.yaml#/components/responses/413'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  '/offlinechargingdata/{OfflineChargingDataRef}/update':
    post:
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ChargingDataRequest'
      parameters:
        - name: OfflineChargingDataRef
          in: path
          description: a unique identifier for a charging data resource in a PLMN
          required: true
          schema:
            type: string
      responses:
        '200':
          description: OK. Updated Charging Data resource is returned
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ChargingDataResponse'
        '400':
          description: Bad request
          content:
            application/json:
              schema:

```

```

        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
'403':
  description: Forbidden
  content:
    application/json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
'404':
  description: Not Found
  content:
    application/json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
'401':
  $ref: 'TS29571_CommonData.yaml#/components/responses/401'
'410':
  $ref: 'TS29571_CommonData.yaml#/components/responses/410'
'411':
  $ref: 'TS29571_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29571_CommonData.yaml#/components/responses/413'
'500':
  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'
'/offlinechargingdata/{OfflineChargingDataRef}/release':
  post:
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ChargingDataRequest'
    parameters:
      - name: OfflineChargingDataRef
        in: path
        description: a unique identifier for a charging data resource in a PLMN
        required: true
        schema:
          type: string
    responses:
      '204':
        description: No Content.
      '404':
        description: Not Found
        content:
          application/json:
            schema:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
      '401':
        $ref: 'TS29571_CommonData.yaml#/components/responses/401'
      '410':
        $ref: 'TS29571_CommonData.yaml#/components/responses/410'
      '411':
        $ref: 'TS29571_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29571_CommonData.yaml#/components/responses/413'
      '500':
        $ref: 'TS29571_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29571_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nchf-offlineonlycharging: Access to the Nchf_OfflineOnlyCharging API
schemas:
  ChargingDataRequest:
    type: object
    properties:

```

```

subscriberIdentifier:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
nfConsumerIdentification:
  $ref: '#/components/schemas/NFIdentification'
invocationTimeStamp:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
invocationSequenceNumber:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
retransmissionIndicator:
  type: boolean
serviceSpecificationInfo:
  type: string
multipleUnitUsage:
  type: array
  items:
    $ref: '#/components/schemas/MultipleUnitUsage'
  minItems: 0
triggers:
  type: array
  items:
    $ref: '#/components/schemas/Trigger'
  minItems: 0
pDUSessionChargingInformation:
  $ref: '#/components/schemas/PDUSessionChargingInformation'
roamingQBCInformation:
  $ref: '#/components/schemas/RoamingQBCInformation'
required:
- nfConsumerIdentification
- invocationTimeStamp
- invocationSequenceNumber
ChargingDataResponse:
  type: object
  properties:
    invocationTimeStamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    invocationSequenceNumber:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    invocationResult:
      $ref: '#/components/schemas/InvocationResult'
    sessionFailover:
      $ref: '#/components/schemas/SessionFailover'
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    pDUSessionChargingInformation:
      $ref: '#/components/schemas/PDUSessionChargingInformation'
    roamingQBCInformation:
      $ref: '#/components/schemas/RoamingQBCInformation'
  required:
- invocationTimeStamp
- invocationSequenceNumber
NFIdentification:
  type: object
  properties:
    nFName:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    nFIPv4Address:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    nFIPv6Address:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
    nFPLMNID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    nodeFunctionality:
      $ref: '#/components/schemas/NodeFunctionality'
    nFFqdn:
      type: string
  required:
- nodeFunctionality
MultipleUnitUsage:
  type: object
  properties:
    ratingGroup:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatingGroup'
    usedUnitContainer:
      type: array
      items:

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    $ref: '#/components/schemas/UsedUnitContainer'
  minItems: 0
  uPFID:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
  multihomedPDUAddress:
    $ref: '#/components/schemas/PDUAddress'
  required:
  - ratingGroup
InvocationResult:
  type: object
  properties:
    error:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    failureHandling:
      $ref: '#/components/schemas/FailureHandling'
Trigger:
  type: object
  properties:
    triggerType:
      $ref: '#/components/schemas/TriggerType'
    triggerCategory:
      $ref: '#/components/schemas/TriggerCategory'
    timeLimit:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    volumeLimit:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    volumeLimit64:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    eventLimit:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    maxNumberOfccc:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  required:
  - triggerType
  - triggerCategory
UsedUnitContainer:
  type: object
  properties:
    serviceId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ServiceId'
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    triggerTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    time:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    totalVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    uplinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    downlinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    serviceSpecificUnits:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    eventTimeStamps:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      minItems: 0
    localSequenceNumber:
      type: integer
    pduContainerInformation:
      $ref: '#/components/schemas/PDUContainerInformation'
  required:
  - localSequenceNumber
PDUSessionChargingInformation:
  type: object
  properties:
    chargingId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ChargingId'
    smfChargingId:
      type: string
    userInformation:
      $ref: '#/components/schemas/UserInformation'

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userLocationInfo:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
mAPDUNon3GPPUserLocationInfo:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
userLocationTime:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
presenceReportingAreaInformation:
  type: object
  additionalProperties:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
  minProperties: 0
uetimeZone:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
pduSessionInformation:
  $ref: '#/components/schemas/PDUSessionInformation'
unitCountInactivityTimer:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
rANSecondaryRATUsageReport:
  $ref: '#/components/schemas/RANSecondaryRATUsageReport'
required:
- pduSessionInformation
UserInformation:
  type: object
  properties:
    servedGPSI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    servedPEI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
    unauthenticatedFlag:
      type: boolean
    roamerInOut:
      $ref: '#/components/schemas/RoamerInOut'
PDUSessionInformation:
  type: object
  properties:
    networkSlicingInfo:
      $ref: '#/components/schemas/NetworkSlicingInfo'
    pduSessionID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
    pduType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
    sscMode:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ScsMode'
    hPlmnId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    servingNetworkFunctionID:
      $ref: '#/components/schemas/ServingNetworkFunctionID'
    ratType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
mAPDUNon3GPPRATType:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
dnnId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
chargingCharacteristics:
  type: string
chargingCharacteristicsSelectionMode:
  $ref: '#/components/schemas/ChargingCharacteristicsSelectionMode'
startTime:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
stopTime:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
3gppPSDataOffStatus:
  $ref: '#/components/schemas/3GPPPSDataOffStatus'
sessionStopIndicator:
  type: boolean
pduAddress:
  $ref: '#/components/schemas/PDUAddress'
diagnostics:
  $ref: '#/components/schemas/Diagnostics'
authorizedQoSInformation:
  $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/AuthorizedDefaultQos'
subscribedQoSInformation:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/SubscribedDefaultQos'
authorizedSessionAMBR:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
subscribedSessionAMBR:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
servingCNPlmnId:
```



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    $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
  mAPDUSessionInformation:
    $ref: '#/components/schemas/MAPDUSessionInformation'
  enhancedDiagnostics:
    $ref: '#/components/schemas/EnhancedDiagnostics5G'
  required:
    - pduSessionID
    - dnnId
PDUContainerInformation:
  type: object
  properties:
    timeofFirstUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    timeofLastUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    qosInformation:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosData'
    qosCharacteristics:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'
    afCorrelationInformation:
      type: string
    userLocationInformation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    ratType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    servingNodeID:
      type: array
      items:
        $ref: '#/components/schemas/ServingNetworkFunctionID'
      minItems: 0
    presenceReportingAreaInformation:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
      minProperties: 0
    3gppPSDataOffStatus:
      $ref: '#/components/schemas/3GPPPSDataOffStatus'
    sponsorIdentity:
      type: string
    applicationServiceProviderIdentity:
      type: string
    chargingRuleBaseName:
      type: string
    mAPDUSteeringFunctionality:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/SteeringFunctionality'
    mAPDUSteeringMode:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/SteeringMode'
NetworkSlicingInfo:
  type: object
  properties:
    sNSSAI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  required:
    - sNSSAI
PDUAddress:
  type: object
  properties:
    pduIPv4Address:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    pduIPv6AddresswithPrefix:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
    pduAddressprefixlength:
      type: integer
    ipv4dynamicAddressFlag:
      type: boolean
    ipv6dynamicPrefixFlag:
      type: boolean
ServingNetworkFunctionID:
  type: object
  properties:
    servingNetworkFunctionInformation:
      $ref: '#/components/schemas/NFIIdentification'
    amFid:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AmfId'
  required:
    - servingNetworkFunctionInformation

```

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RoamingQBCInformation:
  type: object
  properties:
    multipleQFIcontainer:
      type: array
      items:
        $ref: '#/components/schemas/MultipleQFIcontainer'
      minItems: 0
    uPFID:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    roamingChargingProfile:
      $ref: '#/components/schemas/RoamingChargingProfile'
MultipleQFIcontainer:
  type: object
  properties:
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    triggerTimestamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    time:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    totalVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    uplinkVolume:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
    localSequenceNumber:
      type: integer
    qFIContainerInformation:
      $ref: '#/components/schemas/QFIContainerInformation'
  required:
    - localSequenceNumber
QFIContainerInformation:
  type: object
  properties:
    qFI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
    timeofFirstUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    timeofLastUsage:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    qosInformation:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosData'
    qosCharacteristics:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'
    userLocationInformation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    presenceReportingAreaInformation:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
      minProperties: 0
    rATType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    servingNetworkFunctionID:
      type: array
      items:
        $ref: '#/components/schemas/ServingNetworkFunctionID'
      minItems: 0
    3gppPSDataOffStatus:
      $ref: '#/components/schemas/3GPPPSDataOffStatus'
RoamingChargingProfile:
  type: object
  properties:
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/Trigger'
      minItems: 0
    partialRecordMethod:
      $ref: '#/components/schemas/PartialRecordMethod'
RANSecondaryRATUsageReport:
  type: object
  properties:

```

```

    rANSecondaryRATType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    qosFlowsUsageReports:
      type: array
      items:
        $ref: '#/components/schemas/QosFlowsUsageReport'
  Diagnostics:
    type: integer
  IPFilterRule:
    type: string
  QosFlowsUsageReport:
    type: object
    properties:
      qFI:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
      startTimestamp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      endTimestamp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      uplinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
      downlinkVolume:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint64'
  MAPDUSessionInformation:
    type: object
    properties:
      mAPDUSessionIndicator:
        $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/MapduIndication'
      atSSSCapability:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AtsssCapability'
  EnhancedDiagnostics5G:
    $ref: '#/components/schemas/RanNasCauseList'
  RanNasCauseList:
    type: array
    items:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/RanNasRelCause'
  NodeFunctionality:
    anyOf:
      - type: string
        enum:
          - SMF
          - SMSF # Included for backwards compatibility, shall not be used
          - I-SMF
      - type: string
  ChargingCharacteristicsSelectionMode:
    anyOf:
      - type: string
        enum:
          - HOME_DEFAULT
          - ROAMING_DEFAULT
          - VISITING_DEFAULT
      - type: string
  TriggerType:
    anyOf:
      - type: string
        enum:
          - FINAL
          - ABNORMAL_RELEASE
          - QOS_CHANGE
          - VOLUME_LIMIT
          - TIME_LIMIT
          - EVENT_LIMIT
          - PLMN_CHANGE
          - USER_LOCATION_CHANGE
          - RAT_CHANGE
          - SESSION_AMBR_CHANGE
          - UE_TIMEZONE_CHANGE
          - TARIFF_TIME_CHANGE
          - MAX_NUMBER_OF_CHANGES_IN_CHARGING_CONDITIONS
          - MANAGEMENT_INTERVENTION
          - CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA
          - CHANGE_OF_3GPP_PS_DATA_OFF_STATUS
          - SERVING_NODE_CHANGE
          - REMOVAL_OF_UPF
          - ADDITION_OF_UPF
          - INSERTION_OF_ISMF
          - REMOVAL_OF_ISMF
          - CHANGE_OF_ISMF

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- START_OF_SERVICE_DATA_FLOW
- GFBR_GUARANTEED_STATUS_CHANGE
- HANDOVER_CANCEL
- HANDOVER_START
- HANDOVER_COMPLETE
- ADDITION_OF_ACCESS
- REMOVAL_OF_ACCESS
- START_OF_SDF_ADDITIONAL_ACCESS
- type: string
TriggerCategory:
  anyOf:
    - type: string
      enum:
        - IMMEDIATE_REPORT
        - DEFERRED_REPORT
    - type: string
FailureHandling:
  anyOf:
    - type: string
      enum:
        - TERMINATE
        - CONTINUE
        - RETRY_AND_TERMINATE
    - type: string
SessionFailover:
  anyOf:
    - type: string
      enum:
        - FAILOVER_NOT_SUPPORTED
        - FAILOVER_SUPPORTED
    - type: string
3GPPPSDataOffStatus:
  anyOf:
    - type: string
      enum:
        - ACTIVE
        - INACTIVE
    - type: string
ResultCode:
  anyOf:
    - type: string
      enum:
        - SUCCESS
        - END_USER_SERVICE_DENIED
    - type: string
PartialRecordMethod:
  anyOf:
    - type: string
      enum:
        - DEFAULT
        - INDIVIDUAL
    - type: string
RoamerInOut:
  anyOf:
    - type: string
      enum:
        - IN_BOUND
        - OUT_BOUND
    - type: string
```

Annex B (informative):Change history

| Change history | | | | | | | |
|----------------|---------|-----------|------|-----|-----|---|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2018-09 | SA#81 | | | | | Upgrade to change control version | 15.0.0 |
| 2018-12 | SA#82 | SP-181157 | 0001 | 1 | F | Correction on the Reference and Resource name | 15.1.0 |
| 2018-12 | SA#82 | SP-181157 | 0002 | 1 | F | Editorial Correction | 15.1.0 |
| 2018-12 | SA#82 | SP-181157 | 0003 | 1 | F | Data Type Applicability Correction | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0004 | 1 | F | Serving Node ID Correction | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0006 | 1 | F | Correction of Common Data reference in Nchf_ConvergedCharging API | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0007 | 1 | F | Correction of references to TS 29.512, TS 29.514 and data types | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0008 | 1 | F | Clarification of requested units handling | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0009 | 1 | F | Remove of underscore in the API name | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0010 | 1 | F | Correction of data type for subscriber identifier | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0011 | - | F | Correction of response code in flow for Notify | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0012 | 1 | F | Allow updating of Notify URI | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0013 | 1 | F | Correction of overlapping results between Invocation result and Result code | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0014 | 1 | F | Correction of Invocation result at http ok | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0015 | 1 | F | Correction of Rating Group Id and Service Id to Uint32 | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0016 | 1 | F | Correction of name for Multiple Unit Information | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0018 | 1 | F | Correction of name for Multiple Unit Information | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0019 | 1 | F | Correction of missing http status code | 15.1.0 |
| 2018-12 | SA#82 | SP-181052 | 0020 | 1 | B | Addition of event based charging | 15.1.0 |
| 2018-12 | SA#82 | SP-181057 | 0021 | 1 | B | Introduction Data Volume Reporting for Option 4&7 | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0022 | 1 | F | Alignment for session identifier | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0023 | 1 | F | Correction on Charging Notification message | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0024 | 1 | F | Correction on Charging ID data type | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0025 | 1 | F | Correction on Reauthorizationdetails | 15.1.0 |
| 2018-12 | SA#82 | SP-181052 | 0026 | 2 | B | Data Type for SMS | 15.1.0 |
| 2018-12 | SA#82 | SP-181052 | 0027 | 1 | B | Introduce Binding for SMS charging | 15.1.0 |
| 2018-12 | SA#82 | SP-181052 | 0028 | 1 | B | Introduce OpenAPI extension for SMS charging | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0029 | - | F | Failure Handling Mechanism Clarification | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0030 | - | F | Correction of Serving Network Function ID definition | 15.1.0 |
| 2019-03 | SA#83 | SP-190116 | 0031 | 1 | F | Correction of create operation description for event | 15.2.0 |
| 2019-03 | SA#83 | SP-190115 | 0032 | 1 | F | Correction of data type associated to volume | 15.2.0 |
| 2019-03 | SA#83 | SP-190214 | 0033 | 3 | F | Correction on reference for common data types | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0034 | 1 | F | Correction of inconsistencies in data types | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0035 | 1 | F | Correction of NF Consumer Information | 15.2.0 |

| | | | | | | | |
|---------|-------|-----------|------|---|---|---|--------|
| 2019-03 | SA#83 | SP-190117 | 0036 | - | F | Correction of SMSF as NF Consumer | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0037 | - | F | Correction of validityTime data type | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0038 | 1 | F | Correction of API versioning and externalDocs field | 15.2.0 |
| 2019-03 | SA#83 | SP-190212 | 0039 | 4 | F | Correction of Qos Information | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0040 | 1 | F | Correct missing Session Identifier | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0041 | 1 | F | Correct faults in yaml part | 15.2.0 |
| 2019-03 | SA#83 | SP-190115 | 0042 | 1 | F | Correction of User Information | 15.2.0 |
| 2019-03 | SA#83 | SP-190115 | 0043 | - | F | Correction of dnn data type | 15.2.0 |
| 2019-03 | SA#83 | SP-190213 | 0044 | 3 | F | Correction of serving Network Function | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0045 | 1 | F | Correction of Multiple Unit Information in ChargingDataResponse | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0046 | 1 | F | Correction of trigger in ChargingDataResponse | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0048 | 1 | F | Correction of RANSecondaryRATUsageReport occurrence | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0052 | - | F | Correcting of table for bindings | 15.2.0 |
| 2019-03 | SA#83 | SP-190115 | 0054 | 1 | F | Correction of UE IP Addresses | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0055 | - | F | Correction on local sequence nb | 15.2.0 |
| 2019-03 | SA#83 | | | | | Editorial corrections in the OPENAPI (MCC) | 15.2.1 |
| 2019-06 | SA#84 | SP-190384 | 0057 | - | F | Add the reference for SMS charging | 15.3.0 |
| 2019-06 | SA#84 | SP-190384 | 0058 | 1 | F | Correct the failure handling | 15.3.0 |
| 2019-06 | SA#84 | SP-190384 | 0063 | 1 | F | Correction on errors description | 15.3.0 |
| 2019-06 | SA#84 | SP-190384 | 0064 | - | F | Correction on Gateway timeout code | 15.3.0 |
| 2019-06 | SA#84 | SP-190384 | 0065 | - | F | Correction of used unit container attributes | 15.3.0 |
| 2019-06 | SA#84 | SP-190383 | 0066 | 1 | F | Correction on binding | 15.3.0 |
| 2019-06 | SA#84 | SP-190383 | 0067 | - | F | Correction of trigger type for start of service data flow | 15.3.0 |
| 2019-06 | SA#84 | SP-190383 | 0068 | 1 | F | Correction of trigger type unit count inactivity timer | 15.3.0 |
| 2019-06 | SA#84 | SP-190383 | 0069 | 1 | F | Correction of Nchf_ConvergedCharging release usage | 15.3.0 |
| 2019-06 | SA#84 | SP-190383 | 0070 | 1 | F | Correction of missing http status codes | 15.3.0 |
| 2019-06 | SA#84 | SP-190522 | 0072 | - | F | Correction on the OpenAPI version | 15.3.0 |
| 2019-06 | SA#84 | SP-190381 | 0056 | 1 | B | Definition of data model for interworking with EPC | 16.0.0 |
| 2019-06 | SA#84 | SP-190382 | 0059 | 1 | B | Add Offline only charging service API name | 16.0.0 |
| 2019-06 | SA#84 | SP-190382 | 0060 | 1 | B | Add Offline only charging service API resource definition | 16.0.0 |
| 2019-06 | SA#84 | SP-190382 | 0061 | 1 | B | Add Offline only charging service API data model | 16.0.0 |
| 2019-06 | SA#84 | SP-190382 | 0062 | 1 | B | Add Offline only charging service API error handling | 16.0.0 |
| 2019-06 | SA#84 | SP-190382 | 0071 | - | B | Add Offline only charging service operations | 16.0.0 |
| 2019-09 | SA#85 | SP-190757 | 0073 | 1 | B | Modify the Charging ID | 16.1.0 |
| 2019-09 | SA#85 | SP-190757 | 0074 | 1 | B | Definition of data model for interworking with EPC | 16.1.0 |

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| 2019-09 | SA#85 | SP-190758 | 0075 | 1 | B | Correct Offline only charging service API resource definition | 16.1.0 |
| 2019-09 | SA#85 | SP-190758 | 0076 | 1 | B | Add Offline only charging service API data model | 16.1.0 |
| 2019-09 | SA#85 | SP-190758 | 0077 | 1 | B | Add Simple data types and enumerations for offline only charging service API data model | 16.1.0 |
| 2019-09 | SA#85 | SP-190758 | 0078 | 1 | B | Add Bindings of common CDR field for Offline only charging service API | 16.1.0 |
| 2019-09 | SA#85 | SP-190758 | 0079 | 1 | B | Add Offline only charging open API schema | 16.1.0 |
| 2019-09 | SA#85 | SP-190854 | 0080 | 2 | B | Update Open API for interworking | 16.1.0 |
| 2019-09 | SA#85 | SP-190761 | 0082 | 1 | A | Correction of nfConsumerIdentification and usedUnitContainer | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0084 | 1 | A | Correction of TriggerCategory and Triggers | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0086 | 1 | A | Correction of Report Time in QFI Container Information | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0088 | 1 | A | Correction of SubscriptionIdentificationType | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0092 | 1 | A | Correction of multipleQuotaInformation | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0094 | 1 | A | Correction of HTTP Status Codes | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0110 | - | A | Correct the QoS change trigger | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0111 | 1 | A | Add the selection mode in PDU session information | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0114 | 1 | A | Event based charging mechanism | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0115 | 1 | A | Bindings of common field correction | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0116 | 1 | A | Coordination of attribute Presence condition | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0117 | 1 | A | Bindings for 5G data connectivity correction | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0118 | 1 | A | Correction of data structure of response body | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0119 | - | A | Correction of serving Network Function identifier | 16.1.0 |
| 2019-09 | SA#85 | SP-190750 | 0122 | 1 | F | Correction of AF Charging Identifier naming | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0124 | - | A | Corrections on OpenAPI | 16.1.0 |
| 2019-09 | SA#85 | SP-190750 | 0126 | - | B | Correction on OpenAPI version | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0127 | - | A | Correction of version numbering | 16.1.0 |
| 2019-09 | SA#85 | | | | | Correction of history table and adding correct version of CR 0080 (MCC) | 16.1.1 |
| 2019-12 | SA#86 | SP-191162 | 0144 | 1 | A | Add the Service Specification Information | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0145 | 1 | F | Add the QoS characteristics | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0146 | 1 | A | Add the QNC support | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0147 | 3 | A | Clarify the QoS change trigger | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0150 | 1 | A | Correction of Nchf_ConvergedCharging_Release operation | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0151 | - | A | Correction of subscriberIdentifier | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0152 | 1 | F | Corrections on OpenAPI for UsedUnitContainer | 16.2.0 |
| 2019-12 | SA#86 | SP-191153 | 0153 | 2 | B | Introduce AMF in Nchf Converged Charging | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0154 | 1 | F | Add Retransmission IE for alignment with TS 32.290 | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0156 | 1 | A | Correction InvocationResult description and binding | 16.2.0 |

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| 2019-12 | SA#86 | SP-191159 | 0157 | 1 | F | Correction of yaml | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0158 | 1 | F | Correction of pduSessionChargingInformation | 16.2.0 |
| 2019-12 | SA#86 | SP-191154 | 0159 | 1 | B | Adding Exposure Function Northbound API Specified Data Type | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0163 | 1 | A | Alignment with TS 29.501 template | 16.2.0 |
| 2019-12 | SA#86 | SP-191153 | 0164 | - | B | Introduce OpenAPI for AMF charging | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0171 | 1 | A | Correction of Notify Response | 16.2.0 |
| 2019-12 | SA#86 | SP-191205 | 0173 | 2 | A | Correction of ChargingNotifyResponse description | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0175 | 1 | A | Correction on the Resource URI | 16.2.0 |
| 2019-12 | SA#86 | SP-191167 | 0179 | 1 | B | Adding I-SMF related trigger type | 16.2.0 |
| 2019-12 | SA#86 | SP-191167 | 0180 | 1 | B | Add I-SMF as a new serving network function | 16.2.0 |
| 2019-12 | SA#86 | SP-191203 | 0183 | 2 | A | Add Session-AMBR change trigger | 16.2.0 |
| 2019-12 | SA#86 | SP-191154 | 0186 | 1 | B | Addition of binding for exposure function northbound API | 16.2.0 |
| 2019-12 | SA#86 | SP-191154 | 0187 | 1 | B | Addition of attributes in yaml for exposure function northbound API | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0189 | - | A | Correction to NF consumer identification | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0191 | 1 | A | Correction of binding for 5G data connectivity | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0192 | - | F | Correction OpenAPI syntax | 16.2.0 |
| 2019-12 | SA#86 | SP-191153 | 0193 | 1 | B | Introduction of Binding for AMF Charging | 16.2.0 |
| 2019-12 | SA#86 | SP-191167 | 0194 | 1 | B | Add serving node information | 16.2.0 |
| 2019-12 | SA#86 | SP-191339 | 0198 | 1 | F | Update OpenAPI version | 16.2.0 |
| 2020-03 | SA#87E | SP-200170 | 0199 | - | F | Update of Serving Network Function ID | 16.3.0 |
| 2020-03 | SA#87E | SP-200248 | 0208 | 1 | F | Correct the style for TriggerType in OpenAPI | 16.3.0 |
| 2020-03 | SA#87E | SP-200166 | 0209 | - | B | Update OpenAPI version | 16.3.0 |
| 2020-07 | SA#88E | SP-200510 | 0216 | - | A | Missing AMF as network function | 16.4.0 |
| 2020-07 | SA#88E | SP-200484 | 0217 | 1 | F | Missing event limit in trigger type | 16.4.0 |
| 2020-07 | SA#88E | SP-200484 | 0219 | - | F | Missing downlink volume in QFI container | 16.4.0 |
| 2020-07 | SA#88E | SP-200484 | 0220 | - | F | Correction of content problem, callback and version | 16.4.0 |
| 2020-07 | SA#88E | SP-200522 | 0221 | 2 | F | Add the Retransmission Indicator in Open API | 16.4.0 |
| 2020-07 | SA#88E | SP-200484 | 0224 | 1 | B | Add the reference about the storage of OPENAPI in FORGE | 16.4.0 |
| 2020-07 | SA#88E | SP-200505 | 0226 | 1 | B | Add description on identifier for 5G RG and FN RG | 16.4.0 |
| 2020-07 | SA#88E | SP-200507 | 0228 | 1 | F | Correction of NodeFunctionality | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0231 | - | B | Introduce TS 29.500 and TS 29.501 full applicability | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0232 | 1 | F | Correct the PDU address | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0233 | 1 | F | Correct the Charging Data Response for NEF charging | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0237 | 1 | F | Correct offline only charging service API due to maintainance | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0240 | 1 | F | Correcting pduSessionInformation as optional | 16.4.0 |

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| 2020-07 | SA#88E | SP-200508 | 0242 | - | B | Adding CHFCQM as supported feature | 16.4.0 |
| 2020-07 | SA#88E | SP-200486 | 0244 | - | A | Open API version Update | 16.4.0 |
| 2020-07 | SA#88E | | | | | Adding the yaml file to the zip | 16.4.1 |
| 2020-07 | SA#88E | | | | | Addressing two implementation errors in the annex Nchf_OfflineOnlyCharging API | 16.4.2 |
| 2020-09 | SA#89e | SP-200740 | 0245 | 1 | F | Clarify Charging information 5GC interworking with EPC | 16.5.0 |
| 2020-09 | SA#89e | SP-200813 | 0246 | - | F | Corrections in names and cardinality for attributes | 16.5.0 |
| 2020-09 | SA#89e | SP-200813 | 0247 | 1 | F | Authorization of CHF services access by OAuth 2.0 | 16.5.0 |
| 2020-09 | SA#89e | SP-200733 | 0248 | 1 | B | Introduction of ATSSS | 16.5.0 |
| 2020-09 | SA#89e | SP-200745 | 0249 | 1- | B | Introduction of NSM charging information | 16.5.0 |
| 2020-09 | SA#89e | SP-200742 | 0251 | - | F | Charging characteristics not consistently defined | 16.5.0 |
| 2020-09 | SA#89e | SP-200813 | 0252 | 1 | F | Correction of missing AF Charging Id in string format | 16.5.0 |
| 2020-09 | SA#89e | SP-200813 | 0254 | - | F | Correction to tariffTimeChange with UTC time | 16.5.0 |
| 2020-09 | SA#89e | SP-200741 | 0256 | 1 | F | Missing suspend of quota management | 16.5.0 |
| 2020-09 | SA#89e | SP-200743 | 0261 | 1 | B | Add the NSPA charging attribute for convergedcharging service | 16.5.0 |
| 2020-09 | SA#89e | SP-200817 | 0262 | 1 | F | Add timeLimit and eventLimit | 16.5.0 |
| 2020-09 | SA#89e | SP-200813 | 0263 | 1 | F | Update cardinality for event time stamps | 16.5.0 |
| 2020-09 | SA#89e | SP-200742 | 0265 | 1 | A | Correction on Converged Charging and Requested Unit handling | 16.5.0 |
| 2020-09 | SA#89e | SP-200740 | 0267 | - | F | Add ePDG as serving node | 16.5.0 |
| 2020-09 | SA#89e | SP-200742 | 0268 | - | A | Update OpenAPI version | 16.5.0 |
| 2020-09 | SA#89e | | | | | Correction of various CR implementation errors | 16.5.1 |
| 2020-12 | SA#90e | SP-201071 | 0271 | 1 | A | Correction of TriggerType | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0272 | - | F | Add Multi-homed PDU Address in CHF-CDR for IPv6 multi-homing | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0275 | 1 | F | Add the QNC subscription | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0277 | 1 | F | Add the enhanced Diagnostics for 5G Charging | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0278 | 1 | F | Correct the InvocationSequenceNumber | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0280 | - | F | Correct the bindings for 5G data connectivity | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0281 | 1 | F | Correct the Open API | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0282 | 1 | F | Correction on missing NEF and PGW-C+SMF as NF consumers | 16.6.0 |
| 2020-12 | SA#90e | SP-201049 | 0285 | 1 | A | Correcting charging id availability for all NF | 16.6.0 |
| 2020-12 | SA#90e | SP-201072 | 0287 | 1 | A | Correcting SMS message types | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0288 | - | F | Correcting binding of event time stamp in SMS | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0289 | - | F | Correction of roamer in out from SMSF | 16.6.0 |
| 2020-12 | SA#90e | SP-201088 | 0294 | - | A | Update OpenAPI version | 16.6.0 |
| 2020-12 | SA#90e | SP-201088 | 0301 | - | F | Correction of not quota management tariff time trigger | 16.6.0 |
| 2020-12 | SA#90e | SP-201088 | 0302 | - | F | Correction of SMS TP status value | 16.6.0 |

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| 2020-12 | SA#90e | | | | | Correcting implementation mistake from CR0277 | 16.6.1 |
| 2021-03 | SA#91e | SP-210166 | 0306 | 1 | F | Missing eventLimit in trigger and OpenAPI | 16.7.0 |
| 2021-03 | SA#91e | SP-210146 | 0309 | 1 | F | Correcting binding for IPv6dynamicPrefixFlag | 16.7.0 |
| 2021-03 | SA#91e | SP-210146 | 0310 | - | F | Correcting NEF naming | 16.7.0 |
| 2021-03 | SA#91e | SP-210159 | 0312 | 1 | F | Correction on different identities for NEF charging | 16.7.0 |
| 2021-03 | SA#91e | SP-210158 | 0313 | - | F | Correction on missing MnS producer | 16.7.0 |
| 2021-03 | SA#91e | SP-210163 | 0314 | - | F | Correction on missing attributes for AMF Charging | 16.7.0 |
| 2021-03 | SA#91e | SP-210158 | 0315 | 1 | F | Add the Bindings for NSM Charging | 16.7.0 |
| 2021-03 | SA#91e | SP-210146 | 0317 | 1 | F | Optional header clarification | 16.7.0 |
| 2021-03 | SA#91e | SP-210146 | 0318 | - | F | Update OpenAPI version | 16.7.0 |
| 2021-06 | SA#92e | SP-210418 | 0320 | 1 | F | Correct the Nchf_ OfflineOnlyCharging API resource definition | 16.8.0 |
| 2021-06 | SA#92e | SP-210418 | 0321 | - | F | Correct the Nchf_ ConvergedCharging API resource definition | 16.8.0 |
| 2021-06 | SA#92e | SP-210398 | 0323 | 1 | F | Correction on Presence Reporting Areas(s) subscription in AMF | 16.8.0 |
| 2021-06 | SA#92e | SP-210418 | 0324 | - | F | Correction on missing binding attributes | 16.8.0 |
| 2021-06 | SA#92e | SP-210400 | 0325 | 1 | F | Correction on PDU address using DHCPv6 for connected RG to 5GC | 16.8.0 |
| 2021-06 | SA#92e | SP-210413 | 0328 | 1 | F | Correcting feature handling for ETSUN | 16.8.0 |
| 2021-07 | SA#92e | | | | | Fixing OPENAPI version and copyright dates | 16.8.1 |
| 2021-09 | SA#93e | SP-210886 | 0335 | 1 | F | Clarify the Presence Reporting Area information | 16.9.0 |
| 2021-09 | SA#93e | SP-210886 | 0336 | - | F | Correction on the Used Unit container in the QFIContainerInformation | 16.9.0 |
| 2021-09 | SA#93e | SP-210886 | 0337 | 1 | F | Clarify the User Location information | 16.9.0 |
| 2021-09 | SA#93e | SP-210886 | 0342 | - | F | Update OpenAPI version | 16.9.0 |
| 2021-09 | SA#93e | SP-210888 | 0332 | 1 | B | Nchf interface enhancements to support of GERAN and UTRAN | 17.0.0 |
| 2021-09 | SA#93e | SP-210887 | 0339 | 1 | F | Correcting filter rule as list | 17.0.0 |
| 2021-09 | SA#93e | SP-210866 | 0340 | 1 | B | Addition of IMS charging information | 17.0.0 |
| 2021-09 | SA#93e | SP-210863 | 0341 | - | B | Addition of new URLLC information element | 17.0.0 |
| 2021-09 | SA#93e | SP-210990 | 0343 | 1 | F | Update OpenAPI version | 17.0.0 |
| 2021-12 | SA#94e | SP-211482 | 0344 | 1 | B | Addition of IMS charging information data types | 17.1.0 |
| 2021-12 | SA#94e | SP-211482 | 0345 | - | B | Addition of IMS charging information enumerations | 17.1.0 |
| 2021-12 | SA#94e | SP-211482 | 0346 | 1 | B | Addition of IMS charging information general types | 17.1.0 |
| 2021-12 | SA#94e | SP-211482 | 0347 | 1 | B | Correction of IMS charging information | 17.1.0 |
| 2021-12 | SA#94e | SP-211485 | 0353 | 3 | A | Alignment of the charging data request and response | 17.1.0 |
| 2021-12 | SA#94e | SP-211481 | 0354 | 3 | F | Addition of QoS Monitoring to Assist URLLC Service | 17.1.0 |
| 2021-12 | SA#94e | SP-211482 | 0356 | 1 | B | Addition of IMS converged charging announcement | 17.1.0 |
| 2021-12 | SA#94e | SP-211482 | 0357 | 1 | B | Addition of MMTel converged charging information | 17.1.0 |
| 2021-12 | SA#94e | SP-211463 | 0358 | - | F | Update OpenAPI version | 17.1.0 |

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| 2022-03 | SA#95e | SP-220164 | 0360 | 1 | B | Additional charging information for the 5G LAN Communication | 17.2.0 |
| 2022-03 | SA#95e | SP-220162 | 0365 | - | F | Addition of the Supported Feature for URLLC | 17.2.0 |
| 2022-03 | SA#95e | SP-220185 | 0367 | 1 | A | Extensibility Mechanisms for charging | 17.2.0 |
| 2022-03 | SA#95e | SP-220159 | 0368 | 1 | B | Add charging information of 5GS ClIoT | 17.2.0 |
| 2022-03 | SA#95e | SP-220186 | 0369 | 1 | F | Correcting response code 2xx | 17.2.0 |
| 2022-03 | SA#95e | SP-220186 | 0371 | 1 | F | Correcting response code 4xx | 17.2.0 |
| 2022-03 | SA#95e | SP-220170 | 0374 | - | A | Correcting quota management suspended | 17.2.0 |
| 2022-03 | SA#95e | SP-220167 | 0375 | 1 | B | Addition of IMS converged charging yaml | 17.2.0 |
| 2022-03 | SA#95e | SP-220167 | 0376 | 1 | B | Addition of MMTel converged charging yaml | 17.2.0 |
| 2022-03 | SA#95e | SP-220167 | 0377 | 1 | B | Addition of IMS converged charging announcement yaml | 17.2.0 |
| 2022-03 | SA#95e | SP-220186 | 0378 | - | F | Update OpenAPI version | 17.2.0 |
| 2022-06 | SA#96 | SP-220496 | 0370 | 2 | F | Correcting response code 3xx | 17.3.0 |
| 2022-06 | SA#96 | SP-220496 | 0372 | 2 | F | Correcting response code 5xx | 17.3.0 |
| 2022-06 | SA#96 | SP-220565 | 0385 | 1 | A | Correction on the identifiers for NEF API Charging information | 17.3.0 |
| 2022-06 | SA#96 | SP-220564 | 0386 | - | F | Correcting IMS triggering for PLMN change | 17.3.0 |
| 2022-06 | SA#96 | SP-220564 | 0387 | - | F | Correcting V-SMF as node functionality | 17.3.0 |
| 2022-06 | SA#96 | SP-220496 | 0389 | - | F | Correcting error handling | 17.3.0 |
| 2022-06 | SA#96 | SP-220520 | 0392 | 1 | F | Missing IMS binding | 17.3.0 |
| 2022-06 | SA#96 | SP-220520 | 0393 | - | F | Correcting IMS called identity as array | 17.3.0 |
| 2022-06 | SA#96 | SP-220496 | 0395 | 1 | F | RedirectAdresssType datatype missing | 17.3.0 |
| 2022-06 | SA#96 | SP-220518 | 0398 | 1 | F | Correction on the Qos Monitoring Report | 17.3.0 |
| 2022-06 | SA#96 | SP-220565 | 0400 | 1 | A | Correction on the Time attribute | 17.3.0 |
| 2022-06 | SA#96 | SP-220522 | 0402 | 1 | B | Introduce OpenAPI for 5G Prose charging | 17.3.0 |
| 2022-06 | SA#96 | SP-220522 | 0403 | 1 | B | Introduce Binding for 5G Prose charging | 17.3.0 |
| 2022-06 | SA#96 | SP-220522 | 0404 | 1 | B | Introduce Data Type for 5G ProSe | 17.3.0 |
| 2022-06 | SA#96 | SP-220519 | 0405 | 1 | B | Update Nchf_ConvergedCharging service API for Edge Computing | 17.3.0 |
| 2022-06 | SA#96 | SP-220496 | 0407 | - | F | Update Open API version | 17.3.0 |
| 2022-09 | SA#97e | SP-220869 | 0408 | 1 | F | Adding missing NodeFunctionality value for IMS | 17.4.0 |
| 2022-09 | SA#97e | SP-220869 | 0409 | 1 | F | Alignment between IMSNodeFunctionality description and YAML | 17.4.0 |
| 2022-09 | SA#97e | SP-220853 | 0413 | 1 | A | Correction of IPv6 prefixes in PDU address | 17.4.0 |
| 2022-09 | SA#97e | SP-220850 | 0414 | 1 | F | Correction of use QMI in notify | 17.4.0 |
| 2022-09 | SA#97e | SP-220850 | 0415 | 1 | F | Correcting missing user location mapping to ASN.1 | 17.4.0 |
| 2022-09 | SA#97e | SP-220850 | 0416 | 1 | F | Correcting missing ClIoT indicators in yaml | 17.4.0 |
| 2022-09 | SA#97e | SP-220850 | 0418 | - | F | Correcting missing V-SMF | 17.4.0 |
| 2022-09 | SA#97e | SP-220850 | 0423 | 1 | F | Correction on the Charging Identifier Uniqueness | 17.4.0 |

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| 2022-09 | SA#97e | SP-220868 | 0425 | - | F | Correction on the EASRequirement | 17.4.0 |
| 2022-09 | SA#97e | SP-220868 | 0426 | - | F | Correction on the mapping between EC and NEF | 17.4.0 |
| 2022-09 | SA#97e | SP-220868 | 0427 | - | F | Add the EAS ID for EC charging | 17.4.0 |
| 2022-09 | SA#97e | SP-220853 | 0429 | - | A | Update Open API version | 17.4.0 |
| 2022-12 | SA#98e | SP-221168 | 0430 | 1 | F | Handling of Retry Correction | 17.5.0 |
| 2022-12 | SA#98e | SP-221193 | 0431 | 1 | F | SIP Request/Answer with different Timestamps | 17.5.0 |
| 2022-12 | SA#98e | SP-221168 | 0432 | 1 | F | Add SMF Charging Id in Offline Charging | 17.5.0 |
| 2022-12 | SA#98e | SP-221171 | 0434 | 1 | A | Correcting SMSF as Node Functionality | 17.5.0 |
| 2022-12 | SA#98e | SP-221171 | 0436 | 1 | A | Case Mismatch for Management Operation | 17.5.0 |
| 2022-12 | SA#98e | SP-221168 | 0437 | 1 | F | Add Missing Consumers in Converged Charging | 17.5.0 |
| 2022-12 | SA#98e | SP-221168 | 0440 | 1 | F | Correction of Result Code | 17.5.0 |
| 2022-12 | SA#98e | SP-221168 | 0445 | 1 | F | Correction on Charging notification | 17.5.0 |
| 2022-12 | SA#98e | SP-221168 | 0446 | - | F | Addition of the NodeFunctionality for EC | 17.5.0 |
| 2022-12 | SA#98e | SP-221195 | 0448 | 1 | A | Correction on the Nchf_OfflineOnlyCharging | 17.5.0 |
| 2022-12 | SA#98e | SP-221168 | 0450 | - | F | Update Open API version | 17.5.0 |
| 2023-03 | SA#99 | SP-230213 | 0454 | 1 | F | Add EAS Deployment Requirements | 17.6.0 |
| 2023-03 | SA#99 | SP-230197 | 0456 | 1 | F | Correction on the YAML for Edge Charging | 17.6.0 |
| 2023-03 | SA#99 | SP-230197 | 0459 | 1 | F | Correction of UPFIId in QBC | 17.6.0 |
| 2023-03 | SA#99 | SP-230197 | 0463 | - | F | Update OpenAPI version | 17.6.0 |
| 2023-06 | SA#100 | SP-230652 | 0466 | 1 | F | Add LCM Event Type in EAS Deployment Charging Info | 17.7.0 |
| 2023-06 | SA#100 | SP-230650 | 0470 | 2 | F | Correction of requested units | 17.7.0 |
| 2023-06 | SA#100 | SP-230650 | 0475 | 1 | F | Update OpenAPI version | 17.7.0 |
| 2023-06 | SA#100 | SP-230650 | 0478 | 1 | F | Correction of QFIContainerInformation | 17.7.0 |
| 2023-09 | SA#101 | SP-230951 | 0468 | 2 | F | Update EAS Infrastructure Usage Charging Information | 17.8.0 |
| 2023-09 | SA#101 | SP-230945 | 0481 | - | F | Correction on AMF identifier | 17.8.0 |
| 2023-09 | SA#101 | SP-230945 | 0483 | 1 | F | Correction on API Target Network Function information | 17.8.0 |
| 2023-09 | SA#101 | SP-230945 | 0489 | 1 | F | Correction on Category | 17.8.0 |
| 2023-09 | SA#101 | SP-230945 | 0491 | 1 | F | Correct the NSPAContainerInformation for NSPA | 17.8.0 |
| 2023-09 | SA#101 | SP-230936 | 0494 | 1 | F | Correction to QoSMonitoring feature | 17.8.0 |
| 2023-09 | SA#101 | SP-230942 | 0497 | - | A | Correction to triggerType in Nchf_ConvergedCharging API | 17.8.0 |
| 2023-09 | SA#101 | SP-230942 | 0501 | - | A | Update OpenAPI version | 17.8.0 |
| 2023-12 | SA#102 | SP-231491 | 0509 | 1 | F | Rel-17 CR 32.291 QBC Charging Session Continuity Identification at V-SMF Change | 17.9.0 |
| 2023-12 | SA#102 | SP-231491 | 0513 | - | F | Resolve References to nrm yaml | 17.9.0 |
| 2023-12 | SA#102 | SP-231488 | 0517 | 1 | A | Rel-17 CR 32.291 Correction of NEF identifiers as a list | 17.9.0 |
| 2023-12 | SA#102 | SP-231491 | 0524 | - | F | Update OpenAPI version | 17.9.0 |

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|---------|--------|---------------------------|------|---|---|--|---------|
| 2023-12 | SA#102 | | | | | Proper reference to TS28541_SliceNrm.yaml, correct indentation and add YAML files in zip | 17.9.1 |
| 2024-06 | SA#104 | SP-240807 | 0546 | 1 | F | Rel-17 CR 32.291 Correction on the supported feature | 17.10.0 |
| 2024-06 | SA#104 | SP-240807 | 0554 | 1 | F | Correction of servingNetworkFunctionInformation | 17.10.0 |
| 2024-06 | SA#104 | SP-240807 | 0556 | | F | Fix errors in Nchf_ConvergedCharging API | 17.10.0 |
| 2024-06 | SA#104 | SP-240807 | 0572 | | F | Update OpenAPI version | 17.10.0 |

History

| Document history | | |
|-------------------------|---------------|-------------|
| V17.2.0 | May 2022 | Publication |
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