



**LTE;
5G;
Service Enabler Architecture Layer for Verticals (SEAL);
Application Programming Interface (API) specification;
Stage 3
(3GPP TS 29.549 version 19.4.0 Release 19)**



Reference

RTS/TSGC-0329549vj40

Keywords

5G,LTE

ETSI

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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.

In the present document, modal verbs have the following meanings:

- shall** indicates a mandatory requirement to do something
- shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

- should** indicates a recommendation to do something
- should not** indicates a recommendation not to do something
- may** indicates permission to do something
- need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

- can** indicates that something is possible
- cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present specification describes the APIs for the Service Enabler Architecture Layer for Verticals (SEAL). The related stage 2 architecture, functional requirements and information flows are specified in 3GPP TS 23.434 [2] and 3GPP TS 23.433 [34] (for SEAL Data Delivery).

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 TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.434: "Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows".
- [3] 3GPP TS 29.122: "T8 reference point for Northbound Application Programming Interfaces (APIs)".
- [4] IETF RFC 6455: "The WebSocket Protocol".
- [5] IETF RFC 9112: "HTTP/1.1".
- [6] IETF RFC 9110: "HTTP Semantics".
- [7] Void.
- [8] Void.
- [9] IETF RFC 9111: "HTTP Caching".
- [10] Void.
- [11] Void.
- [12] IETF RFC 9113: "HTTP/2".
- [13] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [14] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [15] Open API: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.
- [16] 3GPP TS 29.222: "Common API Framework for 3GPP Northbound APIs; Stage 3".
- [17] 3GPP TS 23.222: "Common API Framework for 3GPP Northbound APIs; Stage 2".
- [18] 3GPP TS 33.122: "Security Aspects of Common API Framework for 3GPP Northbound APIs".
- [19] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [20] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".
- [21] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

- [22] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [23] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE_LTE); MB2 reference point; Stage 3".
- [24] 3GPP TR 21.900: "Technical Specification Group working methods".
- [25] 3GPP TS 33.210: "3G security; Network Domain Security (NDS); IP network layer security".
- [26] 3GPP TS 33.434: "Service Enabler Architecture Layer for Verticals (SEAL); Security Aspects".
- [27] 3GPP TS 29.486: "V2X Application Enabler (VAE) Services; Stage 3".
- [28] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".
- [29] IEEE 802.1Qcc-2018: "IEEE Standard for Local and Metropolitan Area Networks—Bridges and Bridged Networks".
- [30] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".
- [31] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".
- [32] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".
- [33] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".
- [34] 3GPP TS 23.433: "Service Enabler Architecture Layer for Verticals (SEAL); Data Delivery enabler for vertical applications".
- [35] 3GPP TS 29.548: "Service Enabler Architecture Layer for Verticals (SEAL); SEAL Data Delivery (SEALDD) Server Services; Stage 3".
- [36] 3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services; Stage 2".
- [37] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description".
- [38] 3GPP TS 23.436: "Functional architecture and information flows for Application Data Analytics Enablement Service".
- [39] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [40] IETF RFC 9562: "Universally Unique IDentifier (UUIDs)".
- [41] 3GPP TS 23.435: "Procedures for Network Slice Capability Exposure for Application Layer Enablement Service".
- [42] 3GPP TS 29.435: "Service Enabler Architecture Layer for Verticals (SEAL); Network Slice Capability Exposure (NSCE) Server Services; Stage 3".
- [43] 3GPP TS 29.558: "Enabling Edge Applications; Application Programming Interface (API) specification; Stage 3".
- [44] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".
- [45] 3GPP TS 23.437: "Service Enabler Architecture Layer for Verticals (SEAL); Spatial map and Spatial anchors".
- [46] 3GPP TS 23.438: "Service Enabler Architecture Layer for Verticals (SEAL); Digital asset".
- [47] 3GPP TS 23.482: "Functional architecture and information flows for AIML Enablement Service".
- [48] 3GPP TS 29.482: "Service Enabler Architecture Layer for Verticals (SEAL); Artificial Intelligence Machine Learning Enablement (AIMLE) Services; Stage 3".
- [49] 3GPP TS 29.437: "Service Enabler Architecture Layer for Verticals (SEAL); Metaverse Enablement Services; Stage 3".

3 Definitions of terms and abbreviations

3.1 Terms

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

VAL service: A generic name for any service offered by the VAL service provider to their VAL users.

SEAL service: A generic name for a common service (e.g. group management, configuration management, location management) that can be utilized by multiple vertical applications.

SEAL provider: Provider of SEAL service(s).

VAL server: A generic name for the server application function of a specific VAL service.

SEAL server: An entity that provides the server side functionalities corresponding to the specific SEAL service.

VAL system: The collection of applications, services, and enabling capabilities required to support a VAL service.

VAL group: A defined set of VAL UEs or VAL users configured for specific purpose in a VAL service.

NOTE: The set could be of either VAL UEs or VAL users depending on the specific VAL service.

VAL group home system: The VAL system where the VAL group is defined.

VAL group member: A VAL service user, whose VAL user ID is listed in a particular VAL group.

Vertical application: An application catering to a specific vertical.

3.2 Abbreviations

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

5GS	5G System
ADAE	Application Data Analytics Enablement
A-ADRF	Application layer - Analytical Data Repository Function
A-DCCF	Application layer - Data Collection and Coordination Function
ADAEs	ADAE Server
AEF	API Exposing Function
API	Application Programming Interface
BDT	Background Data Transfer
DA	Digital Asset
DN	Data Network
DNAI	Data Network Access Identifier
DNN	Data Network Name
DS-TT	Device-Side TSN Translator
EAS	Edge Application Server
EES	Edge Enabler Server
JSON	JavaScript Object Notation
NDS	Network Domain Security
NDS/IP	NDS for IP based protocols
NRM	Network Resource Management
NSCE	Network Slice Capability Enablement
PLMN	Public Land Mobile Network
REST	Representational State Transfer
SAn	Spatial Anchors
SCEF	Service Capability Exposure Function
SCS	Service Capability Server

SR	Short Range
SEAL	Service Enabler Architecture Layer for Verticals
SEALDD	SEAL Data Delivery
SM	Spatial Map
TMGI	Temporary Mobile Group Identity
TSC	Time Sensitive Communication
TSN	Time Sensitive Networking
UE	User Equipment
VAL	Vertical Application Layer
UASS	UAS Application Specific Server

4 Overview

3GPP has considered in 3GPP TS 23.434 [2], 3GPP TS 23.433 [34] (for SEALDD), 3GPP TS 23.435 [41] (for NSCE), 3GPP TS 23.436 [38] (for ADAE), 3GPP TS 23.437 [45] (for SM and SAn), 3GPP TS 23.438 [46] (for DA management) and 3GPP TS 23.482 [47] (for AIMLE) the development of Service enabler architecture layer for verticals (SEAL) over 3GPP networks to support vertical applications (e.g. V2X applications). It specifies the functional architecture for SEAL and the procedures, information flows and APIs for each service within SEAL in order to support vertical applications over the 3GPP systems. To ensure efficient use and deployment of vertical applications over 3GPP systems, SEAL services include, group management, configuration management, location management, identity management, key management, network resource management, network slice capability enablement (NSCE), application data analytics enablement (ADAE), data delivery management (SEALDD), spatial anchor management, spatial map management, digital asset management and AIML enablement (AIMLE).

Clause 6 of 3GPP TS 23.434 [2] specifies the functional entities and domains of the functional model, reference points descriptions and SEAL APIs for SEAL services.

The present document specifies the APIs needed to support SEAL. 3GPP TS 29.548 [35] specifies the APIs needed for SEALDD. 3GPP TS 29.435 [42] specifies the APIs needed for NSCE. 3GPP TS 29.482 [48] specifies the APIs needed for AIML Enablement. 3GPP TS 29.437 [49] specifies the APIs needed for Spatial Anchor and Spatial Map services.

5 Services offered by the SEAL servers

5.1 Introduction of SEAL services

The table 5.1-1 lists the SEAL server APIs below the service name. A service description clause for each API gives a general description of the related API.

Table 5.1-1: List of SEAL Service APIs

Service Name	Service Operations	Operation Semantics	Consumer(s)
SS_LocationReporting	Create_Trigger_Location_Reporting	Request/ Response	VAL server
	Fetch_Location_Report_Trigger	Request/Response	VAL server
	Update_Trigger_Location_Reporting	Request/ Response	VAL server
	Cancel_Trigger_Location_Reporting	Request/ Response	VAL server
	Notify_Trigger_Location_Reporting	Notify	VAL server
	Notify_Adaptive_Configuration	Notify	VAL server
SS_LocationInfoEvent	Subscribe_Location_Info	Subscribe/Notify	VAL server
	Update_Location_Info_Subscription		VAL server
	Unsubscribe_Location_Info		VAL server
	Notify_Location_Info		VAL server
SS_LocationInfoRetrieval	Obtain_Location_Info	Request/ Response	VAL server
SS_LocationAreaInfoRetrieval	Obtain_UEs_Info	Request/ Response	VAL server
SS_LocationMonitoring	Subscribe_Location_Monitoring	Subscribe/Notify	VAL server
	Update_Location_Monitoring_Subscription		
	Unsubscribe_Location_Monitoring		
	Notify_Location_Monitoring_Events		
SS_LocationAreaMonitoring	Subscribe_Location_Area_Monitoring	Subscribe/Notify	VAL server
	Notify_Location_Area_Monitoring_Events		
	Update_Location_Area_Monitoring_Subscribe		
	Unsubscribe_Location_Area_Monitoring		
SS_VALServiceAreaConfiguration	Configure_VAL_Service_Area	Request/Response	VAL server
	Obtain_VAL_Service_Area	Request/Response	VAL server
	Update_VAL_Service_Area	Request/Response	VAL server
	Delete_VAL_Service_Area	Request/Response	VAL server
	Subscribe_VAL_Service_Area_Change_Event	Subscribe/Notify	SEAL server
	Update_Subscription_VAL_Service_Area_Change_Event		
	Unsubscribe_VAL_Service_Area_Change_Event		
	Notify_VAL_Service_Area_Change_Event		
SS_LocationHistoryInfoEvent	Create	Request/Response	e.g., VAL Server
	Update		e.g., VAL Server
	Delete		e.g., VAL Server
	Query		e.g., VAL Server
SS_ConfirmLocation	Subscribe	Subscribe/Notify	e.g., VAL Server
	Notify		LM Server
SS_SLPositioningManagement	Subscribe	Subscribe/Notify	VAL server
	Notify		VAL Server
	SRInfoRequest	Request/Response	VAL Server
SS_GroupManagement	Query_Group_Info	Request/ Response	VAL server
	Update_Group_Info	Request/ Response	VAL server

SS_GroupManagementEvent	Create_Group	Request/ Response	VAL server
	Delete_Group	Request/Response	VAL server
	Subscribe_Group_Info_Modification	Subscribe/Notify	VAL server
	Notify_Group_Info_Modification		VAL server
	Notify_Group_Creation		VAL server
SS_UserProfileRetrieval	Obtain_User_Profile	Request/ Response	VAL server
SS_VALServiceData	Obtain_VAL_Service_Data	Request/Response	SEAL server
SS_ASCAIInfoRetrieval	Obtain_ASCAI_Info	Request/Response	e.g., VAL Server
SS_UserProfileEvent	Subscribe_User_Profile_Update	Subscribe/Notify	VAL server
	Notify_User_Profile_Update		VAL server
SS_NetworkResourceAdaptation (NOTE 3)			
	Reserve_Network_Resource	Request/Response	e.g., VAL server, SEALDD Server
	Reserve_Network_Resource_Modify	Request/Response	e.g., VAL server, SEALDD Server
	Request_Multicast_Resource	Request/Response	e.g., VAL server
	Notify_UP_Delivery_Mode	Subscribe/Notify	e.g., VAL server
	Discover_TSC_Stream_Availability	Request/Response	e.g., VAL server
	Create_TSC_Stream	Request/Response	e.g., VAL server
	Delete_TSC_Stream	Request/Response	e.g., VAL server
	Create_MBS_Resource	Request/Response	e.g., VAL server
	Update_MBS_Resource	Request/Response	e.g., VAL server
	Delete_MBS_Resource	Request/Response	e.g., VAL server
	Activate_MBS_Resource	Request/Response	e.g., VAL server
	Deactivate_MBS_Resource	Request/Response	e.g., VAL server
	Reliable_Transmission_Request	Request/Response	e.g., SEALDD Server, VAL Server
	BDT_Configuration_Request	Request/Response	e.g., VAL server, SEALDD Server
	BDT_Negotiation_Notification	Subscribe/Notify	e.g., VAL server, SEALDD Server
	BDT_Configuration_Get	Request/Response	e.g., VAL server, SEALDD Server
	BDT_Configuration_Update	Request/Response	e.g., VAL server, SEALDD Server
	BDT_Configuration_Delete	Request/Response	e.g., VAL server, SEALDD Server
	Subscribe_Unified_Traffic_Pattern_and_Monitoring_Management	Subscribe/Notify	e.g., VAL server
	Update_Unified_Traffic_Pattern_and_Monitoring_Management_Subscription		
	Unsubscribe_Unified_Traffic_Pattern_and_Monitoring_Management		
	Notify_Unified_Traffic_Pattern_Update		
SS_EventsMonitoring	Subscribe_Monitoring_Events	Subscribe/Notify	VAL server
	Notify_Monitoring_Events		
SS_Events	Subscribe_Event	Subscribe/Notify	VAL server
	Notify_Event		VAL server
	Unsubscribe_Event		VAL server
	Update_Subscription		VAL server
SS_KeyInfoRetrieval	Obtain_Key_Info	Request/Response	VAL server

SS_KMParametersProvisioning	Request	Request/Response	VAL server
SS_NetworkResourceMonitoring	Subscribe_Unicast_QoS_Monitoring_Data	Subscribe/Notify	VAL server
	Unsubscribe_Unicast_QoS_Monitoring_Data		VAL server
	Notify_Unicast_QoS_Monitoring_Data		VAL server
	Obtain_Unicast_QoS_Monitoring_Data	Request/Response	VAL server
	Update_Unicast_QoS_Monitoring_Subscription		VAL server
SS_IdmParameterProvisioning	Provide_Configuration	Request/Response	VAL server
	Get_Configuration		
	Update_Configuration		
	Delete_Configuration		
SS_ADAE_VALPerformanceAnalytics	Subscribe_VAL_Performance_Analytics	Subscribe/Notify	VAL server
	Notify_VAL_Performance_Analytics		
	Unsubscribe_VAL_Performance_Analytics		
SS_ADAE_SlicePerformanceAnalytics API	Subscribe_Slice_Performance_Analytics	Subscribe/Notify	VAL server
	Notify_Slice_Performance_Analytics		
	Unsubscribe_Slice_Performance_Analytics		
SS_ADAE_Ue2UePerformanceAnalytics	UE-to-UE_Performance_Analytics_Subscribe	Subscribe/Notify	VAL server
	UE-to-UE_Performance_Analytics_Notify		
	UE-to-UE_Performance_Analytics_Unsubscribe		
SS_ADAE_LocationAccuracyAnalytics	Subscribe_Location_Accuracy_Analytics	Subscribe/Notify	VAL server
	Notify_Location_Accuracy_Analytics		
	Unsubscribe_Location_Accuracy_Analytics		
SS_ADAE_ServiceApiAnalytics	Subscribe_Service_API_Analytics	Subscribe/Notify	VAL server
	Notify_Service_API_Analytics		
	Unsubscribe_Service_API_Analytics		
SS_ADAE_SliceUsagePatternAnalytics	Subscribe_Slice_Usage_Pattern_Analytics	Subscribe/Notify	VAL server, NSCE server
	Notify_Slice_Usage_Pattern_Analytics		
	Unsubscribe_Slice_Usage_Pattern_Analytics		
	Get_Slice_Usage_Stats	Request/Response	VAL server, NSCE server
SS_ADAE_EdgeLoadAnalytics	Subscribe_Edge_Load	Subscribe/Notify	VAL server, EAS, EES
	Notify_Edge_Load		
	Unsubscribe_Edge_Load		

	Get_Edge_Load_Data	Request/Response	VAL server, EAS, EES
SS_ADAE_LocationRelatedUeGroupAnalytics	Subscribe	Subscribe/Notify	e.g. LM Server
	Notify		
SS_ADAE_CollisionDetectionAnalytics	Subscribe	Subscribe/Notify	e.g., VAL Server, LM Server, UAE Server, UASS
	Notify		
SS_ADAE_UeRatConnectivityAnalytics	Subscribe	Subscribe/Notify	e.g., VAL Server
	Update		
	Unsubscribe		
	Notify		
SS_ADAE_ServerToServerPerformanceAnalytics	Subscribe	Subscribe/Notify	e.g., VAL Server, EES
	Notify		
SS_AADRF_DataManagement	Data_Storage	Request/Response	ADAE server, A-DCCF
	SS_AADRF_DataManagement_Subscribe	Subscribe/Notify	ADAE server
	SS_AADRF_DataManagement_Unsubscribe		
	SS_AADRF_DataManagement_Notify		
SS_ADCCF_DataCollection	Subscribe	Subscribe/Notify	e.g., ADAE server
	Notify		
	Request	Request/Response	e.g., ADAE server
SS_DAPProfileManagement	Create	Request/Response	SS_DAPProfileManagement
	Retrieve		
	Update		
	Delete		
SS_DADiscovery	Discovery	Request/Response	SS_DADiscovery
SS_DAMediaManagement	Upload	Request/Response	SS_DAMediaManagement
	Download		
	Update		
	Delete		
SS_ADAE_AIMLMemberCapabilityAnalytics	Subscribe	Subscribe/Notify	e.g., VAL Server, AIML Server
	Update		
	Unsubscribe		
	Notify		
SS_ADAE_DN_energy_analytics	SS_ADAE_DN_energy_analytics_Request	Request/Response	e.g., VAL Server
NOTE 1: The service operations of SS_Events API are reused by the SS_LocationInfoEvent, SS_LocationMonitoring, SS_LocationAreaMonitoring, SS_GroupManagementEvent, SS_UserProfileEvent, SS_EventsMonitoring and SS_SatelliteSFInfoEvent for events related services. NOTE 2: The service APIs exposed by the SEALDD Server and the corresponding service operations, operation semantics and service consumers are specified in clause 5 of 3GPP TS 29.548 [35]. NOTE 3: The "Create_MBS_Resource", "Update_MBS_Resource", "Delete_MBS_Resource", "Activate_MBS_Resource" and "Deactivate_MBS_Resource" service operations correspond to the stage 2 "Request_Multicast/Broadcast_Resource", "Update_Multicast/Broadcast_Resource", "Delete_Multicast/Broadcast_Resource", "Activate_Multicast_Resource" and "Deactivate_Multicast_Resource" service operations defined in clause 14.4.2 of 3GPP TS 23.434 [2]. NOTE 4: The service APIs exposed by the NSCE Server and the corresponding service operations, operation semantics and service consumers are specified in clause 5 of 3GPP TS 29.435 [42]. NOTE 5: The service APIs exposed by the SAn Server and SM Server, and the corresponding service operations, operation semantics and service consumers are specified in 3GPP TS 29.437 [49]. NOTE 6: The SS_SLPositioningManagement API is reused by the SS_SRPositioningInformation API defined in clause 9.4.11 of 3GPP TS 23.434 [2]. NOTE 7: The SS_ASCAllInfoRetrieval API defined in this specification corresponds to the stage 2 SS_SCAllInfoRetrieval API defined in clause 21.2.4 of 3GPP TS 23.434 [2].			

Table 5.1-2 summarizes the corresponding APIs defined in this specification.

Table 5.1-2: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex
SS_LocationReporting	7.1.1	Report Location Information Service	TS29549_SS_LocationReporting.yaml	ss-lr	A.2
SS_GroupManagement	7.2.1	Group Management Service	TS29549_SS_GroupManagement.yaml	ss-gm	A.3
SS_UserProfileRetrieval	7.3.1	User Profile Retrieval Service	TS29549_SS_UserProfileRetrieval.yaml	ss-upr	A.4
SS_NetworkResourceAdaptation	7.4.1	Network Resource Adaptation Service	TS29549_SS_NetworkResourceAdaptation.yaml	ss-nra	A.5
SS_Events	7.5.1	Events Notify Service	TS29549_SS_Events.yaml	ss-events	A.6
SS_KeyInfoRetrieval	7.6.1	Key Information Retrieval Service	TS29549_SS_KeyInfoRetrieval.yaml	ss-kir	A.7
(NOTE 2)					
SS_LocationAreaInfoRetrieval	7.1.2	Location Area Info Retrieval Service	TS29549_SS_LocationAreaInfoRetrieval.yaml	ss-lair	A.8
SS_NetworkResourceMonitoring	7.4.2	Network Resource Monitoring	TS29549_SS_NetworkResourceMonitoring.yaml	ss-nrm	A.10
SS_VALServiceData	7.3.2	VAL Service Data Service	TS29549_SS_VALServiceData.yaml	ss-vsd	A.11
SS_VALServiceAreaConfiguration	7.1.3	VAL Service Area Configuration Service	TS29549_SS_VALServiceAreaConfiguration.yaml	ss-vsac	A.12
SS_IdmParameterProvisioning	7.8.1	Identity Parameters Provisioning Management Service	TS29549_SS_IdmParameterProvisioning.yaml	ss-ipp	A.13
SS_KMParametersProvisioning	7.6.2	Key Management Parameters Provisioning Service	TS29549_SS_KMParametersProvisioning.yaml	ss-kpp	A.14
(NOTE 3)					
SS_ADAE_VALPerformanceAnalytics	7.10.1	ADAE VAL performance analytics service	TS29549_SS_ADAE_VALPerformanceAnalytics.yaml	ss-adae-pa	A.15
SS_ADAE_SlicePerformanceAnalytics	7.10.2	ADAE slice specific application performance analytics service	TS29549_SS_ADAE_SlicePerformanceAnalytics.yaml	ss-adae-sspa	A.16
SS_ADAE_Ue2UePerformanceAnalytics	7.10.3	ADAE UE-to-UE PerformanceAnalytics Service	TS29549_SS_ADAE_Ue2UePerformanceAnalytics.yaml	ss-adae-uupa	A.17
SS_ADAE_LocationAccuracyAnalytics	7.10.4	ADAE location accuracy performance analytics service	TS29549_SS_ADAE_LocationAccuracyAnalytics.yaml	ss-adae-laa	A.18
SS_ADAE_ServiceApiAnalytics	7.10.5	ADAE service API analytics service	TS29549_SS_ADAE_ServiceApiAnalytics.yaml	ss-adae-sa	A.19
SS_ADAE_SliceUsagePatternAnalytics	7.10.6	ADAE slice usage pattern analytics service	TS29549_SS_ADAE_SliceUsagePatternAnalytics.yaml	ss-adae-sup	A.20
SS_ADAE_EdgeLoadAnalytics	7.10.7	Edge load analytics service	TS29549_SS_ADAE_EdgeLoadAnalytics.yaml	ss-adae-el	A.21
SS_AADRF_DataManagement	7.10.8	A-ADRF Data Management Service	TS29549_SS_AADRF_DataManagement.yaml	ss-aadr-datamanagement	A.22
SS_ADAE_LocationRelatedUeGroupAnalytics	7.10.9	ADAE Location-Related UE Group Analytics service	TS29549_SS_ADAE_LocationRelatedUeGroupAnalytics.yaml	ss-adae-lruga	A.23
SS_ADAE_CollisionDetectionAnalytics	7.10.10	ADAE Collision Detection Analytics service	TS29549_SS_ADAE_CollisionDetectionAnalytics.yaml	ss-adae-cda	A.24
SS_LocationHistoryInfoEvent	7.1.4	Location Tracing Configuration Management	TS29549_SS_LocationHistoryInfoEvent.yaml	ss-lhie	A.25
SS_ConfirmLocation	7.1.5	Location Confirmation Service Management	TS29549_SS_ConfirmLocation.yaml	ss-cl	A.26
SS_SLPositioningManagement	7.1.6	SL Positioning Management service	TS29549_SS_SLPositioningManagement.yaml	ss-slp	A.27

SS_ADAE_AIMLMemberCapabilityAnalytics	7.10.11	ADAE AIML member capability analytics service	TS29549_SS_ADAE_AIMLMemberCapabilityAnalytics.yaml	ss-adae-aimlmca	A.28
SS_ADCCF_DataCollection	7.10.13	A-DCCF Data Collection service	TS29549_SS_ADCCF_DataCollection.yaml	ss-adccf-dc	A.29
SS_ADAE_ServerToServerPerformanceAnalytics	7.10.14	ADAE Server-to-Server Performance Analytics service	TS29549_SS_ADAE_ServerToServerPerformanceAnalytics.yaml	ss-adae-sspa	A.30
SS_ADAE_UeRatConnectivityAnalytics	7.10.12	ADAE UE RAT Connectivity Analytics service	TS29549_SS_ADAE_UeRatConnectivityAnalytics.yaml	ss-adae-uerat	A.31
SS_DAPProfileManagement	7.13.1	Manage digital asset profile service	TS29549_SS_DAPProfileManagement.yaml	ss-da-pm	A.33
SS_DADiscovery	7.13.2	Digital asset discovery service	TS29549_SS_DADiscovery.yaml	ss-da-d	A.34
SS_DAMediaManagement	7.13.3	Manage digital asset media service	TS29549_SS_DAMediaManagement.yaml	ss-da-medm	A.35
SS_ASCAInfoRetrieval	7.3.3	Application Satellite Coverage Availability Information service	TS29549_SS_ASCAInfoRetrieval.yaml	ss-ascaiinfo	A.32
SS_ADAE_DN_energy_analytics	7.10.15	DN energy analytics request service	TS29482_SS_ADAE_DN_energy_analytics.yaml	ss-adae-dnea	A.X
NOTE 1: The APIs exposed by the SEALDD Server are specified in clause 5 of 3GPP TS 29.548 [35].					
NOTE 2: The stage 2 requirements for this API are defined in clause 5.3 of 3GPP TS 33.434 [26].					
NOTE 3: The stage 2 requirements for this API are defined in clause 5.8 of 3GPP TS 33.434 [26].					
NOTE 4: The APIs exposed by the NSCE Server are specified in clause 5 of 3GPP TS 29.435 [42].					
NOTE 5: The APIs exposed by the SAn Server and SM Server are specified in 3GPP TS 29.437 [49].					

5.2 Location management APIs

5.2.1 SS_LocationReporting API

5.2.1.1 Service Description

5.2.1.1.1 Overview

The SS_LocationReporting API, as defined 3GPP TS 23.434 [2], allows VAL server via LM-S reference point to configure reporting trigger of location information to the location management server.

5.2.1.2 Service Operations

5.2.1.2.1 Introduction

The service operation defined for SS_LocationReporting API is shown in the table 5.2.1.2.1-1.

Table 5.2.1.2.1-1: Operations of the SS_LocationReporting API

Service operation name	Description	Initiated by
Create_Trigger_Location_Reporting	This service operation is used by VAL server to create the trigger to report location information.	VAL server
Fetch_Location_Report_Trigger	This service operation is used by VAL server to retrieve the location reporting trigger information.	VAL server
Update_Trigger_Location_Reporting	This service operation is used by VAL server to update the trigger to report location information.	VAL server
Cancel_Trigger_Location_Reporting	This service operation is used by VAL server to cancel the trigger to report location information.	VAL server
Notify_Trigger_Location_Reporting	This service operation is used by LM Server to send the notifications to the VAL Server.	LM Server
Notify_Adaptive_Configuration	This service operation is used by the LM Server to notify of the suggested adaptive location configuration and request feedback from the service consumer.	LM Server

5.2.1.2.2 Create_Trigger_Location_Reporting

5.2.1.2.2.1 General

This service operation is used by a VAL server to create the trigger to report location information.

5.2.1.2.2.2 VAL server providing trigger configuration using Create_Trigger_Location_Reporting service operation

To create the reporting trigger configuration, the VAL server shall send HTTP POST request message to location management server. The body of the HTTP POST message shall include the LocationReportConfiguration data type, as specified in the clause 7.1.1.2.2.3.1.

Upon receiving the HTTP POST message as described above, the location management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to provide the trigger;
2. if the VAL server is authorized to provide the triggers, the location management server shall;
 - a. create a new resource for Individual SEAL Location Reporting Configuration as specified in clause 7.1.1.2.1; and
 - b. return within the response message body the created resource representation within the LocationReportConfiguration data structure, and within an HTTP Location header the created resource URI in the response message. and
3. if errors occur when processing the request, the LM Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.1.1.5.

5.2.1.2.3 Fetch_Location_Report_Trigger

5.2.1.2.3.1 General

This service operation is used by VAL server to retrieve an individual location reporting configuration information.

5.2.1.2.3.2 VAL server fetching trigger configuration using Fetch_Location_Report_Trigger service operation

To fetch the location report trigger configuration, the VAL server shall send HTTP GET request message to location management server on the resource URI representing the individual SEAL location reporting configuration, as specified in 7.1.1.2.3.3.1.

Upon receiving the HTTP GET message as described above, the location management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to fetch the trigger information;
2. if the VAL server is authorized to fetch the trigger information, the location management server shall;
 - a. return the location report trigger configuration in LocationReportConfiguration data type, as specified in clause 7.1.1.2.1.

5.2.1.2.4 Update_Trigger_Location_Reporting

5.2.1.2.4.1 General

This service operation is used by a VAL server to update the trigger to report location information.

5.2.1.2.4.2 VAL server providing trigger configuration using Update_Trigger_Location_Reporting service operation

To modify the reporting trigger configuration, the VAL server shall send HTTP PUT message to the location management server to the Resource URI identifying the individual SEAL location reporting configuration resource representation, as specified in the clause 7.1.1.2.3.3.2. If the "PatchUpdate" feature defined in clause 7.1.1.6 is supported, the VAL server may send an HTTP PATCH request message to the Individual SEAL Location Reporting Configuration resource URI as specified in clause 7.1.1.2.3.3.4. The body of the HTTP PATCH request message shall include the requested modifications as specified in clause 7.1.1.2.3.3.4.

When HTTP PUT is used, the "valServerId" attribute within the LocationReportConfiguration data structure shall not be updated.

Upon receiving the HTTP PUT or PATCH request message, the location management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to modify the configuration information;
2. if the VAL server is authorized to modify the information, then the location management server shall;
 - a. if the configuration information in the request is valid, update/modify the resource identified by the Resource URI of the configuration received in the request;
 - b. return a 200 OK status code with the updated location reporting configuration information in the response or a 204 No Content status code.

5.2.1.2.5 Cancel_Trigger_Location_Reporting

5.2.1.2.5.1 General

This service operation is used by a VAL server to cancel the trigger to report location information.

5.2.1.2.5.2 VAL server providing trigger configuration using Cancel_Trigger_Location_Reporting service operation

To delete the reporting trigger configuration, the VAL server shall send an HTTP DELETE message to the resource representing Individual SEAL Location Reporting Configuration as specified in clause 7.1.1.2.3.3.3.

Upon receiving the HTTP DELETE message, the location management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to delete the configuration information; and
2. if the VAL server is authorized to delete the configuration information, the location management server shall delete the resource pointed by the Resource URI for Individual SEAL Location Reporting Configuration.

5.2.1.2.6 Notify_Trigger_Location_Reporting

5.2.1.2.6.1 General

This service operation is used by a LM Server to notify of the location trigger event.

5.2.1.2.6.2 LM Server notifies the VAL Server on the location trigger event using Notify_Trigger_Location_Reporting

In order to notify the VAL Server about location event, the LM Server shall send an HTTP POST request message to the VAL Server targeting the notification URI provided during location trigger configuration (see clauses 5.2.1.2.2.2 and 5.2.1.2.4.2).

Upon receiving the HTTP POST request message, the VAL Server shall:

1. process the location trigger event notification;
2. upon success, respond to the LM Server with a "204 No Content" status code; and
3. if errors occur when processing the request, the VAL Server shall respond to the LM Server with an appropriate error response as specified in clause 7.1.1.5.

5.2.1.2.7 Notify_Adaptive_Configuration

5.2.1.2.7.1 General

This service operation is used by the LM Server to notify the suggested adaptive location configuration and request feedback.

5.2.1.2.7.2 Adaptive Location Configuration Notification

5.2.1.2.7.2.1 General

This service operation is used by the LM Server to notify of the suggested adaptive location configuration and request feedback from the service consumer.

The following procedures are supported by the "Notify_Adaptive_Configuration" service operation:

- Adaptive Location Configuration Notification.

5.2.1.2.7.2.2 Adaptive Location Configuration Notification

To notify of the suggested adaptive location configuration and request feedback from the service consumer, the LM Server shall send an HTTP POST request to the service consumer targeting the notification URI received during the corresponding SEAL Location Reporting Configuration creation/update defined in clauses 5.2.1.2.2 and 5.2.1.2.4, with the request body containing the AdaptConfigNotif data structure as defined in clause 7.1.1.3.3.3.

Upon reception of the HTTP POST request message, the service consumer shall process the suggested adaptive location configuration, and in case of success, respond with an HTTP "200 OK" status code with the response body containing the AdaptConfigNotifResp data structure.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the response body, as specified in clause 7.1.1.5.

5.2.2 SS_LocationInfoEvent API

The SS_LocationInfoEvent API, as defined 3GPP TS 23.434 [2], allows a VAL server via LM-S reference point to subscribe for and receive notifications of location information from the location management server. The SS_LocationInfoEvent API supports this via the event "LM_LOCATION_INFO_CHANGE" of the SS_Events API as specified in clause 7.5. If the event subscription includes an indication for supplementary location information, then the location management server obtains the UE location information from the 3GPP core network and/or a 3rd party location management server.

NOTE: How the location management server obtains the UE location from a 3rd party location management server is out of scope of this specification.

5.2.3 SS_LocationInfoRetrieval API

The SS_LocationInfoRetrieval API, as defined 3GPP TS 23.434 [2], enables the VAL server via LM-S reference point to obtain location information from the location management server. The SS_LocationInfoRetrieval API supports this via the event "LM_LOCATION_INFO_CHANGE" of the SS_Events API by setting the "immRep" attribute to true and setting the "notifMethod" attribute to "ONE_TIME" within the "eventReq" attribute, as specified in clause 7.5.

Upon receipt of the immediate reporting indication in the "immRep" attribute within the "eventReq" attribute sets to true in the HTTP POST request, the location management server shall ignore the "notificationDestination" attribute within the SEALEventSubscription data type and include the event details in the "eventDetails" attribute, if available, in the HTTP POST response.

5.2.4 SS_LocationAreaInfoRetrieval API

5.2.4.1 Service Description

5.2.4.1.1 Overview

The SS_LocationAreaInfoRetrieval API, as defined 3GPP TS 23.434 [2], enables the VAL server via LM-S reference point to obtain UE(s) information in an application defined proximity range of a location.

5.2.4.2 Service Operations

5.2.4.2.1 Introduction

The service operation defined for SS_LocationAreaInfoRetrieval API is shown in the table 5.2.4.2.1-1.

Table 5.2.4.2.1-1: Operations of the SS_LocationAreaInfoRetrieval API

Service operation name	Description	Initiated by
Obtain_UEs_Info	This service operation is used by VAL server to obtain UE(s) information in an application defined proximity range of a location.	VAL server

5.2.4.2.2 Obtain_UEs_Info

5.2.4.2.2.1 General

This service operation is used by a VAL server to obtain UE(s) information in an application defined proximity range of a location.

5.2.4.2.2.2 VAL server obtains UE(s) information in an application defined proximity range of a location using Obtain_UEs_Info service operation

To obtain the UE(s) information in an application defined proximity range of a location, the VAL server shall send HTTP GET message to the location management server, on location information collection resource representation URI as specified in the clause 7.1.2.2.3.1. The GET message shall include the query parameters: Location information or VAL service area identifier and proximity range.

Upon receiving the HTTP GET message as described above, the location management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to fetch the UE(s) information;
2. if the VAL server is authorized to fetch the UE(s) information, the location management server shall;

- a. determine the VAL UE(s) information that are in the proximity range of the location as per the query parameters in the request message from the VAL server;
- b. return HTTP "200 OK" status code with the determined VAL UE(s) information in the LMInformation data type to the VAL server.

5.2.5 SS_LocationMonitoring API

The SS_LocationMonitoring API, as defined 3GPP TS 23.434 [2], allows a VAL server via the LM-S reference point to monitor the VAL UE(s) in relation to a given area of interest. The VAL server subscribes to the LM server to receive notifications of deviation of VAL UE(s) / User(s) location from a given location information. The SS_LocationMonitoring API supports this via the event "LM_LOCATION_DEVIATION_MONITOR" of the SS_Events API as specified in clause 7.5.

Upon the receipt of "LM_LOCATION_DEVIATION_MONITOR" event subscription request from the VAL server, in order to notify the location deviation events to the VAL server, the location management server shall:

1. verify the VAL user(s) / VAL UE(s) identifier(s) provided in the "tgtUes" attribute within the MonitorLocationInterestFilter structure as specified in steps 2a and 2b of clause 5.6.1.2.2.2;
2. periodically obtain the VAL UE location information using the SEAL location information procedures as per the SS_LocationReporting and SS_LocationAreaInfoRetrieval APIs as specified in clauses 5.2.1 and 5.2.4;
3. using the MonitoringEvent API as specified in 3GPP TS 29.122 [3] and 3GPP TS 29.522 [28], periodically obtain the VAL UE location information from the 3GPP core network using the relevant location related monitoring event(s) and subscribe to the service for area of interest monitoring via the "AREA_OF_INTEREST" monitoring event, and may optionally obtain VAL UE location information from the 3rd party location management server;

NOTE: How the location management server obtains the UE location from a 3rd party location management server is out of scope of this specification.

4. process the location information received in steps 2 and 3 above and continue as follows:
 - a. if the location information from the location management client, the 3GPP core network and from the 3rd party location management server (if available) do not match, or when the result of the presence status in the area of interest based on the location information collected from the location management client and the result of the presence status in the area of interest reported by the NEF do not match, then notify the VAL server with the "NOTIFY_MISMATCH_LOCATION" value in the event report;
 - b. if the location information from the location management client, the 3GPP core network and from the 3rd party location management server (if available) match and is not within the area of interest of the VAL server, and such result is also aligned with the NEF reported area of interest monitoring result, then notify the VAL server with the "NOTIFY_ABSENCE" value in the event report;
 - c. if the location information from the location management client, the 3GPP core network and from the 3rd party location management server (if available) match and is within the area of interest of the VAL server, and such result is also aligned with the NEF reported area of interest monitoring result, then notify to the VAL server with the "NOTIFY_PRESENCE" value in the event report, based on the notification interval parameter in VAL server's event subscription; or
 - d. if the "LM_LocationDeviation_Ext1" feature is supported and the LM Server is not able to determine whether or not the current location of VAL UE is within the dynamic area of interest information provided within the "geofCond" attribute of the MonitorLocationInterestFilter data structure (as specified in steps 2a and 2b of clause 5.6.1.2.2.2), then notify the VAL Server with the "NOTIFY_UNKNOWN" value in the event report;

and

5. if the SEAL location management server is unable to satisfy the request, the SEAL location management server shall respond to the VAL server with an appropriate error status code as defined in clause 7.5.1.5.

5.2.6 SS_LocationAreaMonitoring API

The SS_LocationAreaMonitoring API, as defined 3GPP TS 23.434 [2], allows a VAL server via the LM-S reference point to subscribe for and receive notifications of list of UE(s) moving in or out of a given area of interest from the location management server. The SS_LocationAreaMonitoring API supports this via the event "LM_LOCATION_AREA_MONITOR" of the SS_Events API as specified in clause 7.5. The VAL server may indicate the periodic time interval in which the LM server needs to notify the VAL UE's location information in the Reporting Requirements, during the Subscribe_Event service operation of SS_Events API.

5.2.7 SS_VALServiceAreaConfiguration API

5.2.7.1 Service Description

5.2.7.1.1 Overview

The SS_VALServiceAreaConfiguration API, as defined 3GPP TS 23.434 [2], enables a VAL Server to configure and manage VAL service area(s) via the LM-S reference point.

5.2.7.2 Service Operations

5.2.7.2.1 Introduction

The service operations defined for the SS_VALServiceAreaConfiguration API are shown in the table 5.2.7.2.1-1.

Table 5.2.7.2.1-1: Service operations of the SS_VALServiceAreaConfiguration API

Service operation name	Description	Initiated by
Configure_VAL_Service_Area	This service operation is used by a VAL Server to configure VAL service area(s).	VAL Server
Obtain_VAL_Service_Area	This service operation is used by a VAL Server to obtain VAL service area(s) related information.	VAL Server
Update_VAL_Service_Area	This service operation is used by a VAL Server to request the update of VAL service area(s).	VAL Server
Delete_VAL_Service_Area	This service operation is used by a VAL Server to request the deletion of VAL service area(s).	VAL Server
Subscribe_VAL_Service_Area_Change_Event	This service operation is used by a SEAL Server to subscribe to the VAL service area(s) change event(s) reporting.	SEAL Server
Update_Subscription_VAL_Service_Area_Change_Event	This service operation is used by a SEAL Server to update the VAL service area(s) change event(s) subscription.	SEAL Server
Unsubscribe_VAL_Service_Area_Change_Event	This service operation is used by a SEAL Server to unsubscribe from the VAL service area(s) change event(s) reporting.	SEAL Server
Notify_VAL_Service_Area_Change_Event	This service operation is used by a LM Server to notify for the VAL service area(s) change event(s).	SEAL Server

5.2.7.2.2 Configure_VAL_Service_Area

5.2.7.2.2.1 General

This service operation is used by a VAL Server to configure VAL service area(s) with VAL service area ID(s).

5.2.7.2.2.2 VAL Server configures VAL service area(s) using the Configure_VAL_Service_Area service operation

In order to configure VAL service area(s), the VAL Server shall send an HTTP POST request message (i.e., custom operation "Configure") to the LM Server as specified in clause 7.1.3.2.2.4.2. The request body shall include the ValServiceAreaReq data structure defined in clause 7.1.3.4.2.3.

Upon reception of the HTTP POST request message, the LM Server shall:

1. verify the identity of the VAL Server and whether the VAL Server is authorized to configure the VAL service area(s) at the LM Server;
2. if the VAL Server is authorized, the LM Server shall configure the requested VAL service area(s) and respond to the VAL Server with an HTTP "200 OK" status code with the response body including the ValServiceAreaResp data structure defined in clause 7.1.3.4.2.5; and
3. if the LM server is unable to satisfy the request, the LM Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.1.3.5.

5.2.7.2.3 Obtain_VAL_Service_Area

5.2.7.2.3.1 General

This service operation is used by a VAL Server to obtain the VAL service area(s) based on the corresponding VAL service area ID(s).

5.2.7.2.3.2 VAL Server obtains VAL service area(s) using the Obtain_VAL_Service_Area service operation

In order to obtain VAL service area(s) and the corresponding information, the VAL Server shall send an HTTP GET request message to the LM Server targeting the URI of the "VAL Service Areas" resource as specified in clause 7.1.3.2.2.3.1. The request URI may include the requested VAL service identifier(s) as defined in clause 7.1.3.2.2.3.1.

Upon reception of the HTTP GET request message, the LM Server shall:

1. verify the identity of the VAL Server and whether the VAL Server is authorized to obtain the requested VAL service area(s) information from the LM Server;
2. if the VAL Server is authorized, the LM server shall respond to the VAL Server with an HTTP "200 OK" status code with the response body including the ValServiceAreaData data structure defined in clause 7.1.3.2.2.3.1; and
3. if the LM Server is unable to satisfy the request, the LM Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.1.3.5.

5.2.7.2.4 Update_VAL_Service_Area

5.2.7.2.4.1 General

This service operation is used by a VAL Server to update a VAL service area(s) with the corresponding VAL service area ID(s).

5.2.7.2.4.2 VAL Server updates VAL service area(s) using the Update_VAL_Service_Area service operation

In order to update existing VAL service area(s) related information, the VAL Server shall send an HTTP POST request message (i.e., custom operation "Update") to the LM Server as specified in clause 7.1.3.2.2.4.3. The request body shall include the ValServiceAreaReq data structure specified in clause 7.1.3.2.2.4.3.

Upon reception of the HTTP POST request message, the LM Server shall:

1. verify the identity of the VAL Server and whether the VAL Server is authorized to update the requested VAL service area(s) related information at the LM Server;
2. if the VAL Server is authorized, the LM server shall check whether the VAL service area(s) exist and then update the VAL service area(s) information of each VAL service area ID(s), and respond to the VAL Server with an HTTP "200 OK" status code with the response body including the ValServiceAreaResp data structure defined in clause 7.1.3.4.2.5; and

3. if the LM Server is unable to satisfy the request, the LM Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.1.3.5.

5.2.7.2.5 Delete_VAL_Service_Area

5.2.7.2.5.1 General

This service operation is used by a VAL Server to delete VAL service area(s) with the given VAL service area ID(s).

5.2.7.2.5.2 VAL Server deletes service area(s) using the Delete_VAL_Service_Area service operation

In order to delete existing VAL service area(s) and the related information, the VAL Server shall send an HTTP POST request message (i.e., custom operation "Delete") to the LM Server as specified in clause 7.1.3.2.2.4.4.

Upon reception of the HTTP POST request message, the LM Server shall:

1. verify the identity of the VAL Server and whether the VAL Server is authorized to delete the requested VAL service area(s) related information at the LM Server;
2. if the VAL Server is authorized, the LM server shall check whether the target VAL service area(s) exist(s), then delete the corresponding VAL service area(s) information, and respond to the VAL Server with an HTTP "200 OK" status code with the response body including the ValServiceAreaResp data structure defined in clause 7.1.3.4.2.5; and
3. if the LM Server is unable to satisfy the request, the LM Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.1.3.5.

5.2.7.2.6 Subscribe_VAL_Service_Area_Change_Event

5.2.7.2.6.1 General

This service operation is used by a SEAL Server to subscribe to the VAL service area(s) change event(s) reporting.

5.2.7.2.6.2 SEAL Server subscribes for the VAL service area(s) change event(s) reporting using the Subscribe_VAL_Service_Area_Change_Event service operation

In order to subscribe to the VAL service area(s) change event(s) reporting, the SEAL Server shall send an HTTP POST request message targeting the URI of the "VAL Service Area Change Subscriptions" resource as specified in clause 7.1.3.2.3.3.1. The request body shall include the ValServiceAreaSubsc data structure defined in clause 7.1.3.4.2.6.

Upon reception of the HTTP POST request message, the LM Server shall:

1. verify the identity of the SEAL Server and whether the SEAL Server is authorized to subscribe to the VAL service area(s) change event(s) reporting at the LM Server;
2. if the SEAL Server is authorized, the LM Server shall create a new "Individual VAL Service Area Change Subscription" resource and respond to the VAL server with an HTTP "201 Created" status code, including a Location header field containing the URI for the created "Individual VAL Service Area Change Subscription" resource and the response body including the ValServiceAreaSubsc data structure containing a representation of the created resource as defined in clause 7.1.3.4.2.6; and
3. if errors occur when processing the request, the LM Server shall respond to the SEAL Server with an appropriate error response as specified in clause 7.1.3.5.

5.2.7.2.7 Update_Subscription_VAL_Service_Area_Change_Event

5.2.7.2.7.1 General

This service operation is used by a SEAL Server to update the subscription for the VAL service area(s) change event(s) reporting.

5.2.7.2.7.2 SEAL Server updates the subscription for the VAL service area(s) change event(s) reporting using the Update_Subscription_VAL_Service_Area_Change_Event service operation

In order to update an existing individual VAL service area change event subscription reporting, the SEAL Server shall send an HTTP PUT request message including the ValServiceAreaSubsc data structure to the LM Server, targeting the corresponding "Individual VAL Service Area Change Subscription" resource URI as specified in clause 7.1.3.2.4.3.2.

In order to modify an existing individual VAL service area change event subscription reporting, the SEAL Server shall send an HTTP PATCH request message including the ValServiceAreaSubscPatch data structure targeting the "Individual VAL Service Area Change Subscription" resource URI as specified in clause 7.1.3.2.4.3.3.

Upon receiving the HTTP PUT or HTTP PATCH request message, the LM Server shall:

1. verify the identity of the SEAL Server and check if the SEAL Server is authorised to update or modify the "Individual VAL Service Area Change Subscription" resource;
2. if the SEAL Server is authorized, then the LM Server shall:
 - a. update/modify the resource identified by the Resource URI of the configuration received in the request; and
 - b. respond to the SEAL server with an HTTP "200 OK" with the response body containing the updated "Individual VAL Service Area Change Subscription" resource within the ValServiceAreaSubsc data structure or "204 No Content" status code;

and

3. if errors occur when processing the request, the LM Server shall respond to the SEAL Server with an appropriate error response as specified in clause 7.1.3.5.

5.2.7.2.8 Unsubscribe_VAL_Service_Area_Change_Event

5.2.7.2.8.1 General

This service operation is used by a SEAL Server to unsubscribe from the VAL service area(s) change event(s) reporting.

5.2.7.2.8.2 SEAL server unsubscribes from the VAL service area(s) change event(s) using Unsubscribe_VAL_Service_Area_Change_Event

In order to terminate an individual VAL service area change event subscription reporting, the SEAL server shall send an HTTP DELETE request message to the LM Server, on the corresponding "Individual VAL Service Area Change Subscription" resource URI as specified in clause 7.1.3.2.4.3.4.

Upon reception of the HTTP DELETE request message, the LM server shall:

1. verify the identity of the SEAL Server and check if the SEAL Server is authorised to terminate the targeted "Individual VAL Service Area Change Subscription" associated with the resource URI;
2. if the SEAL Server is authorized to unsubscribe from VAL service area(s) change event(s), the LM Server shall delete the related "Individual VAL Service Area Change Subscription" subscription resource at the LM Server;
3. upon success, respond to the SEAL server with a "204 No Content" status code; and
4. if errors occur when processing the request, the LM Server shall respond to the SEAL Server with an appropriate error response as specified in clause 7.1.3.5.

5.2.7.2.9 Notify_VAL_Service_Area_Change_Event

5.2.7.2.9.1 General

This service operation is used by a LM Server to notify for the VAL service area(s) change event(s).

5.2.7.2.9.2 LM server notifies the SEAL Server on VAL service area(s) change event(s) using Notify_VAL_Service_Area_Change_Event

In order to notify the SEAL server about VAL service area(s) change event(s), the LM Server shall send an HTTP POST request message to the SEAL Server targeting the notification URI provided during subscription creation as specified in clause 5.2.7.2.6.

Upon receiving the HTTP POST request message, the SEAL Server shall:

1. process the VAL service area change event(s) notification; and
2. upon success, respond to the LM Server with a "204 No Content" status code; and
3. if errors occur when processing the request, the SEAL Server shall respond to the LM Server with an appropriate error response as specified in clause 7.1.3.5.

5.2.8 SS_LocationHistoryInfoEvent Service

5.2.8.1 Service Description

The SS_LocationHistoryInfoEvent service exposed by the LM Server enables a service consumer to:

- create/update/delete a Location Tracing Configuration; and
- request Location History Report(s).

5.2.8.2 Service Operations

5.2.8.2.1 Introduction

The service operations defined for the SS_LocationHistoryInfoEvent service are shown in table 5.2.8.2.1-1.

Table 5.2.8.2.1-1: SS_LocationHistoryInfoEvent Service Operations

Service Operation Name	Description	Initiated by
SS_LocationHistoryInfoEvent_Create	This service operation enables a service consumer to create a Location Tracing Configuration.	e.g., VAL Server
SS_LocationHistoryInfoEvent_Update	This service operation enables a service consumer to update a Location Tracing Configuration.	e.g., VAL Server
SS_LocationHistoryInfoEvent_Delete	This service operation enables a service consumer to delete a Location Tracing Configuration.	e.g., VAL Server
SS_LocationHistoryInfoEvent_Query	This service operation enables a service consumer to request Location History Report(s).	e.g., VAL Server

5.2.8.2.2 SS_LocationHistoryInfoEvent_Create

5.2.8.2.2.1 General

This service operation is used by a service consumer to request the creation of a Location Tracing Configuration at the LM Server.

The following procedures are supported by the "SS_LocationHistoryInfoEvent_Create" service operation:

- Location Tracing Configuration Creation.

5.2.8.2.2.2 Location Tracing Configuration Creation

This procedure is used by a service consumer to request the LM Server to create a Location Tracing Configuration (see also clause 9.3.21 of 3GPP TS 23.434 [2]).

1. In order to request the creation of a Location Tracing Configuration, the service consumer shall send an HTTP POST request to the LM Server targeting the "Location Tracing Configurations" collection resource, with the request body including the LocTracingConfig data structure defined in clause 7.1.4.6.2.2.
- 2a. Upon success, the LM Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created "Individual Location Tracing Configuration" resource within the LocTracingConfig data structure defined in clause 7.1.4.6.2.2.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.1.4.7.

5.2.8.2.3 SS_LocationHistoryInfoEvent_Update

5.2.8.2.3.1 General

This service operation is used by a service consumer to request the update of an existing Location Tracing Configuration at the LM Server.

The following procedures are supported by the "SS_LocationHistoryInfoEvent_Update" service operation:

- Location Tracing Configuration Update.

5.2.8.2.3.2 Location Tracing Configuration Update

This procedure is used by a service consumer to request the LM Server to update an existing Location Tracing Configuration (see also clause 9.3.21 of 3GPP TS 23.434 [2]).

1. In order to request the update/modification of an existing Location Tracing Configuration, the service consumer shall send an HTTP PUT/PATCH request to the LM Server targeting the corresponding "Individual Location Tracing Configuration" resource, with the request body including either:
 - the updated representation of the resource within the LocTracingConfig data structure defined in clause 7.1.4.6.2.2, in case the HTTP PUT method is used; or
 - the requested modifications to the resource within the LocTracingConfigPatch data structure defined in clause 7.1.4.6.2.3, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

If the LM Server is not able to handle the request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI of the resource located in an alternative LM Server, as defined in clause 5.2.10 of 3GPP TS 29.122 [3].

2a. Upon success, the LM Server shall respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated/modified "Individual Location Tracing Configuration" resource within the LocTracingConfig data structure defined in clause 7.1.4.6.2.2; or
- an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 7.1.4.7.

5.2.8.2.4 SS_LocationHistoryInfoEvent_Delete

5.2.8.2.4.1 General

This service operation is used by a service consumer to request the deletion of an existing Location Tracing Configuration at the LM Server.

The following procedures are supported by the "SS_LocationHistoryInfoEvent_Delete" service operation:

- Location Tracing Configuration Deletion.

5.2.8.2.4.2 Location Tracing Configuration Deletion

This procedure is used by a service consumer to request the LM Server to delete an existing Location Tracing Configuration (see also clause 9.3.21 of 3GPP TS 23.434 [2]).

1. In order to request the deletion of an existing Location Tracing Configuration, the service consumer shall send an HTTP DELETE request to the LM Server targeting the corresponding "Individual Location Tracing Configuration" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation/update of the targeted resource) can initiate this request.

2a. Upon success, the LM Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 7.1.4.7.

5.2.8.2.5 SS_LocationHistoryInfoEvent_Query

5.2.8.2.5.1 General

This service operation is used by a service consumer to retrieve Location History Report(s) from the LM Server.

The following procedures are supported by the "SS_LocationHistoryInfoEvent_Query" service operation:

- Location History Report(s) Retrieval.

5.2.8.2.5.2 Location History Report(s) Retrieval

This procedure is used by a service consumer to request to retrieve Location History Report(s) from the LM Server (see also clause 9.3.21 of 3GPP TS 23.434 [2]).

1. In order to retrieve Location History Report(s), the service consumer shall send an HTTP GET request to the LM Server targeting the URI of the "Location History Reports" collection resource, with the request URI containing query parameter(s) to filter the responses from the LM Server.

2a. Upon success, the LM Server shall respond with an HTTP "200 OK" status code with the response body containing the requested Location History Report(s) within the LocHistoryReports data structure defined in clause 7.1.4.6.2.5.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP GET response body, as specified in clause 7.1.4.7.

5.2.9 SS_ConfirmLocation Service

5.2.9.1 Service Description

The SS_ConfirmLocation service exposed by the LM Server enables a service consumer to:

- create/update/delete a Location Confirmation Service Subscription; and
- receive location confirmation service usage related event(s) reporting.

5.2.9.2 Service Operations

5.2.9.2.1 Introduction

The service operations defined for the SS_ConfirmLocation service are shown in table 5.2.9.2.1-1.

Table 5.2.9.2.1-1: SS_ConfirmLocation Service Operations

Service Operation Name	Description	Initiated by
SS_ConfirmLocation_Subscribe	This service operation enables a service consumer to create/update/delete a Location Confirmation Service Subscription.	e.g., VAL Server
SS_ConfirmLocation_Notify	This service operation enables the LM Server to notify on location confirmation service usage related event(s).	LM Server

5.2.9.2.2 SS_ConfirmLocation_Subscribe

5.2.9.2.2.1 General

This service operation is used by a service consumer to request the creation of a Location Confirmation Service Subscription at the LM Server.

The following procedures are supported by the "SS_ConfirmLocation_Subscribe" service operation:

- Location Confirmation Service Subscription Creation.
- Location Confirmation Service Subscription Update.
- Location Confirmation Service Subscription Deletion.

5.2.9.2.2.2 Location Confirmation Service Subscription Creation

This procedure is used by a service consumer to request the LM Server to create a Location Confirmation Service Subscription (see also clause 9.3.23 of 3GPP TS 23.434 [2]).

1. In order to request the creation of a Location Confirmation Service Subscription, the service consumer shall send an HTTP POST request to the LM Server targeting the "Location Confirmation Service Subscriptions" collection resource, with the request body including the LocConfirmSubsc data structure.
- 2a. Upon success, the LM Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created "Individual Location Confirmation Service Subscription" resource within the LocConfirmSubsc data structure.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.1.5.7.

5.2.9.2.2.3 Location Confirmation Service Subscription Update

This procedure is used by a service consumer to request the LM Server to update an existing Location Confirmation Service Subscription (see also clause 9.3.23 of 3GPP TS 23.434 [2]).

1. In order to request the update/modification of an existing Location Confirmation Service Subscription, the service consumer shall send an HTTP PUT/PATCH request to the LM Server targeting the corresponding "Individual Location Confirmation Service Subscription" resource, with the request body including either:
 - the updated representation of the resource within the LocConfirmSubsc data structure, in case the HTTP PUT method is used; or
 - the requested modifications to the resource within the LocConfirmSubscPatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

If the LM Server is not able to handle the request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI of the resource located in an alternative LM Server, as defined in clause 5.2.10 of 3GPP TS 29.122 [3].

2a. Upon success, the LM Server shall respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated/modified "Individual Location Confirmation Service Subscription" resource within the LocConfirmSubsc data structure; or
- an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 7.1.5.7.

5.2.9.2.2.4 Location Confirmation Service Subscription Deletion

This procedure is used by a service consumer to request the LM Server to delete an existing Location Confirmation Service Subscription (see also clause 9.3.23 of 3GPP TS 23.434 [2]).

1. In order to request the deletion of an existing Location Confirmation Service Subscription, the service consumer shall send an HTTP DELETE request to the LM Server targeting the corresponding "Individual Location Confirmation Service Subscription" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation/update of the targeted resource) can initiate this request.

2a. Upon success, the LM Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 7.1.5.7.

5.2.9.2.3 SS_ConfirmLocation_Notify

5.2.9.2.3.1 General

This service operation is used by the LM Server to notify on location confirmation service usage related event(s).

The following procedures are supported by the "SS_ConfirmLocation_Notify" service operation:

- Location Confirmation Service Usage Notification.

5.2.9.2.3.2 Location Confirmation Service Usage Notification

This procedure is used by the LM Server to notify on location confirmation service usage related event(s) (see also clause 9.3.23 of 3GPP TS 23.434 [2]).

1. In order to notify a previously subscribed service consumer on location confirmation service usage related event(s), the LM Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding Location Confirmation Service Subscription using the procedures defined in clauses 5.2.9.2.2, and the request body including the LocConfirmUsageNotif data structure.

2a. Upon success, the service consumer shall respond to the LM Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.1.5.7.

5.2.10 SS_SLPositioningManagement API

5.2.10.1 Service Description

The SS_SLPositioningManagement API, as defined 3GPP TS 23.434 [2], enables a service consumer to:

- create/update/delete a SL Positioning Management Subscription;
- receive SL Positioning Management related event(s) notification; and
- request SR based positioning information.

5.2.10.2 Service Operations

5.2.10.2.1 Introduction

The service operations defined for the SS_SLPositioningManagement API are shown in the table 5.2.10.2.1-1.

Table 5.2.10.2.1-1: Service operations of the SS_SLPositioningManagement API

Service operation name	Description	Initiated by
SS_SLPositioningManagement_Subscribe	This service operation is used by a service consumer to create/update/delete a SL Positioning Management Subscription.	VAL Server
SS_SLPositioningManagement_Notify	This service operation is used by the LM Server to notify on the SL Positioning Management event(s).	SEAL Server
SS_SLPositioningManagement_SRInfoRequest	This service operation is used by a service consumer to request SR based positioning information.	VAL Server

5.2.10.2.2 SS_SLPositioningManagement_Subscribe

5.2.10.2.2.1 General

This service operation is used by a service consumer to request the creation of a SL Positioning Management Subscription at the LM Server.

The following procedures are supported by the "SS_SLPositioningManagement_Subscribe" service operation:

- SL Positioning Management Subscription Creation.
- SL Positioning Management Subscription Update.
- SL Positioning Management Subscription Deletion.

5.2.10.2.2.2 SL Positioning Management Subscription Creation

This procedure is used by a service consumer to request the LM Server to create a SL Positioning Management Subscription.

1. In order to request the creation of a SL Positioning Management Subscription, the service consumer shall send an HTTP POST request to the LM Server targeting the "SL Positioning Management Subscriptions" collection resource, with the request body including the SIPositionMgmtSubsc data structure.
- 2a. Upon success, the LM Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created "Individual SL Positioning Management Subscription" resource within the SIPositionMgmtSubsc data structure.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.1.6.7.

5.2.10.2.3 SL Positioning Management Subscription Update

This procedure is used by a service consumer to request the LM Server to update an existing SL Positioning Management Subscription Subscription.

1. In order to request the update/modify an existing SL Positioning Management Subscription, the service consumer shall send an HTTP PUT/PATCH request to the LM Server targeting the corresponding "Individual SL Positioning Management Subscription" resource, with the request body including either:
 - the updated representation of the resource within the SIPositionMgmtSubsc data structure, in case the HTTP PUT method is used; or
 - the requested modifications to the resource within the SIPositionMgmtSubscPatch data structure, in case the HTTP PATCH method is used.

If the LM Server is not able to handle the request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI of the resource located in an alternative LM Server, as defined in clause 5.2.10 of 3GPP TS 29.122 [3].

2a. Upon success, the LM Server shall respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated/modified "Individual SL Positioning Management Subscription" resource within the SIPositionMgmtSubsc data structure; or
- an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 7.1.6.7.

5.2.10.2.2.4 SL Positioning Management Subscription Deletion

This procedure is used by a service consumer to request the LM Server to delete an existing SL Positioning Management Subscription.

1. In order to request the deletion of an existing SL Positioning Management Subscription, the service consumer shall send an HTTP DELETE request to the LM Server targeting the corresponding "Individual SL Positioning Management Subscription" resource.

2a. Upon success, the LM Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 7.1.6.7.

5.2.10.2.3 SS_SLPositioningManagement_Notify

5.2.10.2.3.1 General

This service operation is used by the LM Server to notify on SL Positioning Management related event(s).

The following procedures are supported by the "SS_SLPositioningManagement_Notify" service operation:

- SL Positioning Management Event Notification.

5.2.10.2.3.2 SL Positioning Management Event Notification

This procedure is used by the LM Server to notify on SL Positioning Management related event(s).

1. In order to notify a previously subscribed service consumer on SL Positioning related event(s), the LM Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding SL Positioning Management Subscription using the procedures defined in clauses 5.2.10.2.2, and the request body including the SIPositionMgmtNotif data structure.

2a. Upon success, the service consumer shall respond to the LM Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.1.6.7.

5.2.10.2.4 SS_SLPositioningManagement_SRInfoRequest

5.2.10.2.4.1 General

This service operation is used by a service consumer to request SR based positioning information to the LM Server.

5.2.10.2.4.2 Short-Range based positioning information request

This procedure is used by a service consumer to request Short-Range based positioning information.

1. In order to request the Short-Range based positioning information, the service consumer shall send an HTTP POST request to the LM Server with the request body including the SrPosInfoReq data structure specified in clause 7.1.6.4.

2a. Upon success, the LM Server shall respond with an HTTP "200 OK" status code with the response body containing a representation of the Short-Range based positioning information within the SrPosInfoResp data structure.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.1.6.4.

5.3 Group management APIs

5.3.1 SS_GroupManagement API

5.3.1.1 Service Description

5.3.1.1.1 Overview

The SS_GroupManagement API, as defined 3GPP TS 23.434 [2], allows VAL server via GM-S reference point to create, fetch, update and delete VAL group membership and configuration information.

5.3.1.2 Service Operations

5.3.1.2.1 Introduction

The service operation defined for SS_GroupManagement API is shown in the table 5.3.1.2.1-1.

Table 5.3.1.2.1-1: Operations of the SS_GroupManagement API

Service operation name	Description	Initiated by
Query_Group_Info	This service operation is used by VAL server to query for VAL group documents, group membership list and configuration information.	VAL Server
Update_Group_Info	This service operation is used by VAL server to modify group membership and configuration information.	VAL server
Create_Group	This service operation is used by VAL server to configure new VAL group.	VAL server
Delete_Group	This service operation is used by the VAL server to delete the VAL group.	VAL server

5.3.1.2.2 Query_Group_Info

5.3.1.2.2.1 General

This service operation is used by a VAL server to obtain VAL group documents, group membership and configuration information.

5.3.1.2.2.2 VAL server fetching VAL group documents, group membership and configuration information using Query_Group_Info service operation

To obtain membership, configuration information of a VAL group, the VAL server shall send a HTTP GET message to the group management server, on VAL group document's resource representation URI as specified in clause 7.2.1.2.3.3.1. The GET message may include the following query parameters: membership list, group configuration. To obtain VAL groups information, the VAL server shall send a HTTP GET message to the group management server, on VAL group documents collection resource representation URI as specified in clause 7.2.1.2.2.3.2. The GET message may include the following query parameters: VAL Group ID, VAL Service ID.

Upon receiving the HTTP GET message as described above, the group management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to fetch the VAL group information;
2. if the VAL server is authorized to obtain the group information, the group management server shall;
 - a. if the request to VAL group document's resource representation URI includes query parameters, then, return in the response message with VAL group information which includes, group membership list information if the request includes membership list query, group configuration information if the request includes group configuration query and VAL group identifier;
 - b. if the request to VAL group document's resource representation URI does not include query parameter, then, return the VAL group document resource in the response message;
 - c. in the request to VAL group documents collection resource representation URI, return the VAL group documents matching the query parameters in the response message;

and

3. if the group management server is unable to satisfy the request, the group management server shall respond to the VAL server with an appropriate error status code as specified in clause 7.2.1.5.

5.3.1.2.3 Update_Group_Info

5.3.1.2.3.1 General

This service operation is used by a VAL server to modify group membership and configuration information.

5.3.1.2.3.2 VAL server modifying group membership and configuration using Update_Group_Info service operation

To modify group information of a VAL group, the VAL server shall send HTTP PUT message to the group management server to the Resource URI identifying the VAL group document resource representation, as specified in the clause 7.2.1.2.3.3.2. This request shall not replace valGroupId property in the existing resource. If the "PatchUpdate" feature defined in clause 7.2.1.6 is supported, then the VAL server may send an HTTP PATCH request message to the Individual VAL Group Document resource URI as specified in clause 7.2.1.2.3.3.4, to partially update the VAL group document. The body of the HTTP PATCH request message shall include the requested modifications as specified in clause 7.2.1.2.3.3.4. Upon receiving the HTTP PUT message, the group management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to modify VAL group information;
2. for the HTTP PUT request message, verify that valGroupId in the request is same as valGroupId of the VAL group document resource;
3. if the VAL server is authorized to modify/update the group information and the valGroupId matches, then the group management server shall:
 - a. if the group configuration information in the request is valid, update/modify the resource identified by the Resource URI of the group document with group members list, group configuration information, description, VAL service identifiers, external group identifier and location information received in the request;
 - b. if the group document information in the request includes 5G LAN-Type communication, invoke the 5GLANParameterProvision API towards the NEF via an HTTP PUT/PATCH message as defined in clause 4.4.15.3 of 3GPP TS 29.522 [28];
 - c. return a 200 OK status code with the updated VAL group document in the response or a 204 No Content status code;

and

4. if the group management server is unable to satisfy the request, the group management server shall respond to the VAL server with an appropriate error status code as specified in clause 7.2.1.5.

NOTE: The group management server maintains a mapping between DNN and S-NSSAI of the 5GVN group and the VAL server requester identity based on operator policy. How such mapping is configured is implementation specific and out of the scope of this specification.

5.3.1.2.4 Create_Group

5.3.1.2.4.1 General

This service operation is used by a VAL server to create VAL group.

5.3.1.2.4.2 VAL server creating new group using Create_Group service operation

To create a VAL group, the VAL server shall send a HTTP POST message to the group management server. The body of the POST message shall include VAL group document information as specified in clause 7.2.1.2.2.3.1. The VAL server shall use this service operation to create the location-based VAL group as specified for Create_LocationBasedGroup_Info service operation of SS_GroupManagement API, in 3GPP TS 23.434 [2].

Upon receiving HTTP POST message, the group management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to create VAL group document;

2. if the VAL group document information in the request includes location criteria, then shall obtain the list of VAL users or VAL UEs within the requested location criteria information from the Location Management server and include them in VAL group members of the new VAL group;
 - a. if the "valServiceIds" attribute within VALGroupDocument structure was present in the received VAL group document information and the received response from the location management server does not include the identical list of the VAL service IDs as defined in the "valServiceIds" attribute within VALGroupDocument structure, the group management server shall retrieve the VAL service data from the configuration management server for the missed VAL service IDs and include the relevant VAL users or VAL UEs in the VAL group members of the new VAL group;
3. if the VAL group document information in the request includes 5G LAN-Type communication, invoke the 5GLANParameterProvision API towards the NEF via an HTTP POST message as defined in clause 4.4.15.2 of 3GPP TS 29.522 [28];
4. if the VAL server is authorized to create VAL group document, shall create a new resource as defined in 7.2.1.2.2.3.1 and return the VAL group document and its Resource URI in the response message; and
5. if the group management server is unable to satisfy the request, the group management server shall respond to the VAL server with an appropriate error status code as defined in clause 7.2.1.5.

NOTE: The group management server maintains a mapping between DNN and S-NSSAI of the 5GVN group and the VAL server requester identity based on operator policy. How such mapping is configured is implementation specific and out of the scope of this specification.

5.3.1.2.5 Delete_Group

5.3.1.2.5.1 General

This service operation is used by a VAL server to delete a VAL group.

5.3.1.2.5.2 VAL server deleting VAL group using Delete_Group service operation

To delete a VAL group, the VAL server shall send a HTTP DELETE message to the Group Management server to its resource representation in the Group Management server as specified in clause 7.2.1.2.3.3.3. Upon receiving HTTP DELETE message, the Group Management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to delete the VAL group document;
2. if the VAL server is authorized to delete the VAL group document, the Group Management server shall:
 - a. if the group communication type is 5GLAN communication, invoke the 5GLANParameterProvision API towards the NEF via an HTTP DELETE message as defined in clause 4.4.15.4 of 3GPP TS 29.522 [28];
 - b. delete the resource representation pointed by the group document resource identifier;

and

3. if the group management server is unable to satisfy the request, the group management server shall respond to the VAL server with an appropriate error status code as specified in clause 7.2.1.5.

5.3.2 SS_GroupManagementEvent API

The SS_GroupManagementEvent API, as defined 3GPP TS 23.434 [2], allows a VAL server via GM-S reference point to subscribe for and receive notifications from Group Management server on new VAL group creations, on modifications to VAL Group membership and configuration information, on temporary VAL group formation and on VAL group deletion. The SS_GroupManagementEvent API supports this via the "GM_GROUP_CREATE", "GM_GROUP_INFO_CHANGE", "GM_TEMP_GROUP_FORMATION" and "GM_GROUP_DELETION" events of the SS_Events API as specified in clause 7.5. In order to authorize the VAL servers that have to be notified of a "GM_GROUP_CREATE" event, the Group Management server shall identify the VAL services (VAL Service IDs) allowed for the VAL server by the "subscriberId" attribute and shall notify the VAL server if the VAL services enabled for the created VAL group are allowed for the VAL server.

Upon the receipt of the VAL group document from the group management server during Create_Group service operation, if the VAL server is interested in receiving the notifications about newly registered or de-registered VAL UE IDs to the VAL group, then the VAL server may subscribe to "GM_GROUP_INFO_CHANGE" event using the SS_Events API as specified in clause 7.5.1, to receive any VAL group membership update notifications.

Upon the receipt of the message filters information in the "GM_GROUP_INFO_CHANGE" event notification from the group management server, the VAL server shall consider the message filters in VAL specific communication.

5.4 Configuration management APIs

5.4.1 SS_UserProfileRetrieval API

5.4.1.1 Service Description

5.4.1.1.1 Overview

The SS_UserProfileRetrieval API, as defined in 3GPP TS 23.434 [2], allows VAL server via CM-S reference point to obtain user profile from the configuration management server.

5.4.1.2 Service Operations

5.4.1.2.1 Introduction

The service operation defined for SS_UserProfileRetrieval API is shown in the table 5.4.1.2.1-1.

Table 5.4.1.2.1-1: Operations of the SS_UserProfileRetrieval API

Service operation name	Description	Initiated by
Obtain_User_Profile	This service operation is used by VAL server to obtain user profile.	VAL server

5.4.1.2.2 Obtain_User_Profile

5.4.1.2.2.1 General

This service operation is used by a VAL server to obtain VAL user profile information.

5.4.1.2.2.2 VAL server retrieving VAL user profile information using Obtain_User_Profile service operation

To obtain a VAL user's profile, the VAL server shall send HTTP GET request message to configuration management server, on VAL service's resource representation URI, with query parameters VAL user ID or VAL UE ID and optionally VAL service ID, as specified in 7.3.1.2.2.3.1.

Upon receiving the HTTP GET message as described above, the configuration management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to fetch the VAL user profile information;
2. if the VAL server is authorized to obtain the requested VAL user profile information, the configuration management server shall:
 - a. return in the response message with profile information corresponding to the query parameters that was sent in the request message.

5.4.2 SS_UserProfileEvent API

The SS_UserProfileEvent API, as defined in 3GPP TS 23.434 [2], allows a VAL server via CM-S reference point to subscribe for and receive notifications from the Configuration Management server on profile updates to VAL User or VAL UE. The SS_UserProfileEvent API supports this via the "CM_USER_PROFILE_CHANGE" event in SS_Events API as specified in clause 7.5.

5.4.3 SS_VALServiceData API

5.4.3.1 Service Description

5.4.3.1.1 Overview

The SS_VALServiceData API, as defined in 3GPP TS 23.434 [2], allows SEAL Server (e.g., GM Server via SEAL-X3 reference point) to obtain the VAL service data from the CM Server.

5.4.3.2 Service Operations

5.4.3.2.1 Introduction

The service operation defined for SS_VALServiceData API is shown in the table 5.4.3.2.1-1.

Table 5.4.3.2.1-1: Operations of the SS_VALServiceData API

Service operation name	Description	Initiated by
Obtain_VAL_Service_Data	This service operation is used by SEAL Server to obtain VAL service data.	SEAL Server (e.g., GM Server)

5.4.3.2.2 Obtain_VAL_Service_Data

5.4.3.2.2.1 General

This service operation is used by a SEAL Server to retrieve VAL service data.

5.4.3.2.2.2 SEAL Server retrieving VAL service data using the Obtain_VAL_Service_Data service operation

To obtain a VAL service data, the SEAL Server shall send an HTTP GET request message to CM Server targeting the URI of the "VAL Service Data Sets" collection resource, including optionally one or several of the query parameter(s) defined in clause 7.3.2.2.3.1.

Upon reception of the HTTP GET request message, the CM Server shall:

1. verify the identity of the SEAL Server and check whether it is authorized to obtain the VAL service data;
2. if the SEAL Server is authorized to obtain the requested VAL service data and upon successful processing of the request, the CM Server shall respond with an HTTP "200 OK" status code with the response body including the ValServDataResp data structure containing the requested VAL service data set(s) corresponding to the received query parameters. If the request message includes both the "val-tgt-ues" and "val-service-ids" query parameters, the response message shall include the VAL service data set(s) for only the VAL service(s) (the identifiers of which are provided within the "val-service-ids" query parameter) that are common to the VAL user(s)/VAL UE(s) provided within the "val-tgt-ues" query parameter; and
3. if errors occur when processing the request, the CM Server shall take proper error handling actions, as specified in clause 7.3.2.6, and respond with an appropriate error status code.

5.4.4 SS_ASCAIInfoRetrieval API

5.4.4.1 Service Description

5.4.4.1.1 Overview

The SS_ASCAIInfoRetrieval API, as defined in 3GPP TS 23.434 [2], allows a service consumer to request to obtain Application Satellite Coverage Availability Information from the CM Server.

5.4.4.2 Service Operations

5.4.4.2.1 Introduction

The service operation defined for SS_ASCAIInfoRetrieval API is shown in the table 5.4.4.2.1-1.

Table 5.4.4.2.1-1: Operations of the SS_ASCAIInfoRetrieval API

Service operation name	Description	Initiated by
Obtain_ASCAI_Info	This service operation is used by a service consumer to obtain Application Satellite Coverage Availability Information.	e.g., VAL Server

5.4.4.2.2 Obtain_ASCAI_Info

5.4.4.2.2.1 General

This service operation is used by a service consumer to obtain Application Satellite Coverage Availability Information.

5.4.4.2.2.2 Application Satellite Coverage Availability Information Retrieval

To obtain Application Satellite Coverage Availability Information, the service consumer shall send an HTTP POST request message to CM Server targeting the URI of the "RequestASCAIInfo" custom operation with the request body including the AscaiInfoReq data structure.

Upon reception of the HTTP POST request message, the CM Server shall:

1. verify whether the service consumer is authorized to perform this operation;
2. if the service consumer is authorized, the CM Server shall respond with an HTTP "200 OK" status code with the response body including the requested Application Satellite Coverage Availability Information within the AscaiInfoResp data structure.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP GET response body, as specified in clause 7.3.3.6.

5.5 Network resource management APIs

5.5.1 SS_NetworkResourceAdaptation API

5.5.1.1 Service Description

5.5.1.1.1 Overview

The SS_NetworkResourceAdaptation API, as defined 3GPP TS 23.434 [2], allows a service consumer to communicate with the network resource management server for network resource adaptation including reserving network resource, requesting and subscribing for unicast and multicast/broadcast resources.

5.5.1.2 Service Operations

5.5.1.2.1 Introduction

The service operation defined for SS_NetworkResourceAdaptation API is shown in the table 5.5.1.2.1-1.

Table 5.5.1.2.1-1: Operations of the SS_NetworkResourceAdaptation API

Service operation name	Description	Initiated by
Reserve_Network_Resource	Requesting network resource adaptation.	e.g., VAL server, SEALDD Server
Reserve_Network_Resource_Modify	Updating network resource adaptation	e.g., VAL server, SEALDD Server
Request_Multicast_Resource	Requesting multicast resource	e.g., VAL server
Notify_UP_Delivery_Mode	Notifying the user plane delivery mode	NRM server
Discover_TSC_Stream_Availability	Requesting the NRM server to discover the connectivity and available QoS characteristics between the source and the destination DS-TT ports.	e.g., VAL server
Create_TSC_Stream	Requesting the NRM server to create a TSC stream.	e.g., VAL server
Delete_TSC_Stream	Requesting the NRM server to delete a TSC stream.	e.g., VAL server
Create_MBS_Resource	Request the creation of a new MBS Resource.	e.g., VAL server
Update_MBS_Resource	Request the update of an existing "Individual MBS Resource" resource.	e.g., VAL server
Delete_MBS_Resource	Request the deletion of an existing "Individual MBS Resource" resource.	e.g., VAL server
Activate_MBS_Resource	Request the activation of an existing MBS Resource.	e.g., VAL server
Deactivate_MBS_Resource	Request the deactivation of an existing MBS Resource.	e.g., VAL server
BDT_Configuration_Request	Request the creation of a BDT policy configuration.	e.g., VAL server, SEALDD Server
BDT_Negotiation_Notification	Notify about negotiated BDT policy configuration related event(s).	NRM server
BDT_Configuration_Get	Request to retrieve an existing "Individual BDT Policy Configuration" resource.	e.g., VAL server, SEALDD Server
BDT_Configuration_Update	Request to update an existing "Individual BDT Policy Configuration" resource.	e.g., VAL server, SEALDD Server
BDT_Configuration_Delete	Request to delete an existing "Individual BDT Policy Configuration" resource.	e.g., VAL server, SEALDD Server
Subscribe_Unified_Traffic_Pattern_and_Monitoring_Management	Request UE unified traffic pattern and monitoring management subscription.	e.g., VAL server
Update_Unified_Traffic_Pattern_and_Monitoring_Management_Subscription	Request the update of an existing UE unified traffic pattern and monitoring management subscription.	e.g., VAL server
Unsubscribe_Unified_Traffic_Pattern_and_Monitoring_Management	Request the removal of an existing UE unified traffic pattern and monitoring management subscription.	e.g., VAL server
Notify_Unified_Traffic_Pattern_Update	Notify about the update of UE unified traffic patterns.	NRM server
Reliable_Transmission_Request	Request reliable transmission service.	e.g., SEALDD Server, VAL Server

5.5.1.2.2 Void

5.5.1.2.3 Reserve_Network_Resource

5.5.1.2.3.1 General

This service operation is used by a service consumer to request for network resource.

5.5.1.2.3.2 Service consumer requesting for network resource adaptation using Reserve_Network_Resource service operation

The service consumer shall send a HTTP POST message to the NRM server. The body of the POST message shall include VAL user or UE information and the VAL service requirement. Upon receiving HTTP POST message, the NRM server shall

1. verify the identity of the service consumer and check if the service consumer is authorized to request for unicast resource;
2. if the service consumer is authorized, the NRM server evaluates the need for network resources and use of resource sharing;
3. for the VAL user or UE, the NRM server initiates interaction via SIP core;
4. the NRM server creates a unicast subscription as specified in clause 7.4.1.2.4.3.1; and
5. the NRM server provides result in the response message.

5.5.1.2.4 Reserve_Network_Resource_Modify

5.5.1.2.4.1 General

This service operation is used by a service consumer to request for updating the network resource adaptation used by the VAL user or UE.

5.5.1.2.4.2 Service consumer requesting for updating the network resource adaptation using Reserve_Network_Resource_Modify service operation

The service consumer shall send a HTTP PUT or PATCH message to the NRM server. The body of the message shall include VAL user or UE information and the VAL service requirement. Upon receiving HTTP PUT or PATCH message, the NRM server shall

1. verify the identity of the service consumer and check if the service consumer is authorized to request for updating the unicast resource;
2. if the service consumer is authorized, the NRM server decides the need to update the unicast resource. If NRM server decides that no update is required for the unicast resource, then the NRM server sends a failure indication in the response message;
3. if NRM server decides to update the unicast resource, then the NRM server initiates interaction via SIP core; and
4. the NRM server provides result in the response message.

5.5.1.2.5 Request_Multicast_Resource

5.5.1.2.5.1 General

This service operation is used by a service consumer to request for multicast resource.

5.5.1.2.5.2 Service consumer requesting for multicast resource using Request_Multicast_Resource service operation

The service consumer shall send a HTTP POST message to the NRM server. The body of the POST message shall include VAL group information, service announcement mode, QoS information, Broadcast area, the local MBMS information or the local MBMS activation indication and service consumer notification endpoint address information. Upon receiving HTTP POST message, the NRM server shall

1. verify the identity of the service consumer and check if the service consumer is authorized to request for multicast resource;
2. if the service consumer is authorized, the NRM server decides to establish an MBMS bearer in EPS using the procedures defined in 3GPP TS 29.468 [23];
3. the NRM server creates a multicast subscription as specified in clause 7.4.1.2.2.3.1;
4. the NRM server provides the result in the response message.

5.5.1.2.6 Notify_UP_Delivery_Mode

5.5.1.2.6.1 General

This service operation is used by the NRM server to send user plane notifications to the service consumer.

5.5.1.2.6.2 Notifying user plane events using Notify_UP_Delivery_Mode service operation

To notify the user plane events, the NRM server shall send an HTTP POST message using the Notification Destination URI received in the multicast resource request defined in clause 5.5.1.2.5, or the MBS Resource creation/update request defined in clauses 5.5.1.2.10 and 5.5.1.2.11. The body of the HTTP POST message shall include an UserPlaneNotification as specified in clause 7.4.1.3.2.

Upon receiving the HTTP POST message, the service consumer shall process the Event Notification.

5.5.1.2.7 Create_TSC_Stream

5.5.1.2.7.1 General

This service operation is used by a service consumer to request the NRM server to create TSC stream resources.

5.5.1.2.7.2 Service consumer requesting for create TSC stream using Create_TSC_Stream service operation

In order to create a TSC stream resource, the service consumer shall send an HTTP PUT message to the NRM server with {valStreamId} in the request URI path to identify the TSC stream to be created. The request body with the "TscStreamData" data structure shall include stream specification and Traffic Specification Information which includes MaxFrameInterval, MaxFrameSize, MaxIntervalFrames, MaxLatency.

Upon reception of the HTTP PUT message, the NRM server shall:

1. verify the requestor identity of the service consumer, check whether the service consumer is authorized to request the NRM server to create a TSC stream with the VAL Stream ID as the TSC stream resource identifier;

NOTE: It's up to the service consumer to secure the uniqueness of the VAL Stream ID.

2. if the service consumer is authorized, the NRM server shall calculate the schedule for the VAL Stream ID based on the information collected earlier from the 5GS. It provides per-stream filtering and policy parameters (e.g as defined in IEEE 802.1Qcc [29]) used to derive the TSC QoS information and related flow information. The NRM server also provides the forwarding rule (e.g.as defined in IEEE 802.1Qcc [29]) used to identify the DS-TT MAC address of the corresponding PDU session. Based on the 5GS bridge delay information it determines the TSC QoS information and TSC Assistance information for the stream;
3. determine whether time synchronization needs to be activated for the TSC stream on the DS-TTs. If the DS-TTs are time synchronized, then the NRM shall not activate the time synchronization for the corresponding DS-TTs;

4. for each VAL UE, the trusted NRM server within the PLMN operator domain acting as a TSCTSF shall initiate the PCC procedures by triggering the `Npcf_policy_Authorization_Create` service operation as described in 3GPP TS 29.514 [30] for the TSC stream for both uplink QoS flow (sender UE to UPF/bridge) and downlink QoS flow (UPF/bridge to receiver UE). The creation request includes the DS-TT port MAC address, TSC QoS information, TSC Assistance Information, flow bit rate, priority, Service Data Flow Filter containing flow description including Ethernet Packet Filters. The QoS flow will be assigned for the PDU session with the source MAC address for the uplink direction and with the destination MAC address for the downlink direction. This information is delivered to the DS-TT by the 5GS;
5. if the time synchronization for the TSC stream on the DS-TTs was determined as required in step 3, the NRM server shall use the procedures described in 3GPP TS 29.514 [30] to activate the time synchronization for the corresponding DS-TTs; and
6. after the NRM server receiving a successful response from the PCF, the NRM server shall create an "Individual TSC Stream" resource which represents the created TSC stream, addressed by a URI that contains the `{valStreamId}` as the VAL Stream ID identifier the TSC Stream, and shall respond to the service consumer with a 201 Created status code, including a Location header field containing the URI for the created resource. If the NRM server receives an error response from the PCF, the NRM server shall not create the resource and shall respond to the service consumer with a proper error status code.

5.5.1.2.8 Delete_TSC_Stream

5.5.1.2.8.1 General

This service operation is used by a service consumer to delete a TSC stream.

5.5.1.2.8.2 Service consumer requesting to delete a TSC stream using Delete_TSC_Stream service operation

In order to delete a TSC stream, the service consumer shall send an HTTP DELETE message to the NRM server, with `"{apiRoot}/ss-nra/<apiVersion>/tsc-streams/{valStreamId}"` as the Resource URI representing the TSC stream identified by the VAL sStream ID to be deleted.

Upon reception of the HTTP DELETE message, the NRM server shall:

1. identify the MAC addresses of the DS-TTs involved in the stream based on the stored information for the VAL Stream ID;
2. determine the actions related to the time synchronization deactivation for the DS-TTs:
 - if none of the streams require to keep the time synchronization activated, deactivate the time synchronization for the involved DS-TTs in step 3; and
 - otherwise, keep the time synchronization activated for the involved DS-TTs for which time synchronization was previously activated;
3. for each VAL UE, as the trusted NRM server within the PLMN operator domain acting as a TSCTSF shall:
 - deactivate the time synchronization for the DS-TTs as per step 2 above by invoking the `Npcf_PolicyAuthorization_Update` service operation as defined in 3GPP TS 29.514 [30]; and
 - initiate the PCC procedures by triggering the `Npcf_policy_Authorization_Delete` service operation to delete the QoS flows as defined in 3GPP TS 29.514 [30] with all the MAC addresses referred by the VAL Stream ID; and
4. if the NRM server receive a successful response from the PCF, the NRM server shall delete the existing TSC stream in the "Individual TSC Stream" resource. Then the NRM server shall send an HTTP DELETE response message with "204 No Content" status code to the service consumer as a successful result of TSC stream deletion for the VAL Stream ID. If the NRM server receive an error code from the PCF, the NRM server shall take proper error handling action and shall respond to the service consumer with a proper error status code as unsuccessful result.

5.5.1.2.9 Discover_TSC_Stream_Availability

5.5.1.2.9.1 General

This service operation is used by a service consumer to request the NRM server to retrieve the connectivity information between the source and destination DS-TT ports and the related available QoS characteristics, prior to creating the stream.

5.5.1.2.9.2 Service consumer discovering TSC stream availability using Discover_TSC_Stream_Availability service operation

In order to discover the connectivity between the source and destination DS-TT ports and the related available QoS characteristics, the service consumer shall send an HTTP GET request message to the NRM server, with the query parameters containing the targeted stream specifications.

Upon reception of the HTTP GET request message, the NRM server shall:

1. verify if the service consumer is authorized to discover the TSC stream availability;
2. if the service consumer is authorized, the NRM server shall check the connectivity between the DS-TTs ports indicated in the requested TSC stream definition based on the collected 5GS TSC bridge management and port management information, the traffic classes supported by the DS-TTs and the end-to-end latency (including the UE-DS-TT residence times, UPF residence time, and propagation delays) per traffic class;

The necessary information to process the TSC stream availability discovery request, i.e. 5GS TSC bridge management and port management information, the traffic classes supported by the DS-TTs and the end-to-end latency (including the UE-DS-TT residence times, UPF residence time, and propagation delays) per traffic class, is collected by the NRM server and shall be available at the NRM server prior to the reception of the request from the service consumer.

3. if the discovery result is successful upon the connectivity between the DS-TT ports is discovered, the NRM server shall return an HTTP GET response message to the service consumer with an HTTP "200 OK" status code with the TscStreamAvailability data structure as the response body which shall include the stream specification matching the received query parameters and the corresponding list of traffic specifications;
4. if there is no stream specification matching the query parameters or no TSC stream availability information was discovered between the DS-TT ports, then the NRM server shall respond with a 204 No Content status code without response body;
5. Otherwise if error case occur (e.g. the necessary information to process the request is not available at the NRM server), the NRM server shall respond to the service consumer with a proper error status code.

5.5.1.2.10 Create_MBS_Resource

5.5.1.2.10.1 General

This service operation is used by a service consumer to request the creation of a new MBS Resource at the NRM Server (see also clause 14.3.4A of 3GPP TS 23.434 [2]).

5.5.1.2.10.2 Service consumer requesting the creation of an MBS Resource using the Create_MBS_Resource service operation

In order to request the creation of a new MBS Resource, the service consumer shall send an HTTP POST request message to the NRM Server targeting the "MBS Resources" collection resource, with the request body containing the MBSResourceReq data structure.

Upon reception of the HTTP POST request message, the NRM Server shall:

- verify the identity of the service consumer and whether the service consumer is authorized to initiate such request;
- if the service consumer is authorized and upon successful processing of the request, the NRM Server shall create a new "Individual MBS Resource" resource and respond to the service consumer with an HTTP "201 Created"

status code with the response body containing a representation of the created resource and potentially additional information (e.g. the user plane addressing information of the NRM Server for downlink data delivery) within the MBSResourceResp data structure; and

- if errors occur when processing the request, the NRM Server shall take proper error handling actions, as specified in clause 7.4.1.5, and respond to the service consumer with an appropriate error status code.

5.5.1.2.11 Update_MBS_Resource

5.5.1.2.11.1 General

This service operation is used by a service consumer to request the update of an existing MBS Resource at the NRM Server (see also clause 14.3.4A of 3GPP°TS°23.434°[2]).

5.5.1.2.11.2 Service consumer requesting the update of an existing MBS Resource using the Update_MBS_Resource service operation

In order to request the update of an existing MBS Resource, the service consumer shall send an HTTP PUT/PATCH request message to the NRM Server targeting the corresponding "Individual MBS Resource" resource, with the request body containing either:

- the updated representation of the resource within the MBSResource data structure, in case the HTTP PUT method is used; or
- the requested modifications to the resource within the MBSResourcePatch data structure, in case the HTTP PATCH method is used.

Upon reception of the HTTP PUT/PATCH request message, the NRM Server shall:

- verify whether the service consumer is authorized to initiate such request;
- if the service consumer is authorized and upon successful processing of the request, the NRM Server shall update the targeted "Individual MBS Resource" resource and respond to the service consumer with either:
 - an HTTP "200 OK" status code with the response body containing a representation of the updated resource and potentially additional information (e.g., the updated user plane addressing information of the NRM Server for downlink data delivery) within the MBSResource data structure; or
 - an HTTP "204 No Content" status code;

and

- if errors occur when processing the request, the NRM Server shall take proper error handling actions, as specified in clause 7.4.1.5, and respond to the service consumer with an appropriate error status code.

5.5.1.2.12 Delete_MBS_Resource

5.5.1.2.12.1 General

This service operation is used by a service consumer to request the deletion of an existing MBS Resource at the NRM Server (see also clause 14.3.4A of 3GPP°TS°23.434°[2]).

5.5.1.2.12.2 Service consumer requesting the deletion of an existing MBS Resource using the Delete_MBS_Resource service operation

In order to request the deletion of an existing MBS Resource, the service consumer shall send an HTTP DELETE request message to the NRM Server targeting the corresponding "Individual MBS Resource" resource.

Upon reception of the HTTP DELETE request message, the NRM Server shall:

- verify whether the service consumer is authorized to initiate such request;

- if the service consumer is authorized and upon successful processing of the request, the NRM Server shall delete the targeted "Individual MBS Resource" resource and respond to the service consumer with an HTTP "204 No Content" status code; and
- if errors occur when processing the request, the NRM Server shall take proper error handling actions, as specified in clause 7.4.1.5, and respond to the service consumer with an appropriate error status code.

5.5.1.2.13 Activate_MBS_Resource

5.5.1.2.13.1 General

This service operation is used by a service consumer to request the activation of an existing MBS Resource at the NRM Server (see also clause 14.3.4A of 3GPP TS 23.434[2]).

5.5.1.2.13.2 Service consumer requesting the activation of an existing MBS Resource using the Activate_MBS_Resource service operation

In order to request the activation of an existing MBS Resource, the service consumer shall invoke the "Activate" resource custom operation by sending an HTTP POST request message to the NRM Server targeting the URI of the corresponding "Individual MBS Resource" resource custom operation, i.e. "{apiRoot}/ss-nra/<apiVersion>/mbs-resources/{mbsResId}/activate", with the request body including the MbsResAct data structure.

Upon reception of the HTTP POST request message, the NRM Server shall:

- verify whether the service consumer is authorized to initiate such request;
- if the service consumer is authorized and upon successful processing of the request, the NRM Server shall respond to the service consumer with an HTTP "200 OK" status code with the response body including the the MbsResAct data structure; and
- if errors occur when processing the request, the NRM Server shall take proper error handling actions, as specified in clause 7.4.1.5, and respond to the service consumer with an appropriate error status code.

5.5.1.2.14 Deactivate_MBS_Resource

5.5.1.2.14.1 General

This service operation is used by a service consumer to request the deactivation of an existing MBS Resource at the NRM Server (see also clause 14.3.4A of 3GPP TS 23.434[2]).

5.5.1.2.14.2 Service consumer requesting the deactivation of an existing MBS Resource using the Deactivate_MBS_Resource service operation

In order to request the deactivation of an existing MBS Resource, the service consumer shall invoke the "Deactivate" resource custom operation by sending an HTTP POST request message to the NRM Server targeting the URI of the corresponding "Individual MBS Resource" resource custom operation, i.e. "{apiRoot}/ss-nra/<apiVersion>/mbs-resources/{mbsResId}/deactivate", with the request body including the MbsResDeact data structure.

Upon reception of the HTTP POST request message, the NRM Server shall:

- verify whether the service consumer is authorized to initiate such request;
- if the service consumer is authorized and upon successful processing of the request, the NRM Server shall respond to the service consumer with an HTTP "200 OK" status code with the response body including the the MbsResDeact data structure; and
- if errors occur when processing the request, the NRM Server shall take proper error handling actions, as specified in clause 7.4.1.5, and respond to the service consumer with an appropriate error status code.

5.5.1.2.15 BDT_Configuration_Request

5.5.1.2.15.1 General

This service operation is used by a service consumer to request the creation of a background data transfer policy configuration at the NRM Server.

5.5.1.2.15.2 Creation of background data transfer policy configuration using the BDT_Configuration_Request service operation

In order to create a background data transfer policy configuration, the service consumer shall send an HTTP POST request message to the NRM server targeting the URI of the "BDT Policy Configurations" collection resource, with the request body including the BdtPolConfig data structure.

Upon reception of the HTTP POST request message, the NRM Server shall:

- verify whether the service consumer is authorized to initiate such request;
- if the service consumer is authorized, when the NRM server decides to negotiate BDT policy with the 3GPP network, it triggers the background data transfer procedures defined in the clause 4.16.7.2 of 3GPP TS 23.502 [39];
- upon success, the NRM Server shall respond to the service consumer with an HTTP "201 Created" status code with the response body including the representation of the created "Individual BDT Policy Configuration" resource within the BdtPolConfig data structure; and
- if errors occur when processing the request or the NRM Server receives an error response from 5GC, the NRM Server shall take proper error handling actions, as specified in clause 7.4.1.5, and respond to the service consumer with an appropriate error status code.

5.5.1.2.16 BDT_Negotiation_Notification

5.5.1.2.16.1 General

This service operation is used by the NRM Server to notify about update in the negotiated background data transfer policy.

5.5.1.2.16.2 NRM Server notifying the background data transfer policy using the BDT_Negotiation_Notification service operation

To notify on the updates in the negotiated BDT policies received from the 3GPP network, the NRM server shall send an HTTP POST request message with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding BDT policy configuration as defined in clauses 5.5.1.2.15 and 5.5.1.2.18, and the request body including the BdtNotification data structure.

Upon successful processing of the request, the service consumer shall:

- respond with an HTTP "204 No Content" status code.

On failure, the service consumer shall take proper error handling actions, as specified in clause 7.4.1.5, and respond to the NRM server with an appropriate error status code.

5.5.1.2.17 BDT_Configuration_Get

5.5.1.2.17.1 General

This service operation is used by a service consumer to request the retrieval of an existing "Individual BDT Policy Configuration" resource at the NRM Server.

5.5.1.2.17.2 Retrieval of an individual background data transfer policy configuration using the BDT_Configuration_Get service operation

In order to retrieve an individual background data transfer policy configuration resource, the service consumer shall send an HTTP GET request message targeting the URI of the corresponding "Individual BDT Policy Configuration" resource.

Upon reception of the HTTP GET request message, the NRM server shall:

- verify whether the service consumer is authorized to retrieve the BDT policy configuration information;
- if the service consumer is authorized to fetch the BDT policy configuration information, the NRM server shall;
- responds to the service consumer with an HTTP "200 OK" status code with the response body including the requested BDT policy configuration within the BdtPolConfig data structure.

5.5.1.2.18 BDT_Configuration_Update

5.5.1.2.18.1 General

This service operation is used by a service consumer to request the update of an existing "Individual BDT Policy Configuration" resource at the NRM server.

5.5.1.2.18.2 Update of an individual background data transfer policy configuration using the BDT_Configuration_Update service operation

In order to update an existing background data transfer policy configuration, the service consumer shall send an HTTP PUT/PATCH request message to the NRM server targeting the corresponding "Individual BDT Policy Configuration" resource with the request body including either:

- the updated representation of the resource within the BdtPolConfig data structure, in case the HTTP PUT method is used; or
- the requested modifications to the resource within the BdtPolConfigPatch data structure, in case the HTTP PATCH method is used.

Upon receiving the HTTP PUT/PATCH request message from the service consumer, the NRM server shall:

- check whether the service consumer is authorized to request the update of the targeted existing "Individual BDT Policy Configuration" resource;
- if the service consumer is authorized, then the NRM server shall update/modify the targeted resource accordingly and respond to the service consumer with either:
 - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual BDT Policy Configuration" resource within the BdtPolConfig data structure; or
 - an HTTP "204 No Content" status code;

and

- if errors occur when processing the request or the NRM Server receives an error response from 5GC, the NRM Server shall take proper error handling actions, as specified in clause 7.4.1.5, and respond to the service consumer with an appropriate error status code.

5.5.1.2.19 BDT_Configuration_Delete

5.5.1.2.19.1 General

This service operation is used by a service consumer to request the deletion of an existing "Individual BDT Policy Configuration" resource at the NRM server.

5.5.1.2.19.2 Deletion an individual background data transfer policy configuration using the BDT_Configuration_Delete service operation

In order to delete an existing BDT policy configuration, the service consumer shall send an HTTP DELETE request message to the NRM server targeting the corresponding "Individual BDT Policy Configuration" resource.

Upon receiving the HTTP DELETE request message:

- check whether the service consumer is authorized to request the deletion of the targeted existing "Individual BDT Policy Configuration" resource;
- if the service consumer is authorized, the NRM server shall delete the resource and respond to the service consumer with an HTTP "204 No Content" status code; and
- if errors occur when processing the request, the NRM Server shall respond to the service consumer with an appropriate error response as specified in clause 7.4.1.5.

5.5.1.2.20 Subscribe_Unified_Traffic_Pattern_and_Monitoring_Management

5.5.1.2.20.1 General

This service operation is used by a service consumer to subscribe to UE unified traffic pattern and monitoring management at the NRM Server.

5.5.1.2.20.2 Service consumer subscribing to unified traffic pattern using the Subscribe_Unified_Traffic_Pattern_and_Monitoring_Management service operation

In order to create subscribe to UE unified traffic pattern monitoring and management, the service consumer shall send an HTTP POST request message to the NRM server targeting the URI of the "Unified Traffic Pattern Subscriptions" resource, with the request body including the UnfTrafficSubc data structure.

Upon reception of the HTTP POST request message, the NRM Server shall:

- verify whether the service consumer is authorized to initiate such request;
- if the service consumer is authorized, then the NRM Server executes one or more management and 5GC exposure procedures (per UE) as specified in clause 14.3.12.2 of 3GPP TS 23.434 [2];
- upon success, the NRM shall create the requested "Individual Unified Traffic Pattern Subscription" resource and respond to the service consumer with an HTTP "201 Created" status code with the response body including the the representation of the created resource within the UnfTrafficSubc data structure; and
- if errors occur when processing the request, the NRM Server shall take proper error handling actions, as specified in clause 7.4.1.5, and respond to the service consumer with an appropriate error status code.

5.5.1.2.21 Update_Unified_Traffic_Pattern_and_Monitoring_Management_Subscription

5.5.1.2.21.1 General

This service operation is used by a service consumer to update an existing UE unified traffic pattern and monitoring management subscription at the NRM Server.

5.5.1.2.21.2 Service consumer updating the subscription to unified traffic pattern using the Update_Unified_Traffic_Pattern_and_Monitoring_Management_Subscription service operation

To update an existing UE unified traffic pattern monitoring and management subscription, the service consumer shall send to the NRM server targeting the URI of the "Individual Unified Traffic Pattern Subscription" resource either,

- an HTTP PUT request message with the request body including the UnfTrafficSubc data structure, or
- an HTTP PATCH request message with the request body including the UnfTrafficSubcPatch data structure

Upon receiving the HTTP PUT/PATCH request message, if the service consumer is authorized to modify/update the UE unified traffic pattern and monitoring management subscription, then the NRM server shall:

1. update/modify the targeted resource accordingly;
 2. respond to the service consumer with either:
 - an HTTP "200 OK" with the response body containing the updated representation of the "Individual Unified Traffic Pattern Subscription" resource within UnfTrafficSubc data structure; or
 - an HTTP "204 No Content" status code;
- and
3. if errors occur when processing the request, the NRM Server shall respond to the service consumer with an appropriate error response as specified in clause 7.1.3.5.

5.5.1.2.22 Unsubscribe_Unified_Traffic_Pattern_and_Monitoring_Management

5.5.1.2.22.1 General

This service operation is used by a service consumer to delete an existing UE unified traffic pattern and monitoring management subscription at the NRM Server.

5.5.1.2.22.2 Service consumer deleting the subscription to unified traffic pattern using the Unsubscribe_Unified_Traffic_Pattern_and_Monitoring_Management service operation

To delete an existing UE unified traffic pattern subscription, the service consumer shall send a HTTP DELETE request message to the NRM server targeting the corresponding "Individual Unified Traffic Pattern Subscription" resource.

Upon reception of the HTTP DELETE request message, if the service consumer is authorized to delete the UE unified traffic pattern subscription, then the NRM server shall:

1. delete the targeted resource and respond to the service consumer with an HTTP "204 No Content" status code;and
2. if errors occur when processing the request, the NRM Server shall respond to the service consumer with an appropriate error response as specified in clause 7.1.3.5.

5.5.1.2.23 Notify_Unified_Traffic_Pattern_Update

5.5.1.2.23.1 General

This service operation is used by the NRM Server to notify the service consumer on UE unified traffic pattern monitoring and management related event(s).

5.5.1.2.23.2 NRM Server notifying on unified traffic pattern monitoring and management related event(s) using the Notify_Unified_Traffic_Pattern_Update service operation

To notify on UE unified traffic pattern monitoring and management related event(s) as specified in clause 14.3.12.3 of 3GPP TS 23.434 [2], the NRM server shall send an HTTP POST request message to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding unified traffic pattern subscription as defined in clauses 5.5.1.2.20 and 5.5.1.2.21 and the request body including the UpdTraficUpdNotif data structure.

Upon successful processing of the request, the service consumer shall respond with an HTTP "204 No Content" status code.

On failure, the service consumer shall take proper error handling actions, as specified in clause 7.4.1.5, and respond to the NRM server with an appropriate error status code.

5.5.1.2.24 Reliable_Transmission_Request

5.5.1.2.24.1 General

This service operation is used by a service consumer to request reliable transmission service to the NRM Server (see also clause 14.3.10.2 of 3GPP TS 23.434 [2]).

The following procedures are supported by the "Reliable_Transmission_Request" service operation:

- Reliable Transmission Service Request.

5.5.1.2.24.2 Reliable Transmission Service Request

1. In order to request reliable transmission service, the service consumer shall send an HTTP POST request to the NRM Server targeting the URI of the corresponding custom operation (i.e., "RelTransRequest"), with the request body including the RelTransReq data structure.
2. Upon reception of the HTTP POST request message, the NRM Server shall:
 - check whether the service consumer is authorized to initiate such request;
 - if the service consumer is authorized and upon successful processing of the request, the NRM Server shall respond with an HTTP "204 No Content" status code; and
 - on failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.4.1.5.

5.5.2 SS_EventsMonitoring API

The SS_EventsMonitoring API, as defined in 3GPP TS 23.434 [2], allows a VAL server via NRM-S reference point to subscribe for and receive notifications from the Network Resource Management server about events related to VAL UE(s). The SS_EventsMonitoring API supports this via the "NRM_MONITOR_UE_USER_EVENTS" event in SS_Events API as specified in clause 7.5. Based on the events of interest information related to the VAL UE(s), the NRM server shall subscribe to UE monitoring types and analytics events as specified in clause 4.4.2 and clause 4.4.14 of 3GPP TS 29.522 [28].

5.5.3 SS_NetworkResourceMonitoring API

5.5.3.1 Service Description

5.5.3.1.1 Overview

The SS_NetworkResourceMonitoring API, as defined in 3GPP TS 23.434 [2], allows VAL server via NRM-S reference point to communicate with the network resource management server for network resource monitoring including requesting unicast QoS monitoring data and managing unicast QoS monitoring subscription.

5.5.3.2 Service Operations

5.5.3.2.1 Introduction

The service operations defined for the SS_NetworkResourceMonitoring API are shown in the table 5.5.3.2.1-1.

Table 5.5.3.2.1-1: Operations of the SS_NetworkResourceMonitoring API

Service operation name	Description	Initiated by
Subscribe_Unicast_QoS_Monitoring	This service operation is used by VAL server to subscribe to unicast QoS monitoring events from SEAL servers.	VAL server
Unsubscribe_Unicast_QoS_Monitoring	This service operation is used by VAL server to unsubscribe from unicast QoS monitoring events from SEAL servers.	VAL server
Notify_Unicast_QoS_Monitoring	This service operation is used by SEAL server to send the notifications to the VAL server.	NRM server
Obtain_Unicast_QoS_Monitoring	This service operation is used by VAL server to obtain unicast QoS monitoring data.	VAL server
Update_Unicast_QoS_Monitoring_Subscription	This service operation is used by VAL server to update or modify the individual unicast QoS monitoring subscription.	VAL server

5.5.3.2.2 Subscribe_Unicast_QoS_Monitoring

5.5.3.2.2.1 General

This service operation is used by a VAL server to create a unicast QoS monitoring subscription to the NRM server.

5.5.3.2.2.2 VAL server subscribes for Unicast QoS Monitoring using Subscribe_Unicast_QoS_Monitoring

In order to subscribe to unicast QoS monitoring, the VAL server shall send an HTTP POST message to the NRM server targeting the URI of the "Unicast Monitoring Subscriptions" resource as specified in clause 7.4.2.2.3.1. The request body shall include the MonitoringSubscription data structure as defined in clause 7.4.2.4.2.8. The VAL server shall indicate within the ReportingRequirement data structure whether one-time reporting and/or immediate reporting is requested, i.e.:

- the "immRep" attribute set to "true", if immediate reporting of the unicast QoS Monitoring data is requested; and/or
- the "reportingMode" attribute set to "ONE_TIME" and the "immRep" attribute set to "true", if one-time reporting of the unicast QoS Monitoring data is requested via the Obtain_Unicast_QoS_Monitoring service operation.

Upon reception of the HTTP POST request message, the NRM server shall:

1. verify the identity of the VAL server and whether the VAL server is authorized to create a unicast QoS monitoring subscription at the NRM server;
2. if the VAL server is not authorized, the NRM server shall respond to the VAL server with an appropriate error status code;
3. if the VAL server is authorized:
 - a. if immediate reporting and one-time reporting are requested, the NRM server determines if the requested data is available internally or not and whether to interact with the NEF to retrieve the data using the Nnef_AnalyticsExposure API (UE Communication Analytics Events and DN Performance Analytics) as defined in 3GPP TS 29.522 [28];
 - b. otherwise, the NRM server shall interact with the NEF to establish the associated QoS monitoring subscriptions by invoking the Nnef_AnalyticsExposure API (UE Communication Analytics Events and DN Performance Analytics) and AsSessionWithQoS API as defined in 3GPP TS 29.522 [28]. The NRM server determines the relevant NEF subscription procedures and the parameters for these subscriptions based on the inputs received from the VAL server;
4. upon reception of successful response(s) from the NEF or retrieval of the requested data internally;

- a. if immediate reporting and one-time reporting are requested, an HTTP "200 OK" status code, with the response body including the MonitoringReport data structure containing the available requested Unicast QoS Monitoring data as defined in clause 7.4.2.4.2.2;
- b. otherwise, the NRM server shall create a new "Individual Unicast Monitoring Subscription" resource and respond to the VAL server with:
 - an HTTP "201 Created" status code, including a Location header field containing the URI for the created "Individual Unicast Monitoring Subscription" resource and the response body including the MonitoringSubscription data structure containing a representation of the created resource as defined in clause 7.4.2.4.2.8; and
 - if immediate reporting was requested by the VAL server, the returned MonitoringSubscription data structure shall also contain the requested Unicast QoS Monitoring data within the "monRep" attribute, if the requested data is available, as defined in clause 7.4.2.4.2.2;
- c. in the case of partial failure, i.e. the request fails for only a subset of the targeted VAL UE(s) or VAL Stream ID(s), the NRM server shall include the "failureRep" attribute within the returned MonitoringReport data structure indicating the list of VAL UE(s) or VAL Stream ID(s) for which the NRM server failed to obtain the requested data and the related failure reasons;

and

5. if the NRM server is unable to satisfy the request, the NRM server shall respond to the VAL server with an appropriate error status code.

5.5.3.2.3 Unsubscribe_Unicast_QoS_Monitoring

5.5.3.2.3.1 General

This service operation is used by a VAL server to terminate a unicast QoS monitoring subscription at the NRM server.

5.5.3.2.3.2 VAL server unsubscribes for Unicast QoS Monitoring using Unsubscribe_Unicast_QoS_Monitoring

In order to terminate a unicast QoS monitoring subscription, the VAL server shall send an HTTP DELETE request message to the NRM server, on the corresponding "Individual Unicast Monitoring Subscription" resource URI as specified in clause 7.4.2.3.3.1.

Upon reception of the HTTP DELETE request message, the NRM server shall:

1. verify the identity of the VAL server and check if the VAL server is authorised to terminate the targeted "Individual Unicast Monitoring Subscription" associated with the resource URI;
2. if the VAL server is authorized to unsubscribe from Unicast QoS Monitoring, interact with the NEF to terminate the related QoS monitoring subscription and delete the related "Individual Unicast Monitoring Subscription" subscription resource at the NRM server; and
3. upon success, respond to the VAL server with a "204 No Content" status code.

5.5.3.2.4 Notify_Unicast_QoS_Monitoring

5.5.3.2.4.1 General

This service operation is used by the NRM server to notify the VAL server of unicast QoS monitoring data.

5.5.3.2.4.2 NRM server notifies for Unicast QoS Monitoring using Notify_Unicast_QoS_Monitoring

The NRM server receives unicast QoS monitoring data by means of notifications provided by the NEF. The NRM server coordinates and aggregates the received information from the NEF notifications and determines whether to send a notification to the VAL server based on the VAL server subscription's reporting requirements. For event-triggered reporting, the NRM server notifies the VAL server when any given event is triggered. For a VAL group or a list of

VAL UEs, the NRM server aggregates QoS monitoring data for each UE belonging to the group or the list; for a VAL stream, the NRM server aggregates the QoS monitoring data for the stream.

The NRM server stops reporting according to the VAL server subscription's termination of reporting requirements. In the case user-triggered termination of reporting is requested or no termination of reporting requirements are provided, the NRM server terminates the Unicast Monitoring Subscription after receiving an explicit request from the VAL Server as specified in clause 5.5.3.2.3. In the case of time-triggered or event-triggered termination of reporting, the NRM server shall stop the reporting and terminate the subscription when the provided conditions are met. The NRM server may also store internally the QoS monitoring data as needed for later retrieval.

In order to notify the VAL server about Unicast QoS Monitoring information updates, the NRM server shall send an HTTP POST request message to the VAL server targeting the notification URI provided during subscription creation as specified in clause 5.5.3.2.2.2.

Upon receiving the HTTP POST request message, the VAL server shall:

1. process the Unicast QoS Monitoring notification; and
2. upon success, respond to the NRM server with a "204 No Content" status code.

5.5.3.2.5 Obtain_Unicast_QoS_Monitoring_Data

5.5.3.2.5.1 General

This service operation is used by a VAL server to obtain the QoS monitoring data from the NRM server for a time period of interest either in the past or in the present (i.e. current time). This service operation is supported via the `Subscribe_Unicast_QoS_Monitoring` service operation using the immediate reporting and one-time reporting mechanisms as defined in clause 5.5.3.2.2.2.

5.5.3.2.6 Update_Unicast_QoS_Monitoring_Subscription

5.5.3.2.6.1 General

This service operation is used by a VAL server to update a unicast QoS monitoring subscription at the NRM server.

5.5.3.2.6.2 VAL server modifies for Unicast QoS Monitoring Subscription using Update_Unicast_QoS_Monitoring Subscription

If the "UpdateSupport" feature defined in clause 7.4.2.6 is supported, the VAL server may send an HTTP PUT or an HTTP PATCH request to update or modify an individual unicast QoS monitoring subscription, respectively.

In order to update an existing individual unicast QoS monitoring subscription, the VAL server shall send an HTTP PUT request message to the NRM server, targeting the corresponding "Individual Unicast Monitoring Subscription" resource URI as specified in clause 7.4.2.2.3.3.3.

In order to modify an existing individual unicast QoS monitoring subscription, the VAL server shall send an HTTP PATCH request message targeting the "Individual Unicast Monitoring Subscription" resource URI as specified in clause 7.4.2.2.3.3.4. The body of the HTTP PATCH request message shall include the requested modifications as specified in clause 7.4.2.2.3.3.4.

The updated resource representation information provided via an HTTP PUT method shall not change any target identifier, i.e., the "valUeIds", "valGroupId", and "valStreamIds" attributes within the "Individual Unicast Monitoring Subscription" resource.

Upon receiving the HTTP PUT or HTTP PATCH request message, the NRM server shall:

1. check if the required features for the received HTTP request are supported as defined in clause 7.4.2.6;
2. verify the identity of the VAL server and check if the VAL server is authorised to update or modify the "Individual Unicast Monitoring Subscription" resource;
3. if the required feature for the received HTTP request is supported and the VAL server is authorized, then the NRM server shall:

- a. if the configuration information in the request is valid, interact with the NEF to update, modify, or establish the associated QoS monitoring subscriptions by invoking the Nnef_AnalyticsExposure API (UE Communication Analytics Events and DN Performance Analytics) and AsSessionWithQoS API as defined in 3GPP TS 29.522 [28]. The NRM server determines the relevant NEF subscription procedures and the parameters for these subscriptions based on the inputs received from the VAL server;
 4. upon reception of successful response(s) from the NEF:
 - a. update/modify the resource identified by the Resource URI of the configuration received in the request; and
 - b. respond to the VAL server with an HTTP "200 OK" status;
- and
5. if the NRM server is unable to satisfy the request, the NRM server shall respond to the VAL server with an appropriate error status code as defined in clause 7.4.2.5.

5.5.4 SS_SatelliteSFInfoEvent API

The SS_SatelliteSFInfoEvent API, as defined in 3GPP TS 23.434 [2], allows a VAL Server via the NRM-S reference point to subscribe and receive notifications from the NRM Server on Satellite S&F related event(s). The SS_SatelliteSFInfoEvent API supports this via the "NRM_SAT_SF_INFO" event of the SS_Events API as specified in clause 7.5.

5.6 Events APIs

5.6.1 SS_Events API

5.6.1.1 Service Description

5.6.1.1.1 Overview

The SS_Events API, allows a VAL server via LM-S, GM-S, CM-S and NRM-S reference points to subscribe and unsubscribe from SEAL events and to receive notifications from the Location Management Server, Group Management Server, Configuration Management Server and Network Resource Management Server respectively.

5.6.1.2 Service Operations

5.6.1.2.1 Introduction

The service operations defined for the SS_Events API are shown in the table 5.6.1.2.1-1.

Table 5.6.1.2.1-1: Operations of the SS_Events API

Service operation name	Description	Initiated by
Subscribe_Event	This service operation is used by VAL server to subscribe for events from SEAL servers.	VAL Server
Unsubscribe_Event	This service operation is used by VAL server to unsubscribe for events from SEAL servers.	VAL Server
Notify_Event	This service operation is used by SEAL servers to send the notifications to the VAL server.	SEAL servers (Location Management, Group Management, Configuration Management).
Update_Subscription	This service operation is used by VAL server to update its events subscription at SEAL server.	VAL Server

5.6.1.2.2 Subscribe_Event

5.6.1.2.2.1 General

This service operation is used by a VAL server to subscribe to the SEAL events.

5.6.1.2.2.2 Subscribing to SEAL events using Subscribe_Event service operation

To subscribe to SEAL events, the VAL server shall send an HTTP POST message to the SEAL server. The body of the HTTP POST message shall include VAL Server Identifier, Event Type, Event Filters, Reporting Requirements and a Notification Destination URI as specified in clause 7.5.1.2.2.3.1.

Upon receiving the above described HTTP POST message, the SEAL server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to subscribe to the SEAL events mentioned in the HTTP POST message;
2. if the VAL server is authorized to subscribe to the SEAL events, the SEAL server shall:
 - a. verify the provided identifier(s) in the request;
 - b. if the PartialFailureSupport feature is supported and partial failure has occurred (e.g. the SEAL server fails to verify the identifier(s) of only a subset of the provided target identifiers), the SEAL server shall process the request for the identifier(s) for which the verification is successful, create a new resource as specified in clause 7.5.1.2.1 and include in the response to the service consumer (i.e. VAL server) the "partialFailRep" attribute within the EventSubscription data structure indicating the list of the target identifier(s) for which the verification failed;
 - c. otherwise, upon successful verification of the provided identifier(s) and successful processing of the request, create a new resource as specified in clause 7.5.1.2.1;
 - d. return the created resource representation and the created SEAL Resource URI in the response message ; and
 - e. if the SEAL server is unable to satisfy the request, the SEAL server shall respond to the VAL server with an appropriate error status code as defined in clause 7.5.1.5.

5.6.1.2.3 Notify_Event

5.6.1.2.3.1 General

This service operation is used by the SEAL servers to send notifications to the VAL server.

5.6.1.2.3.2 Notifying SEAL events using Notify_Event service operation

To notify the SEAL events, the SEAL server shall send an HTTP POST message using the Notification Destination URI received in the subscription request. The body of the HTTP POST message shall include an Event Notification and SEAL Resource URI.

Upon receiving the HTTP POST message, the VAL server shall process the Event Notification.

5.6.1.2.4 Unsubscribe_Event

5.6.1.2.4.1 General

This service operation is used by a VAL server to un-subscribe from the SEAL events.

5.6.1.2.4.2 Unsubscribing from SEAL events using Unsubscribe_Event service operation

To unsubscribe from SEAL events, the VAL server shall send an HTTP DELETE message to the resource representing the event in the SEAL server as specified in clause 7.5.1.2.3.3.1.

Upon receiving the HTTP DELETE message, the SEAL sever shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to Unsubscribe from the SEAL event associated with the SEAL Resource URI; and
2. if the VAL server is authorized to unsubscribe from the SEAL events, the SEAL server shall delete the resource pointed by the SEAL Resource URI

5.6.1.2.5 Update_Subscription

5.6.1.2.5.1 General

This service operation is used by a VAL server to update its SEAL events subscription.

5.6.1.2.5.2 Updating the SEAL events subscription using Update_Subscription service operation

If the "SubscUpdate" feature as defined in clause 7.5.1.6 is supported, then to request the update/modification of an existing Individual SEAL Events Subscription, the VAL server shall send a HTTP PATCH request (for partial modification) or PUT request (for fully replacement) message to the SEAL server on resource URI "Individual SEAL Events Subscription" resource as specified in clause 7.5.1.2.3.3.2 for HTTP PATCH message and in clause 7.5.1.2.3.3.3 for HTTP PUT message.

Upon receiving the HTTP PATCH or PUT message from the VAL server, the SEAL server shall:

1. check whether the VAL server is authorized to update the existing "Individual SEAL Events Subscription" resource or not;
2. if the VAL server is authorized to update the SEAL Events Subscription, then:
 - a. if the "PartialFailureSupport" feature is supported and partial failure has occurred (e.g., the SEAL server fails to verify the identifier(s) of only a subset of the provided target identifiers), the SEAL server shall process the request for the identifier(s) for which the verification is successful, update the existing "Individual SEAL Events Subscription" resource and respond to the service consumer (i.e., VAL server) with an HTTP "200 OK" status code with the response body including the "partialFailRep" attribute, indicating the list of the target identifier(s) for which the verification failed, within the concerned instance(s) (encoded using the EventSubscription data structure) of the SEALEventSubscription data structure;
 - b. otherwise, the SEAL server shall update the existing "Individual SEAL Events Subscription" resource and respond to the VAL server with either an HTTP "204 No Content" status code or an HTTP "200 OK" status code with the response body including the updated representation of the "Individual SEAL Events Subscription" resource within the SEALEventSubscription data structure.

5.7 Key management APIs

5.7.1 SS_KeyInfoRetrieval API

5.7.1.1 Service Description

5.7.1.1.1 Overview

As specified in 3GPP TS 33.434 [26], the SS_KeyInfoRetrieval API, allows the VAL server via KM-S reference point to obtain the VAL service specific key management information from the key management server.

5.7.1.2 Service Operations

5.7.1.2.1 Introduction

The service operation defined for SS_KeyInfoRetrieval API is shown in the table 5.7.1.2.1-1.

Table 5.7.1.2.1-1: Operations of the SS_KeyInfoRetrieval API

Service operation name	Description	Initiated by
Obtain_Key_Info	This service operation is used by VAL server to obtain key management information.	VAL server

5.7.1.2.2 Obtain_Key_Info

5.7.1.2.2.1 General

This service operation is used by the VAL server to obtain VAL service specific key management information.

5.7.1.2.2.2 VAL server obtaining VAL service specific key material using Obtain_Key_Info service operation

To obtain key management information specific to VAL service, the VAL server shall send HTTP GET request message to key management server, on Key records resource collection URI, with query parameters VAL service ID and optionally VAL user ID or VAL UE ID, as specified in 7.6.1.2.2.3.1.

Upon receiving the HTTP GET message as described above, the key management server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to obtain key management information specific to VAL service, VAL user or VAL UE, the URI in the request is of target SEAL KMS and date/time of the request is in recent time window;
2. if the VAL server is authorized to obtain the requested key management information, the key management server shall;
 - a. return in the response message with key management information corresponding to the query parameters that were sent in the request message.

5.7.2 SS_KMParametersProvisioning API

5.7.2.1 Service Description

5.7.2.1.1 Overview

As specified in 3GPP TS 23.434 [2] and 3GPP TS 33.434 [26], the SS_KMParametersProvisioning API enables a VAL server to provision the key parameters information specific to VAL service, VAL User or VAL UE at the Key Management (KM) server over the SEAL KM-S reference point.

5.7.2.2 Service Operations

5.7.2.2.1 Introduction

The service operations defined for the SS_KMParametersProvisioning API are shown in the table 5.7.2.2.1-1.

Table 5.7.2.2.1-1: Operations of the SS_KMParametersProvisioning API

Service operation name	Description	Initiated by
Provide_Configuration	This service operation is used by a VAL server to provision the VAL service, VAL User or VAL UE specific key parameter information to the KM server.	VAL server

5.7.2.2.2 Provide_Configuration

5.7.2.2.2.1 General

This service operation is used by a VAL server to provision key parameter information to the KM server.

5.7.2.2.2.2 VAL server provisioning key parameter information using Provide_Configuration service operation

To provision the VAL service, VAL User or VAL UE specific key parameter information, the VAL server shall send an HTTP POST request message to the KM Server with the request body including the VALKeyConfiguration data structure specified in clause 7.6.2.5.2.2.

Upon receiving HTTP POST message, the key management server shall:

1. verify the identity of the VAL Server and check if the VAL Server is authorized to provision the key parameter information as specified in 3GPP TS 33.434 [26];
2. if the VAL Server is authorized to provision the key parameter information, shall create a new resource as defined in 7.6.2.2.3.1; and
3. if the KM Server is unable to satisfy the request, the KM Server shall respond to the VAL Server with an appropriate error status code as defined in clause 7.6.2.5.

5.8 Network Slice Capability Enablement APIs

NSCE APIs are defined in 3GPP TS 29.435 [42].

5.9 Identity Management APIs

5.9.1 SS_IdmParameterProvisioning API

5.9.1.1 Service Description

5.9.1.1.1 Overview

As specified in 3GPP TS 23.434 [2], the SS_IdmParameterProvisioning API enables a VAL server to communicate with the Identity Management (IM) server for the provisioning of the VAL service specific information for a VAL server (i.e. VAL server's VAL service(s) and the related VAL user(s) information) over the SEAL IM-S reference point.

5.9.1.2 Service Operations

5.9.1.2.1 Introduction

The service operations defined for the SS_IdmParameterProvisioning API are shown in the table 5.9.1.2.1-1.

Table 5.9.1.2.1-1: Operations of the SS_IdmParameterProvisioning API

Service operation name	Description	Initiated by
Provide_Configuration	This service operation is used to provision the VAL service specific information to the IM server.	e.g. VAL server
Get_Configuration	This service operation is used to retrieve the VAL service specific information provisioned to the IM server.	e.g. VAL server
Update_Configuration	This service operation is used to update the VAL service specific information provisioned to the IM server.	e.g. VAL server
Delete_Configuration	This service operation is used to delete the VAL service specific information provisioned to the IM server.	e.g. VAL server

5.9.1.2.2 Provide_Configuration

5.9.1.2.2.1 General

This service operation is used by a VAL server to provision the list of VAL service specific information of the VAL server to the IM server.

5.9.1.2.2.2 VAL server provisioning VAL service specific information using Provide_Configuration service operation

To provision the VAL services specific information, the VAL server shall send an HTTP POST request message to the IM Server with the request body including the VALServicesConfig data structure specified in clause 7.8.1.5.2.2.

Upon receiving HTTP POST message, the identity management server shall:

1. verify the identity of the VAL Server and check if the VAL Server is authorized to provision the VAL services specific configuration information;

2. if the VAL Server is authorized to provision the VAL services specific configuration information, shall create a new resource as defined in 7.8.1.2.2.3.1; and
3. if the IM Server is unable to satisfy the request, the IM Server shall respond to the VAL Server with an appropriate error status code as defined in clause 7.8.1.5.

5.9.1.2.3 Get_Configuration

5.9.1.2.3.1 General

This service operation is used by a service consumer to fetch the provisioned list of VAL services specific information of the VAL server from the IM server.

5.9.1.2.3.2 Service consumer obtaining the VAL service specific information provisioned using Get_Configuration service operation

To obtain the provisioned VAL services configuration information, the service consumer shall send a HTTP GET message to the IM server targeting either,

- "Individual VAL Services Configuration" resource representation URI as specified in clause 7.8.1.2.3.3.1; or
- "VAL Services Configurations" collection resource representation URI as specified in clause 7.8.1.2.2.3.2. In the GET message to "VAL Services Configurations" collection resource, the service consumer may include the VAL Server ID of the requesting VAL server, list of identifiers identifying the "Individual VAL Services Configuration" resources, as query parameters.

Upon receiving the HTTP GET message as described above, if the service consumer is authorized to obtain the VAL Services Configuration information, then the IM server shall:

1. in the request to "VAL Services Configurations" collection resource representation URI, return the VAL Service Configurations, list of "VALServicesConfig" data type, matching the query parameters in the response message;
2. in the request to "Individual VAL Services Configuration" resource representation URI, return the VAL Service Configuration resource "VALServicesConfig" data type in the response message.
3. if errors occur when processing the request, the IM Server shall respond to the service consumer with an appropriate error response as specified in clause 7.1.3.5.

5.9.1.2.4 Update_Configuration

5.9.1.2.4.1 General

This service operation is used by a service consumer to update the list of VAL service specific information of the VAL server provisioned to the IM server.

5.9.1.2.4.2 Service consumer updating VAL service specific information using Update_Configuration service operation

To modify the VAL Services Configuration, the service consumer shall send either,

- HTTP PUT message, including the "VALServicesConfig" data type, to the IM server to the Resource URI identifying the "Individual VAL Services Configuration" resource representation, as specified in the clause 7.8.1.2.3.3.2. This request shall not replace valServerId property in the existing resource, or
- HTTP PATCH request message, including the "VALServicesConfigPatch" data type, to the "Individual VAL Services Configuration" resource URI as specified in clause 7.8.1.2.3.3.3, to partially update the VAL Service Configuration. The body of the HTTP PATCH request message shall include the requested modifications as specified in clause 7.8.1.2.3.3.3.

Upon receiving the HTTP PUT / PATCH message, if the service consumer is authorized to modify/update the VAL services configuration information, then the IM server shall:

1. update/modify the resource identified by the Resource URI of the "Individual VAL Services Configuration" with the VAL Services information received in the request;
2. respond to the service consumer with HTTP "200 OK" with the response body containing the updated "Individual VAL Services Configuration" in "VALServicesConfig" data type, in the response or a 204 No Content status code;
3. if errors occur when processing the request, the IM Server shall respond to the service consumer with an appropriate error response as specified in clause 7.1.3.5.

5.9.1.2.5 Delete_Configuration

5.9.1.2.5.1 General

This service operation is used by a service consumer to delete the list of VAL service specific information of the VAL server provisioned to the IM server.

5.9.1.2.5.2 Service consumer deleting VAL service specific information using Delete_Configuration service operation

To delete a VAL Services Configuration information, the service consumer shall send a HTTP DELETE message to the IM server to its "Individual VAL Services Configuration" resource representation in the IM server as specified in clause 7.8.1.2.3.3.4. Upon receiving the HTTP DELETE message, if the service consumer is authorized to delete the VAL Services Configuration, then the IM server shall:

1. delete the resource representation pointed by the Individual VAL Service Configuration resource identifier;
2. if errors occur when processing the request, the IM Server shall respond to the service consumer with an appropriate error response as specified in clause 7.1.3.5.

5.10 Data Delivery APIs

SEALDD APIs are defined in 3GPP TS 29.548 [35].

5.11 Application data analytics enablement service configuration APIs

5.11.1 SS_ADAE_VALPerformanceAnalytics API

5.11.1.1 Service Description

5.11.1.1.1 Overview

The SS_ADAE_VALPerformanceAnalytics API, as defined 3GPP TS 23.436 [38], allows the VAL server via ADAE-S reference point to subscribe to VAL performance analytics event to the ADAE Server.

5.11.1.2 Service Operations

5.11.1.2.1 Introduction

The service operation defined for SS_ADAE_VALPerformanceAnalytics API is shown in the table 5.11.1.2.1-1.

Table 5.11.1.2.1-1: Operations of the SS_ADAE_VALPerformanceAnalytics API

Service operation name	Description	Initiated by
Subscribe_VAL_Performance_Analytics	This service operation is used by VAL server to subscribe to the event of the VAL performance analytics.	VAL Server
Notify_VAL_Performance_Analytics	This service operation is used by ADAE Server to notify about the VAL performance analytics.	ADAE Server
Unsubscribe_VAL_Performance_Analytics	This service operation is used by VAL server to unsubscribe from the event of the VAL performance analytics.	VAL server

5.11.1.2.2 Subscribe_VAL_Performance_Analytics

5.11.1.2.2.1 General

This service operation is used by the VAL server for VAL performance analytics event subscription to the ADAE Server.

5.11.1.2.2.2 Subscribing to VAL performance analytics event using Subscribe_VAL_Performance_Analytics service operation

To subscribe to VAL performance analytics event, the VAL server shall send an HTTP POST request to the ADAES with a Request-URI set to "{apiRoot}/ss-adae-pa/<apiVersion>/application-performance", and the body containing the AppPerfSub data structure as defined in clause 7.10.1.4.2.2.

Upon receipt of the HTTP POST request, the ADAES shall:

1. verify the identity of the VAL server and determine if the VAL server is authorized to subscribe to the VAL performance analytics event; and
2. if the VAL server:
 - a. is not authorized, the ADAES shall respond to an appropriate error status code; or
 - b. is authorized, the ADAES shall create a new "Individual application performance event subscription" resource and respond to the VAL server with an HTTP "201 Created" status code, including a Location header field containing the URI for the created resource and the response body including the AppPerfSub data structure containing a representation of the created resource.

If errors occur when processing the HTTP POST request, the ADAES shall send an HTTP error response as specified in clause 7.10.1.5.

5.11.1.2.3 Notify_VAL_Performance_Analytics

5.11.1.2.3.1 General

This service operation is used by the ADAES to send a notification about the VAL performance analytics to a previously subscribed VAL Server.

5.11.1.2.3.2 Notifying VAL performance analytics event using Notify_VAL_Performance_Analytics service operation

To notify VAL performance analytics event, the ADAES shall send an HTTP POST request to the VAL server at the notification URI that was provided during the subscription, and the body containing the AppPerfNotif data structure as defined in clause 7.10.1.4.2.3.

Upon receipt of the HTTP POST request, the VAL server shall process the event notification, and in case of success, respond with an HTTP "204 No Content" status code.

If errors occur when processing the HTTP POST request, the VAL server shall send an appropriate HTTP error response as specified in clause 7.10.1.5.

5.11.1.2.4 Unsubscribe_VAL_Performance_Analytics

5.11.1.2.4.1 General

This service operation is used by the VAL server to unsubscribe from the VAL performance analytics events.

5.11.1.2.4.2 Unsubscribing from VAL performance analytics event using Unsubscribe_VAL_Performance_Analytics service operation

To unsubscribe from VAL performance analytics event, the VAL server shall send an HTTP DELETE request to the resource representing the event in the ADAES as specified in clause 7.10.1.2.3.3.2.

Upon receiving the HTTP DELETE request:

1. the ADAES shall verify the identity of the VAL server and check if the VAL server is authorized to unsubscribe from the VAL performance analytics event associated with the resource URI "{apiRoot}/ss-adae-pa/<apiVersion>/application-performance/{appPerfId}";
2. if the VAL server is authorized to unsubscribe from the VAL performance analytics event, the ADAES shall delete the resource pointed by the resource URI "{apiRoot}/ss-adae-pa/<apiVersion>/application-performance/{appPerfId}";
3. if the request is successfully processed, the ADAES shall respond with a "204 No Content" status code; and

If errors occur when processing the request, the ADAES shall send an appropriate HTTP error response as specified in clause 7.10.1.5.

5.11.2 SS_ADAE_SlicePerformanceAnalytics API

5.11.2.1 Service Description

5.11.2.1.1 Overview

The SS_ADAE_SlicePerformanceAnalytics API, as defined 3GPP TS 23.436 [38], allows the VAL server via ADAE-S reference point to subscribe to slice specific application performance analytics event to the ADAE Server.

5.11.2.2 Service Operations

5.11.2.2.1 Introduction

The service operation defined for SS_ADAE_SlicePerformanceAnalytics API is shown in the table 5.11.2.2.1-1.

Table 5.11.2.2.1-1: Operations of the SS_ADAE_SlicePerformanceAnalytics API

Service operation name	Description	Initiated by
Subscribe_Slice_Performance_Analytics	This service operation is used by VAL server to subscribe to the event of the slice-specific application performance analytics.	VAL Server
Notify_Slice_Performance_Analytics	This service operation is used by ADAE Server to notify about the slice-specific application performance analytics.	ADAE Server
Unsubscribe_Slice_Performance_Analytics	This service operation is used by VAL server to unsubscribe from the event of the slice-specific application performance analytics.	VAL server

5.11.2.2.2 Subscribe_Slice_Performance_Analytics

5.11.2.2.2.1 General

This service operation is used by the VAL server for slice-specific application performance analytics event subscription to the ADAE Server.

5.11.2.2.2.2 Subscribing to slice-specific application performance analytics event using Subscribe_Slice_Performance_Analytics service operation

To subscribe to slice specific application performance analytics event, the VAL server shall send an HTTP POST request with a Request-URI according to the pattern "{apiRoot}/ss-adae-sspa/<apiVersion>/slice-specific-application-performance" and with a body containing data type SliceAppPerfSub as defined in clause 7.10.2.4.2.2.

Upon receipt of the HTTP POST request, the ADAE Server shall:

1. verify the identity of the VAL server and determine if the VAL server is authorized to subscribe to the slice-specific application performance analytics event; and
2. if the VAL server:
 - a. is not authorized, the ADAE Server shall respond to the VAL server with an appropriate error status code; or
 - b. is authorized, the ADAE Server shall create a new "Individual slice specific application performance event subscription" resource and respond to the VAL server with an HTTP "201 Created" status code, including a Location header field containing the URI for the created "Individual slice specific application performance event subscription" and the response body including the SliceAppPerfSub data structure containing a representation of the created resource as defined in clause 7.10.2.2.

5.11.2.2.3 Notify_Slice_Performance_Analytics

5.11.2.2.3.1 General

This service operation is used by the ADAE Server to send notification to the VAL server with the slice-specific application performance analytics event subscription to the ADAE Server.

5.11.2.2.3.2 Notifying slice-specific application performance analytics event using Notify_Slice_Performance_Analytics service operation

To notify slice-specific application performance analytics event, the ADAE Server shall send an HTTP POST request with a Request-URI according to the pattern "{notiUri}" and with a body containing data type SliceAppPerfNotif as defined in clause 7.10.2.4.2.3.

Upon receipt of the HTTP POST request, the VAL server shall respond to the ADAE Server with:

1. if the request is successfully processed, a "204 No Content" status code and process the event notification; or
2. if errors occur when processing the request, an appropriate error response as specified in clause 7.10.2.5.

5.11.2.2.4 Unsubscribe_Slice_Performance_Analytics

5.11.2.2.4.1 General

This service operation is used by the VAL server to unsubscribe from the slice-specific application performance analytics event.

5.11.2.2.4.2 Unsubscribing from slice-specific application performance analytics event using Unsubscribe_Slice_Performance_Analytics service operation

To unsubscribe from slice-specific application performance analytics event, the VAL server shall send an HTTP DELETE request to the resource representing the event in the ADAE Server as specified in clause 7.10.2.3.2.

Upon receiving the HTTP DELETE request:

1. the ADAE Server shall verify the identity of the VAL server and check if the VAL server is authorized to unsubscribe from the slice-specific application performance analytics event associated with the resource URI "{apiRoot}/ss-adae-sspa/<apiVersion>/slice-specific-application-performance/{ssAppPerfId}";
2. if the VAL server is authorized to unsubscribe from the slice-specific application performance analytics event, the ADAE Server shall delete the resource pointed by the resource URI "{apiRoot}/ss-adae-sspa/<apiVersion>/slice-specific-application-performance/{ssAppPerfId}";
3. if the request is successfully processed, the ADAE Server shall respond to the VAL server with a "204 No Content" status code; and
4. if errors occur when processing the request, the ADAE Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.10.2.5.

5.11.3 SS_ADAE_Ue2UePerformanceAnalytics API

5.11.3.1 Service Description

5.11.3.1.1 Overview

The SS_ADAE_Ue2UePerformanceAnalytics API, as defined in 3GPP TS 23.436 [38], allows VAL server via ADAE-S reference point to communicate with the ADAE Server for UE-to-UE session performance analytics retrieval including managing UE-to-UE session performance subscriptions.

5.11.3.2 Service Operations

5.11.3.2.1 Introduction

The service operations defined for the SS_ADAE_Ue2UePerformanceAnalytics API are shown in the table 5.11.3.2.1-1.

Table 5.11.3.2.1-1: Operations of the SS_ADAE_Ue2UePerformanceAnalytics API

Service operation name	Description	Initiated by
UE-to-UE_Performance_Analytics_Subscribe	This service operation is used by the VAL Server to subscribe to the UE-to-UE performance analytics.	VAL Server
UE-to-UE_Performance_Analytics_Notify	This service operation is used by the ADAE Server to notify about the UE-to-UE performance analytics.	ADAE Server
UE-to-UE_Performance_Analytics_Unsubscribe	This service operation is used by the VAL Server to unsubscribe to the UE-to-UE performance analytics.	VAL Server

5.11.3.2.2 UE-to-UE_Performance_Analytics_Subscribe

5.11.3.2.2.1 General

This service operation is used by VAL server to subscribe to UE-to-UE performance analytics to the ADAES.

5.11.3.2.2.2 Subscribing for UE-to-UE performance analytics using UE-to-UE_Performance_Analytics_Subscribe

To subscribe to UE-to-UE performance analytics, the VAL server shall send an HTTP POST message to the ADAES with a Request-URI set to "{apiRoot}/ss-adae-uupa/<apiVersion>/ue2ue-session-performance", and the body containing the U2UPerfSub data structure as defined in clause 7.10.3.4.2.2.

Upon reception of the HTTP POST request message, the ADAES shall:

1. verify the identity of the VAL server and determine if the VAL server is authorized to subscribe to the UE-to-UE session performance analytics event; and
2. if the VAL server:
 - a. is not authorized, the ADAES shall respond to an appropriate error status code; or
 - b. is authorized, the ADAES shall create a new "Individual UE-to-UE Session Performance Event Subscription" resource and respond to the VAL server with an HTTP "201 Created" status code, including a Location header field containing the URI for the created resource and the response body including the U2UPerfSub data structure containing a representation of the created resource.

If errors occur when processing the HTTP POST request, the ADAES shall send an appropriate HTTP error response as specified in clause 7.10.3.5.

5.11.3.2.3 UE-to-UE_Performance_Analytics_Notify

5.11.3.2.3.1 General

This service operation is used by the ADAES to send a notification about UE-to-UE performance analytics events to a previously subscribed VAL server.

5.11.3.2.3.2 Notifying UE-to-UE performance analytics events using UE-to-UE_Performance_Analytics_Notify

To notify about UE-to-UE performance analytics events, the ADAES shall send an HTTP POST request to the VAL Server at the notification URI that was provided during subscription, and the body containing the U2UPerfNotif data structure as defined in clause 7.10.3.4.2.3.

Upon receiving the HTTP POST request message, the VAL Server shall process the UE-to-UE performance analytics events notification, and in case of success, respond with the HTTP "204 No Content" status code.

If errors occur when processing the HTTP POST request, the VAL Server shall send an appropriate HTTP error response as specified in clause 7.10.3.5.

5.11.3.2.3.2 UE-to-UE_Performance_Analytics_Unsubscribe

5.11.3.2.3.2.1 General

This service operation is used by VAL server to unsubscribe from UE-to-UE performance analytics events.

5.11.3.2.3.2.2 Unsubscribing from the UE-to-UE performance analytics events using UE-to-UE_Performance_Analytics_Unsubscribe

To unsubscribe from UE-to-UE session performance analytics events, the VAL server shall send an HTTP DELETE request with "{apiRoot}/ss-adae-uupa/<apiVersion>/ue2ue-session-performance/{u2uPerfId}" as Resource URI, where "{u2uPerfId}" is the identifier of the existing subscription that is to be deleted.

Upon receiving the HTTP DELETE request, if the ADAES authorizes the service consumer and successfully performs the deletion of the indicated subscriptions shall:

1. verify the identity of the VAL Server and check if the VAL Server is authorised to terminate the targeted "Individual UE-to-UE Session Performance Event Subscription" associated with the resource URI;
2. if the VAL Server is authorized to unsubscribe from UE-to-UE performance analytics events, the ADAES shall remove the corresponding subscription and respond with the HTTP "204 No Content" status code.

If errors occur when processing the HTTP DELETE request, the ADAES shall send an appropriate HTTP error response as specified in clause 7.10.3.5.

5.11.4 SS_ADAE_LocationAccuracyAnalytics API

5.11.4.1 Service Description

5.11.4.1.1 Overview

The SS_ADAE_LocationAccuracyAnalytics API, as defined 3GPP TS 23.436 [38], allows the VAL server via ADAES reference point to subscribe to location accuracy performance analytics event.

5.11.4.2 Service Operations

5.11.4.2.1 Introduction

The service operation defined for SS_ADAE_LocationAccuracyAnalytics API is shown in the table 5.11.4.2.1-1.

Table 5.11.4.2.1-1: Operations of the SS_ADAE_LocationAccuracyAnalytics API

Service operation name	Description	Initiated by
Subscribe_Location_Accuracy_Analytics	This service operation is used by VAL server to subscribe to the event of the location accuracy performance analytics.	VAL Server
Notify_Location_Accuracy_Analytics	This service operation is used by ADAE Server to notify about the location accuracy performance analytics.	ADAE Server
Unsubscribe_Location_Accuracy_Analytics	This service operation is used by VAL server to unsubscribe from the event of the location accuracy performance analytics.	VAL server

5.11.4.2.2 Subscribe_Location_Accuracy_Analytics

5.11.4.2.2.1 General

This service operation is used by the VAL server for location accuracy performance analytics event subscription to the ADAE Server.

5.11.4.2.2.2 Subscribing to location accuracy performance analytics event using Subscribe_Location_Accuracy_Analytics service operation

To subscribe to location accuracy performance analytics event, the VAL server shall send an HTTP POST request with a Request-URI according to the pattern "{apiRoot}/ss-adae-laa/<apiVersion>/location-accuracy" and with a body containing data type LocAccurSub as defined in clause 7.10.4.4.2.2.

Upon receipt of the HTTP POST request, the ADAE Server shall:

1. verify the identity of the VAL server and determine if the VAL server is authorized to subscribe to the location accuracy performance analytics event; and
2. if the VAL server:
 - a. is not authorized, the ADAE Server shall respond to the VAL server with an appropriate error status code; or
 - b. is authorized, the ADAE Server shall create a new "Individual location accuracy event subscription" resource and respond to the VAL server with an HTTP "201 Created" status code, including a Location header field containing the URI for the created "Individual location accuracy event subscription" and the response body including the LocAccurSub data structure containing a representation of the created resource as defined in clause 7.10.4.2.

5.11.4.2.3 Notify_Location_Accuracy_Analytics

5.11.4.2.3.1 General

This service operation is used by the ADAE Server to send notification to the VAL server with the location accuracy performance analytics event subscription to the ADAE Server.

5.11.4.2.3.2 Notifying location accuracy performance analytics event using Notify_Location_Accuracy_Analytics service operation

To notify location accuracy performance analytics event, the ADAE Server shall send an HTTP POST request with a Request-URI according to the pattern "{notiUri}" and with a body containing data type LocAccurNotif as defined in clause 7.10.4.4.2.3.

Upon receipt of the HTTP POST request, the VAL server shall respond to the ADAE Server:

1. if the request is successfully processed, a "204 No Content" status code and process the event notification; or
2. if errors occur when processing the request, an appropriate error response as specified in clause 7.10.4.5.

5.11.4.2.4 Unsubscribe_Location_Accuracy_Analytics

5.11.4.2.4.1 General

This service operation is used by the VAL server to unsubscribe from the location accuracy performance analytics event.

5.11.4.2.4.2 Unsubscribing from location accuracy performance analytics event using Unsubscribe_Location_Accuracy_Analytics service operation

To unsubscribe from location accuracy performance analytics event, the VAL server shall send an HTTP DELETE request to the resource representing the event in the ADAE Server as specified in clause 7.10.4.2.3.2.

Upon receiving the HTTP DELETE request:

1. the ADAE Server shall verify the identity of the VAL server and check if the VAL server is authorized to unsubscribe from the location accuracy performance analytics event associated with the resource URI "{apiRoot}/ss-adae-laa/<apiVersion>/location-accuracy/{locAccId}";
2. if the VAL server is authorized to unsubscribe from the location accuracy performance analytics event, the ADAE Server shall delete the resource pointed by the resource URI "{apiRoot}/ss-adae-laa/<apiVersion>/location-accuracy/{locAccId}";
3. if the request is successfully processed, the ADAE Server shall respond to the VAL server with a "204 No Content" status code; and
4. if errors occur when processing the request, the ADAE Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.10.4.5.

5.11.5 SS_ADAE_ServiceApiAnalytics API

5.11.5.1 Service Description

5.11.5.1.1 Overview

The SS_ADAE_ServiceApiAnalytics API, as defined 3GPP TS 23.436 [38], allows the VAL server via ADAE-S reference point to subscribe to service API analytics event to the ADAE Server.

5.11.5.2 Service Operations

5.11.5.2.1 Introduction

The service operation defined for SS_ADAE_ServiceApiAnalytics API is shown in the table 5.11.5.2.1-1.

Table 5.11.5.2.1-1: Operations of the SS_ADAE_ServiceApiAnalytics API

Service operation name	Description	Initiated by
Subscribe_Service_API_Analytics	This service operation is used by VAL server to subscribe to the event of the service API analytics.	VAL Server
Notify_Service_API_Analytics	This service operation is used by ADAE Server to notify about the service API analytics.	ADAE Server
Unsubscribe_Service_API_Analytics	This service operation is used by VAL server to unsubscribe from the event of the service API analytics.	VAL Server

5.11.5.2.2 Subscribe_Service_API_Analytics

5.11.5.2.2.1 General

This service operation is used by the VAL server for service API analytics event subscription to the ADAE Server.

5.11.5.2.2.2 Subscribing to service API analytics event using Subscribe_Service_API_Analytics service operation

To subscribe to service API analytics event, the VAL server shall send an HTTP POST request with a Request-URI according to the pattern "{apiRoot}/ss-adae-sa/<apiVersion>/service-api" and with a body containing data type SrvApiSub as defined in clause 7.10.5.4.2.2.

Upon receipt of the HTTP POST request, the ADAE Server shall:

1. verify the identity of the VAL server and determine if the VAL server is authorized to subscribe to the service API analytics event; and
2. if the VAL server:
 - a. is not authorized, the ADAE Server shall respond to the VAL server with an appropriate error status code; or
 - b. is authorized, the ADAE Server shall create a new "Individual service API event subscription" resource and respond to the VAL server with an HTTP "201 Created" status code, including a Location header field containing the URI for the created "Individual service API event subscription" and the response body including the SrvApiSub data structure containing a representation of the created resource as defined in clause 7.10.5.2.

5.11.5.2.3 Notify_Service_API_Analytics

5.11.5.2.3.1 General

This service operation is used by the ADAE Server to send notification to the VAL server with the service API analytics event subscription to the ADAE Server.

5.11.5.2.3.2 Notifying service API analytics event using Notify_Service_API_Analytics service operation

To notify service API analytics event, the ADAE Server shall send an HTTP POST request with a Request-URI according to the pattern "{notiUri}" and with a body containing data type SrvApiNotif as defined in clause 7.10.5.4.2.3.

Upon receipt of the HTTP POST request, the VAL server shall respond to the ADAE Server with:

1. if the request is successfully processed, a "204 No Content" status code and process the event notification; or
2. if errors occur when processing the request, an appropriate error response as specified in clause 7.10.5.5.

5.11.5.2.4 Unsubscribe_Service_API_Analytics

5.11.5.2.4.1 General

This service operation is used by the VAL server to unsubscribe from the service API analytics event.

5.11.5.2.4.2 Unsubscribing from service API analytics event using Unsubscribe_Service_API_Analytics service operation

To unsubscribe from service API analytics event, the VAL server shall send an HTTP DELETE request to the resource representing the event in the ADAE Server as specified in clause 7.10.5.2.3.2.

Upon receiving the HTTP DELETE request:

1. the ADAE Server shall verify the identity of the VAL server and check if the VAL server is authorized to unsubscribe from the service API analytics event associated with the resource URI "{apiRoot}/ss-adae-sa/<apiVersion>/service-api/{srvApiId}";
2. if the VAL server is authorized to unsubscribe from the service-api analytics event, the ADAE Server shall delete the resource pointed by the resource URI "{apiRoot}/ss-adae-sa/<apiVersion>/service-api/{srvApiId}";
3. if the request is successfully processed, the ADAE Server shall respond to the VAL server with a "204 No Content" status code; and
4. if errors occur when processing the request, the ADAE Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.10.5.5.

5.11.6 SS_ADAE_SliceUsagePatternAnalytics API

5.11.6.1 Service Description

5.11.6.1.1 Overview

The SS_ADAE_SliceUsagePatternAnalytics API allows the VAL server and the NSCE server to subscribe to slice usage pattern analytics events and to request slice usage statistics.

5.11.6.2 Service Operations

5.11.6.2.1 Introduction

The service operations defined for the SS_ADAE_SliceUsagePatternAnalytics API is shown in table 5.11.6.2.1-1.

Table 5.11.6.2.1-1: Operations of the SS_ADAE_SliceUsagePatternAnalytics API

Service operation name	Description	Initiated by
Subscribe_Slice_Usage_Pattern_Analytics	This service operation is used by the VAL Server or the NSCE server to subscribe to the slice usage pattern analytics.	VAL Server, NSCE Server
Notify_Slice_Usage_Pattern_Analytics	This service operation is used by the ADAE Server to notify about slice usage pattern analytics.	ADAE Server
Unsubscribe_Slice_Usage_Pattern_Analytics	This service operation is used by the VAL Server or the NSCE server to unsubscribe from slice usage pattern analytics.	VAL Server, NSCE Server
Get_Slice_Usage_Stats	This service operation is used by the VAL Server or the NSCE server to request slice usage statistics.	VAL Server, NSCE Server

5.11.6.2.2 Subscribe_Slice_Usage_Pattern_Analytics

5.11.6.2.2.1 General

This service operation is used by the service consumer to subscribe to slice usage pattern analytics to the ADAE server.

5.11.6.2.2.2 Subscribing to slice usage pattern analytics using the Subscribe_Slice_Usage_Pattern_Analytics service operation

To subscribe to slice usage pattern analytics, the service consumer shall send an HTTP POST request to the ADAES with a Request-URI according as "{apiRoot}/ss-adae-sup/<apiVersion>/slice-usage-pattern", with the body containing the data type SUPSub as defined in clause 7.10.6.4.2.2.

Upon receipt of the HTTP POST request, the ADAES shall:

1. verify the identity of the service consumer and determine if the service consumer is authorized to subscribe to the slice usage pattern analytics event; and
2. if the service consumer:
 - a. is not authorized, the ADAES shall respond with an appropriate error status code; or
 - b. is authorized, the ADAES shall create a new "Individual slice usage pattern event subscription" resource and respond to the service consumer with an HTTP "201 Created" status code, including a Location header field containing the URI for the created resource and the response body including the SUPSub data structure containing a representation of the created resource.

If errors occur when processing the HTTP POST request, the ADAES shall send an HTTP error response as specified in clause 7.10.6.5.

5.11.6.2.3 Notify_Slice_Usage_Pattern_Analytics

5.11.6.2.3.1 General

This service operation is used by the ADAE server to send a notification about slice usage pattern analytics to a previously subscribed service consumer.

NOTE: The steps performed by the ADAE server for data collection, interaction with other entities, and generation of the analytics, which take place between the subscription to slice usage pattern analytics and the sending of the respective notification, are described in 3GPP TS 23.436 [38].

5.11.6.2.3.2 Notifying slice usage pattern analytics using the Notify_Slice_Usage_Pattern_Analytics service operation

To notify about slice usage pattern analytics, the ADAE server shall send an HTTP POST request to the service consumer at the notification URI that was provided during the subscription, with a body containing the data type SUPNotif as defined in clause 7.10.6.4.2.3.

Upon receipt of the HTTP POST request, the service consumer shall process the event notification and in case of success it shall respond with the HTTP "204 No Content" status code.

If errors occur when processing the HTTP POST request, the service consumer shall send an HTTP error response as specified in clause 7.10.6.5.

5.11.6.2.4 Unsubscribe_Slice_Usage_Pattern_Analytics

5.11.6.2.4.1 General

This service operation is used by the service consumer to unsubscribe from slice usage pattern analytics events.

5.11.6.2.4.2 Unsubscribing from slice usage pattern analytics events using the Unsubscribe_Slice_Usage_Pattern_Analytics service operation

To unsubscribe from slice usage pattern analytics events, the service consumer shall send to the ADAES an HTTP DELETE request with "{apiRoot}/ss-adae-sup/<apiVersion>/slice-usage-pattern/{subscriptionId}" as Resource URI, where "{subscriptionId}" is the identifier of the existing subscription that is to be deleted.

Upon receiving the HTTP DELETE request, if the ADAES authorizes the service consumer and successfully performs the deletion of the indicated subscription, the ADAES shall remove the corresponding subscription and respond with the HTTP "204 No Content" status code.

If errors occur when processing the HTTP DELETE request, the ADAES shall send an HTTP error response as specified in clause 7.10.6.5.

5.11.6.2.5 Get_Slice_Usage_Stats

5.11.6.2.5.1 General

This service operation is used by the service consumer to retrieve slice usage statistics.

5.11.6.2.5.2 Retrieving slice usage statistics using the Get_Slice_Usage_Stats service operation

To retrieve slice usage statistics, the service consumer shall invoke the Subscribe_Slice_Usage_Pattern_Analytics service operation as described in 5.11.6.2.2.2, requesting immediate and one-time reporting of historical statistics as described in clause 7.10.6.4.2.2.

5.11.7 SS_ADAE_EdgeLoadAnalytics API

5.11.7.1 Service Description

5.11.7.1.1 Overview

The SS_ADAE_EdgeLoadAnalytics API corresponding to SS_ADAE_edge_analytics API defined in 3GPP TS 23.436 [38], allows a VAL server via ADAE-S reference point or EAS to subscribe and unsubscribe from edge load events to receive notifications from the ADAE server for edge load analytics and for getting notified when analytics are derived, or to request and get response from the ADAE server for edge load analytics data.

5.11.7.2 Service Operations

5.11.7.2.1 Introduction

The service operations defined for the SS_ADAE_EdgeLoadAnalytics API are shown in the table 5.11.7.2.1-1.

Table 5.11.7.2.1-1: Operations of the SS_ADAE_EdgeLoadAnalytics API

Service operation name	Description	Initiated by
Subscribe_Edge_Load	This service operation is used by analytics consumer (VAL Server, EAS, EES) to subscribe for edge load events from ADAE servers.	VAL Server, EAS, EES
Unsubscribe_Edge_Load	This service operation is used by analytics consumer to unsubscribe for edge load events from ADAE servers.	VAL Server, EAS, EES
Notify_Edge_Load	This service operation is used by ADAE servers to send the notifications to the analytics consumer.	ADAEs
Get_Edge_Load_Data	This service operation is used by analytics consumer to retrieve edge load analytics data from ADAE server.	VAL Server, EAS, EES

5.11.7.2.2 Subscribe_Edge_Load

5.11.7.2.2.1 General

This service operation is used by an analytics consumer (VAL server, EAS, EES) to subscribe to the events for edge load analytics and for getting notified when analytics are derived.

5.11.7.2.2.2 Subscribing to edge load events using Subscribe_Edge_Load service operation

To subscribe to edge load events, the analytics consumer (VAL server, EAS, EES) shall send an HTTP POST message to the ADAE server. The body of the HTTP POST message shall include EdgeSub data type as specified in clause 7.10.7.4.2.2.

Upon receiving the above described HTTP POST message, the ADAE Server shall:

1. verify the identity of the analytics consumer and check if the Consumer is authorized to subscribe to the events mentioned in the HTTP POST message;
2. if the analytics consumer is authorized to subscribe to the events, the ADAE server shall:
 - a. verify the provided identifier(s) in the request;

- b. upon successful verification of the provided identifier(s) and successful processing of the request, create a new resource as specified in clause 7.10.7.2.1;
- c. return the created resource representation and the created Resource URI in the response message; and
- d. if the ADAE server is unable to satisfy the request, the ADAE server shall respond to the analytics consumer with an appropriate error status code as defined in clause 7.10.7.5.

5.11.7.2.3 Notify_Edge_Load

5.11.7.2.3.1 General

This service operation is used by the ADAE server to send notifications to the analytics consumer.

5.11.7.2.3.2 Notifying edge load events using Notify_Edge_Load service operation

To notify the edge load events, the ADAE server shall send an HTTP POST message using the Notification Destination URI received in the subscription request. The body of the HTTP POST message shall include an Event Notification and Resource URI.

Upon receiving the HTTP POST request message, the VAL Server shall:

1. process the edge load analytics events notification;
2. upon success, respond to the ADAE Server with a "204 No Content" status code; and
3. if errors occur when processing the request, the VAL Server shall respond to the ADAE Server with an appropriate error response as specified in clause 7.10.3.5.

5.11.7.2.4 Unsubscribe_Edge_Load

5.11.7.2.4.1 General

This service operation is used by an analytics consumer to unsubscribe from the edge load events for edge load analytics.

5.11.7.2.4.2 Unsubscribing from edge load events using Unsubscribe_Edge_Load service operation

To unsubscribe for edge load events, the analytics consumer shall send an HTTP DELETE message to the resource representing the event in the ADAE server as specified in clause 7.10.7.2.3.3.2.

Upon receiving the HTTP DELETE message, the ADAE server shall:

1. verify the identity of the analytics consumer and check if the analytics consumer is authorized to Unsubscribe from the event associated with the Resource URI; and
2. if the analytics consumer is authorized to unsubscribe from the events, the ADAE server shall delete the resource pointed by the Resource URI.

5.11.7.2.5 Get_Edge_Load_Data

5.11.7.2.5.1 General

This service operation is used by the service consumer to retrieve edge load analytics data.

5.11.7.2.5.2 Retrieving edge load analytics data using the Get_Edge_Load_Data service operation

To retrieve edge load analytics data, the service consumer shall invoke the Subscribe_Edge_Load service operation as described in 5.11.7.2.2.2, requesting immediate and one-time reporting of edge load analytics data as described in clause 7.10.7.4.2.2.

5.11.8 SS_AADRF_DataManagement API

5.11.8.1 Service Description

5.11.8.1.1 Overview

The SS_AADRF_DataManagement API corresponding to SS_AADRF_Data_Collection, SS_AADRF_Historical_serviceAPI_logs, SS_AADRF_NetworkSlice_data, SS_AADRF_EdgeData_Collection, SS_AADRF_Location_Accuracy, SS_AADRF_ServerToServer_Analytics and SS_AADRF_UE_RAT_Connectivity_Analytics services as defined in 3GPP TS 23.436 [38], is provided by the Application layer - Analytical Data Repository Function (A-ADRF) and allows ADAE server to retrieve the offline analytics/data from the A-ADRF.

5.11.8.2 Service Operations

5.11.8.2.1 Introduction

The following services are specified for the A-ADRF.

Table 5.11.8.2.1-1: Services provided by A-ADRF

Service Name	Description	Service Operations	Operation Semantics	Example Consumer(s)
SS_AADRF_DataManagement (NOTE)	This service enables the NF service consumers to subscribe to/unsubscribe from notifications for offline analytics/data from the A-ADRF and request data storage.	Data_Storage	Request/Response	ADAE server, A-DCCF
		Subscribe	Subscribe / Notify	ADAE server
		Unsubscribe		
		Notify		
NOTE: This service implements the AADRF_Historical_serviceAPI_logs, SS_AADRF_NetworkSlice_data, SS_AADRF_Location_Accuracy, SS_AADRF_ServerToServer_Analytics and SS_AADRF_UE_RAT_Connectivity_Analytics services as specified in 3GPP TS 23.436 [38] by using immediate and one-time reporting requirement.				

5.11.8.2.2 SS_AADRF_DataManagement_Subscribe service operation

5.11.8.2.2.1 General

This service operation is used by an ADAE server to subscribe the offline analytics/data from the A-ADRF.

5.11.8.2.2.2 Subscribing to the offline analytics/data using the SS_AADRF_DataManagement_Subscribe service operation

In order to subscribe to the offline analytics/data from the A-ADRF, the consumer shall send an HTTP POST message to the A-ADRF, with "{apiRoot}/ss-aadr-f-datamanagement/<apiVersion>/subscriptions" as Resource URI, to create a subscription for an "Individual A-ADRF Data Management Subscription" according to the DataManageSub data type contained in the message body as defined in clause 7.10.8.5.2.2.

Upon receiving the HTTP POST message as described above, the A-ADRF shall:

1. verify the identity of the consumer and check if the consumer is authorized to retrieve the requested analytics/data;
2. if the consumer is authorized, the A-ADRF shall create a new "Individual A-ADRF Data Management Subscription" resource and respond to the consumer with an HTTP "201 Created" status code, including a Location header field containing the URI for the created "Individual A-ADRF Data Management Subscription"

resource and the response body including the DataManageSub data structure containing a representation of the created resource as defined in clause 7.10.8.5.2.2;

and

3. if the A-ADRF is unable to satisfy the request, the A-ADRF shall respond to the consumer with an appropriate error status code as specified in clause 7.10.8.5.

5.11.8.2.3 SS_AADRF_DataManagement_Notify service operation

5.11.8.2.3.1 General

This service operation is used by an A-ADRF to send a notification about the offline analytics/data to a previously subscribed service consumer.

5.11.8.2.3.2 Notifying the offline analytics/data using the SS_AADRF_DataManagement_Notify service operation

To notify about offline analytics/data, the A-ADRF shall send an HTTP POST request to the service consumer at the notification URI that was provided during the subscription, with a body containing the data type DataManageNotification as defined in clause 7.10.8.5.2.6.

Upon receipt of the HTTP POST request, the service consumer shall process the event notification and in case of success it shall respond with the HTTP "204 No Content" status code.

If errors occur when processing the HTTP POST request, the service consumer shall send an HTTP error response as specified in clause 7.10.8.6.

If the service consumer determines the received HTTP POST request needs to be redirected, the service consumer shall send an HTTP redirect response as defined in clause 7.10.8.4.2.

5.11.8.2.4 SS_AADRF_DataManagement_Unsubscribe

5.11.8.2.4.1 General

This service operation is used by the service consumer to unsubscribe from the offline analytics/data events.

5.11.8.2.5 Data_Storage service operation

5.11.8.2.5.1 General

This service operation is used by a service consumer to store data at A-ADRF.

5.11.8.2.5.2 Requesting to store data using the Data_Storage service operation

In order to store data at A-ADRF, the consumer shall send an HTTP POST request (i.e., custom operation "Store") to the A-ADRF as specified in clause 7.10.8.3.2. The request body shall include the DataStoreReq data structure defined in clause 7.10.8.5.2.9.

Upon receiving the HTTP POST message as described above, the A-ADRF shall:

1. verify the identity of the consumer and check if the consumer is authorized to store the data;
2. if the consumer is authorized, the A-ADRF shall process the request:
 - a. if "subDataStore" attribute is provided within DataStoreReq data structure as described in clause 8.10.2.1 of 3GPP TS 29.436 [38];
 - b. if "dirStorage" attribute is provided within DataStoreReq data structure as described in clause 8.10.2.2 of 3GPP TS 29.436 [38]; and

- c. respond to the consumer with an HTTP "200 OK" status code with DataStoreResp data structure defined in clause 7.10.8.5.2.15.

and

- 3. if the A-ADRF is unable to satisfy the request, the A-ADRF shall respond to the consumer with an appropriate error status code as specified in clause 7.10.8.5.

5.11.9 SS_ADAE_LocationRelatedUeGroupAnalytics API

5.11.9.1 Service Description

The SS_ADAE_LocationRelatedUeGroupAnalytics API, as defined 3GPP TS 23.436 [38], enables a service consumer to:

- create/update/delete a Location-Related UE Group Analytics Subscription; and
- receive Location-Related UE Group Analytics Subscription related event(s) notifications.

5.11.9.2 Service Operations

5.11.9.2.1 Introduction

The service operations defined for the SS_ADAE_LocationRelatedUeGroupAnalytics are shown in the table 5.11.9.2.1-1.

Table 5.11.9.2.1-1: Operations of the SS_ADAE_LocationRelatedUeGroupAnalytics

Service operation name	Description	Initiated by
SS_ADAE_LocationRelatedUeGroupAnalytics_Subscribe	This service operation is used by the service consumer to create/update/delete a Location-Related UE Group Analytics Subscription.	e.g., LM Server
SS_ADAE_LocationRelatedUeGroupAnalytics_Notify	This service operation is used by the ADAE Server to notify a previously subscribed service consumer on Location-Related UE Group Analytics Subscription related event(s).	ADAE Server

5.11.9.2.2 SS_ADAE_LocationRelatedUeGroupAnalytics_Subscribe

5.11.9.2.2.1 General

This service operation is used by a service consumer to request the creation of a Location-Related UE Group Analytics Subscription at the ADAE Server.

The following procedures are supported by the "SS_ADAE_LocationRelatedUeGroupAnalytics_Subscribe" service operation:

- Location-Related UE Group Analytics Subscription Creation.
- Location-Related UE Group Analytics Subscription Update.
- Location-Related UE Group Analytics Subscription Deletion.

5.11.9.2.2.2 Location-Related UE Group Analytics Subscription Creation

To subscribe to location-related UE group analytics related event(s) reporting, the service consumer shall send an HTTP POST message to the ADAES targeting the URI of the "Location-Related UE Group Analytics Subscriptions" collection resource, with the request body containing the LocRelUeGroupSub data structure as defined in clause 7.10.9.4.2.2.

Upon reception of the HTTP POST request message, the ADAE Server shall:

- verify the identity of the service consumer and determine if the service consumer is authorized to subscribe to location-related UE group analytics related event(s) reporting; and
- if the service consumer is authorized and upon successful processing of the request, the ADAE Server shall respond with an HTTP "201 Created" status code with the response body including a representation of the created "Individual Location-Related UE Group Analytics Subscription" resource within the LocRelUeGroupSub data structure, and an HTTP Location header field containing the URI for the created resource;

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.10.9.7.

5.11.9.2.2.3 Location-Related UE Group Analytics Subscription Deletion

To unsubscribe from location-related UE group analytics related event(s) reporting, the service consumer shall send an HTTP DELETE request targeting the URI of the corresponding "Individual Location-Related UE Group Analytics Subscription" resource.

Upon reception of the HTTP DELETE request, the ADAE Server shall:

- verify the identity of the service consumer and check if the service consumer is authorised to terminate the targeted "Individual Location-Related UE Group Analytics Subscription" resource;
- if the service consumer is authorized and upon successful processing of the request, the ADAE Server shall delete the corresponding subscription and respond with an HTTP "204 No Content" status code.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 7.10.9.7.

5.11.9.2.2.4 Location-Related UE Group Analytics Subscription Update

In order to request the update of an existing location-related UE group analytics subscription, the service consumer shall send an HTTP PUT/PATCH request to the ADAE Server, targeting the corresponding "Individual Location-Related UE Group Analytics Subscription" resource, with the request body including either:

- the updated representation of the resource within the LocRelUeGroupSub data structure, in case the HTTP PUT method is used; or
- the requested modifications to the resource within the LocRelUeGroupSubPatch data structure, in case the HTTP PATCH method is used.

Upon reception of the HTTP DELETE request, the ADAES Server shall:

- verify the identity of the service consumer and check if the service consumer is authorised to update the targeted "Individual Location-Related UE Group Analytics Subscription" resource;
- if the service consumer is authorized and upon successful processing of the request, update the targeted "Individual Location-Related UE Group Analytics Subscription" resource accordingly and respond with either:
 - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Location-Related UE Group Analytics Subscription" resource within the LocRelUeGroupSub data structure; or
 - an HTTP "204 No Content" status code.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 7.10.9.7.

5.11.9.2.3 SS_ADAE_LocationRelatedUeGroupAnalytics_Notify

5.11.9.2.3.1 General

This service operation is used by the ADAE Server to notify on Location-Related UE Group Analytics related event(s).

The following procedures are supported by the "SS_ADAE_LocationRelatedUeGroupAnalytics_Notify" service operation:

- Location-Related UE Group Analytics Event Notification.

5.11.9.2.3.2 Location-Related UE Group Analytics Event Notification

To notify on location-related UE group analytics related event(s), the ADAE Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation of the corresponding Location-Related UE Group Analytics Subscription using the procedures defined in clauses 5.11.9.2.2, and the request body containing the LocRelUeGroupNotif data structure as defined in clause 7.10.9.4.2.3.

Upon success, the service consumer shall respond to the ADAE Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.10.9.7.

5.11.10 SS_ADAE_CollisionDetectionAnalytics API

5.11.10.1 Service Description

The SS_ADAE_CollisionDetectionAnalytics API, as defined 3GPP TS 23.434 [2], enables a service consumer to:

- create/update/delete a Collision Detection Analytics Subscription; and
- receive Collision Detection Analytics Subscription related event(s) notification.

5.11.10.2 Service Operations

5.11.10.2.1 Introduction

The service operations defined for the SS_ADAE_CollisionDetectionAnalytics are shown in the table 5.11.10.2.1-1.

Table 5.11.10.2.1-1: Operations of the SS_ADAE_CollisionDetectionAnalytics

Service operation name	Description	Initiated by
Subscribe	This service operation is used by the service consumer to create/update/delete Collision Detection Analytics Subscription.	VAL server, LM Server, UAE server, UASS
Notify	This service operation is used by the ADAE Server to notify about the Collision Detection Analytics event(s).	ADAE Server

5.11.10.2.2 Subscribe

5.11.10.2.2.1 General

This service operation is used by a service consumer to request the creation of a Collision Detection Analytics Subscription at the ADAE Server.

The following procedures are supported by the "Subscribe" service operation:

- Collision Detection Analytics Subscription Creation.
- Collision Detection Analytics Subscription Update.
- Collision Detection Analytics Subscription Deletion.

5.11.10.2.2.2 Collision Detection Analytics Subscription Creation

To subscribe to collision detection analytics, the service consumer shall send an HTTP POST message to the ADAES with a Request-URI set to "{apiRoot}/ss-adae-cda/<apiVersion>/subscriptions", and the body containing the CollisionDetectionSub data structure as defined in clause 7.10.10.4.2.2.

Upon reception of the HTTP POST request message, the ADAES shall:

1. verify the identity of the service consumer and determine if the service consumer is authorized to subscribe to collision detection analytics event; and
2. if the service consumer:
 - a. is not authorized, the ADAES shall respond to an appropriate error status code; or
 - b. is authorized, the ADAES shall create a new "Individual Collision detection analytics Subscription" resource and respond to the service consumer with an HTTP "201 Created" status code, including a Location header field containing the URI for the created resource and the response body including the CollisionDetectionSub data structure containing a representation of the created resource.

If errors occur when processing the HTTP POST request, the ADAES shall send an appropriate HTTP error response as specified in clause 7.10.10.5.

5.11.10.2.2.3 Collision Detection Analytics Subscription Deletion

To unsubscribe from Collision Detection Analytics Event(s), the service consumer shall send an HTTP DELETE request with "{apiRoot}/ss-adae-cda/<apiVersion>/subscriptions/{subscriptionId}" as Resource URI, where "{subscriptionId}" is the identifier of the existing subscription that is to be deleted.

Upon receiving the HTTP DELETE request, if the ADAES authorizes the service consumer and successfully performs the deletion of the indicated subscriptionshall:

1. verify the identity of the service consumer and check if service consumer is authorised to terminate the targeted "Individual Collision Detection Analytics Subscription" associated with the resource URI;
2. if the service consumer is authorized to unsubscribe from collision detection analytics events, the ADAES shall remove the corresponding subscription and respond with the HTTP "204 No Content" status code.

If errors occur when processing the HTTP DELETE request, the ADAES shall send an appropriate HTTP error response as specified in clause 7.10.10.5.

5.11.10.2.2.4 Collision Detection Analytics Subscription Update

In order to request the update of an existing collision detection analytics subscription, the service consumer shall send an HTTP PUT/PATCH request to the ADAE Server, targeting the corresponding "Individual Collision Detection Analytics Subscription" resource, with the request body including either:

- the updated representation of the resource within the CollisionDetectionSub data structure, in case the HTTP PUT method is used; or
- the requested modifications to the resource within the CollisionDetectionSubPatch data structure, in case the HTTP PATCH method is used.

Upon success, the ADAES Server shall update the targeted "Individual Collision detection analytics Subscription" resource accordingly and respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Collision detection analytics Subscription" resource within the CollisionDetectionSub data structure; or
- an HTTP "204 No Content" status code.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 7.10.10.7.

5.11.10.2.3 Notify

5.11.10.2.3.1 General

This service operation is used by the ADAE Server to notify on Collision Detection Analytics event(s).

The following procedures are supported by the "Notify" service operation:

- Collision Detection Analytics Event Notification.

5.11.10.2.3.2 Collision Detection Analytics Event Notification

To notify about Collision Detection Analytics Event(s), the ADAES shall send an HTTP POST request to the service consumer at the notification URI that was provided during subscription, and the body containing the CollisionDetectionNotif data structure as defined in clause 7.10.10.4.2.3.

Upon receiving the HTTP POST request message, the service consumer shall process the collision detection analytics events notification, and in case of success, respond with the HTTP "204 No Content" status code.

If errors occur when processing the HTTP POST request, the service consumer shall send an appropriate HTTP error response as specified in clause 7.10.10.5.

5.11.11 SS_ADAE_AIMLMemberCapabilityAnalytics API

5.11.11.1 Service Description

The SS_ADAE_AIMLMemberCapabilityAnalytics service exposed by the ADAE Server enables a service consumer to:

- create/update/delete AIML Member Capability Analytics Subscription; and
- receive AIML Member Capability Analytics Notifications.

5.11.11.2 Service Operations

5.11.11.2.1 Introduction

The service operations defined for the SS_ADAE_AIMLMemberCapabilityAnalytics service are shown in table 5.11.11.2.1-1.

Table 5.11.11.2.1-1: SS_ADAE_AIMLMemberCapabilityAnalytics Service Operations

Service Operation Name	Description	Initiated by
SS_ADAE_AIML_MemberCapabilityAnalytics_Subscribe	This service operation enables a service consumer to create a AIML member capability analytics Subscription.	e.g. VAL Server, AIMLE Server
SS_ADAE_AIML_MemberCapabilityAnalytics_Update	This service operation enables a service consumer to update an existing AIML member capability analytics Subscription.	e.g. VAL Server, AIMLE Server
SS_ADAE_AIML_MemberCapabilityAnalytics_Unsubscribe	This service operation enables a service consumer to delete an existing AIML member capability analytics Subscription.	e.g. VAL Server, AIMLE Server
SS_ADAE_AIML_MemberCapabilityAnalytics_Notify	This service operation enables a service consumer to receive AIML member capability analytics notifications.	ADAE Server

5.11.11.2.2 SS_ADAE_AIML_MemberCapabilityAnalytics_Subscribe

5.11.11.2.2.1 General

This service operation is used by a service consumer to request the creation of AIML Member Capability Analytics Subscription at the ADAE Server.

The following procedures are supported by the "SS_ADAE_AIML_MemberCapabilityAnalytics_Subscribe" service operation:

- AIML Member Capability Analytics Subscription Creation.

This service operation is used by the service consumer for AIML Member Capability Analytics Subscription to the ADAE Server.

5.11.11.2.2.2 AIML Member Capability Analytics Subscription Creation

Figure 5.11.11.2.2.2-1 depicts a scenario where a service consumer sends a request to the ADAE Server to request the creation of AIML Member Capability Analytics Subscription (see also clause 8.16 of 3GPP°TS°23.436°[38]).

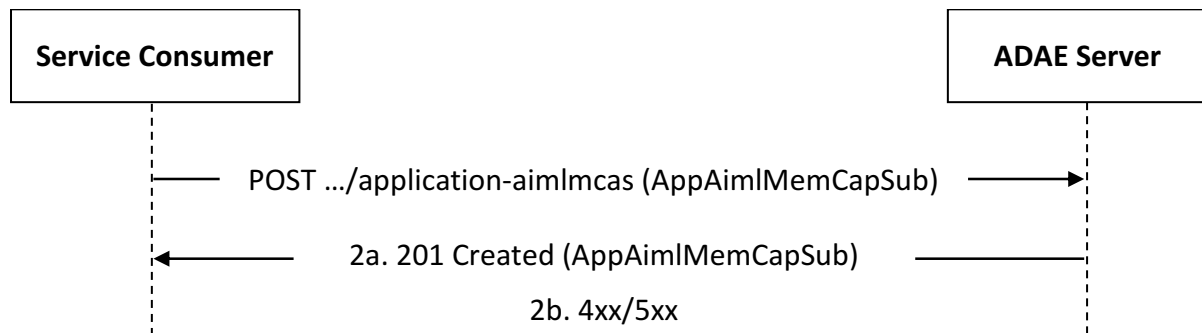


Figure 5.11.11.2.2.2-1: Procedure for AIML Member Capability Analytics Subscription Creation

1. In order to subscribe to AIML Member Capability Analytics reporting, the service consumer shall send an HTTP POST request to the ADAE Server targeting the URI of the "AIML Member Capability Analytics Subscriptions" collection resource, with the request body including the AppAimlMemCapSub data structure.
- 2a. Upon success, the ADAE Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created "Individual AIML Member Capability Analytics Subscription" resource within the AppAimlMemCapSub data structure, and an HTTP "Location" header field containing the URI of the created resource.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.10.11.6.

5.11.11.2.3 SS_ADAE_AIML_MemberCapabilityAnalytics_Unsubscribe

5.11.11.2.3.1 General

This service operation is used by a service consumer to request the deletion of AIML Member Capability Analytics Subscription at the ADAE Server.

The following procedures are supported by the "SS_ADAE_AIML_MemberCapabilityAnalytics_Unsubscribe" service operation:

- AIML Member Capability Analytics Subscription Deletion.

5.11.11.2.3.2 AIML Member Capability Analytics Subscription Deletion

Figure 5.5.2.3.2-1 depicts a scenario where a service consumer sends a request to the ADAE Server to delete an existing AIML Member Capability Analytics Subscription (see also clause 8.16 of 3GPP°TS°23.436°[38])

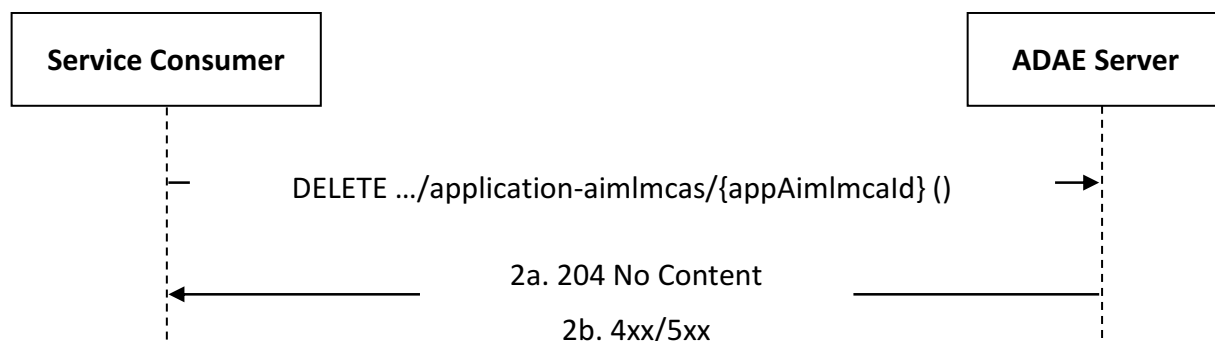


Figure 5.5.2.3.2-1: Procedure for AIML Member Capability Analytics Subscription Deletion

1. In order to request the deletion of an existing AIML Member Capability Analytics Subscription, the service consumer shall send an HTTP DELETE request to the ADAE Server targeting the URI of the corresponding "Individual AIML Member Capability Analytics Subscription" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

2a. Upon success, the ADAE Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 7.10.11.6.

5.11.11.2.4 SS_ADAE_AIML_MemberCapabilityAnalytics_Notify

5.11.11.2.4.1 General

This service operation is used by a ADAE Server to notify a previously subscribed service consumer on:

- AIML Member Capability Analytics report(s).

The following procedures are supported by the "SS_ADAE_AIML_MemberCapabilityAnalytics_Notify" service operation:

- AIML Member Capability Analytics Notification.

5.11.11.2.4.2 AIML Member Capability Analytics Notification

Figure 5.11.11.2.3.2-1 depicts a scenario where the ADAE Server sends a request to notify a previously subscribed service consumer on AIML Member Capability Analytics report(s) (see also clause 8.16 of 3GPP TS 23.436 [38])

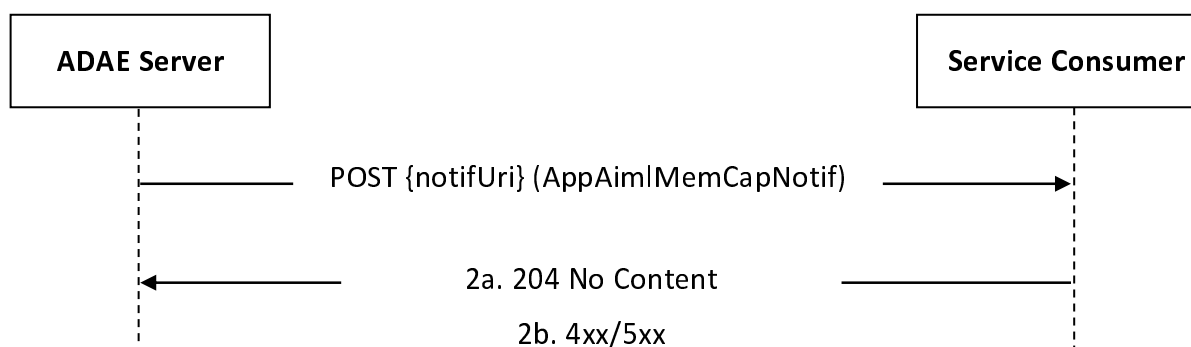


Figure 5.5.2.5.4-1: Procedure for AIML Member Capability Analytics Notification

1. In order to notify a previously subscribed service consumer on AIML Member Capability Analytics report(s), the ADAE Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation of the corresponding AIML Member Capability Analytics Subscription using the procedures defined in clauses 5.11.11.2.2, and the request body including the AppAimlMemCapNotif data structure.
- 2a. Upon success, the service consumer shall respond to the ADAE Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.10.11.6.

5.11.11.2.5 SS_ADAE_AIML_MemberCapabilityAnalytics_Update

5.11.11.2.5.1 General

This service operation is used by a service consumer to request the update of an ADAE_AIML_MemberCapabilityAnalytics Subscription at the ADAE Server.

The following procedures are supported by the "SS_ADAE_AIML_MemberCapabilityAnalytics_Update" service operation:

- AIML Member Capability Analytics Subscription Update.

5.11.11.2.5.2 AIML Member Capability Analytics Subscription Update

Figure 5.5.2.3.2-1 depicts a scenario where a service consumer sends a request to the ADAE Server to request the update of an existing ADAE_AIML_MemberCapabilityAnalytics Subscription (see also clause 8.16 of 3GPP TS 23.436 [38]).

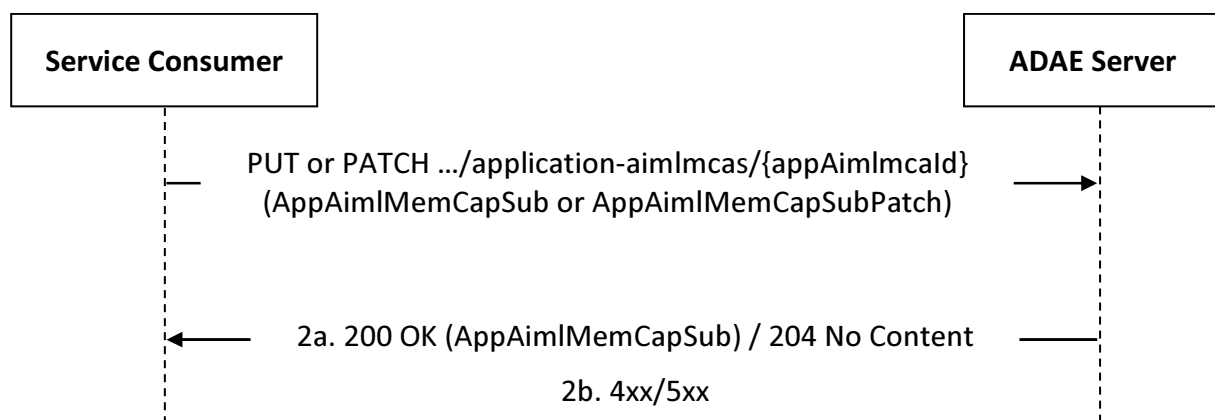


Figure 5.11.11.2.5.2-1: Procedure for AIML Member Capability Analytics Subscription Update

1. In order to request the update of an existing AIML Member Capability Analytics reporting, the service consumer shall send an HTTP PUT/PATCH request to the ADAE Server, targeting the URI of the corresponding "Individual AIML Member Capability Analytics Subscription" resource, with the request body including either:
 - the updated representation of the resource within the AppAimlMemCapSub data structure, in case the HTTP PUT method is used; or
 - the requested modifications to the resource within the AppAimlMemCapSubPatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

- 2a. Upon success, the ADAE Server shall update the targeted "Individual AIML Member Capability Analytics Subscription" resource accordingly and respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual AIML Member Capability Analytics Subscription" resource within the AppAimlMemCapSub data structure; or
- an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 7.10.11.6.

5.11.12 SS_ADCCF_DataCollection API

5.11.12.1 Service Description

The SS_ADCCF_DataCollection API, as defined 3GPP TS 23.434 [2], enables a service consumer to:

- create a Data Collection Subscription; and
- receive Data Collection Subscription related event(s) notification.

5.11.12.2 Service Operations

5.11.12.2.1 Introduction

The service operations defined for the SS_ADCCF_DataCollection are shown in the table 5.11.12.2.1-1.

Table 5.11.12.2.1-1: Operations of the SS_ADCCF_DataCollection

Service operation name	Description	Initiated by
Request	This service operation is used by the service consumer to request data collection.	e.g., ADAE Server
Subscribe	This service operation is used by the service consumer to create/delete Data Collection Subscription.	e.g., ADAE Server
Notify	This service operation is used by the A-DCCF to notify about the Data Collection Subscription event(s).	A-DCCF

5.11.12.2.2 Subscribe

5.11.12.2.2.1 General

This service operation is used by a service consumer to request the creation of a Data Collection Subscription at the A-DCCF.

The following procedures are supported by the "Subscribe" service operation:

- Data Collection Subscription Creation.
- Data Collection Subscription Deletion.

5.11.12.2.2.2 Data Collection Subscription Creation

To subscribe to data collection, the service consumer shall send an HTTP POST message targeting the "Data Collection Subscriptions" resource, and the body containing the DataCollectionSub data structure as defined in clause 7.10.13.4.2.2.

Upon reception of the HTTP POST request message, the A-DCCF shall:

1. verify the identity of the service consumer and determine if the service consumer is authorized to subscribe to data collection event; and

2. if the service consumer authorized, the A-DCCF shall either:
 - a. if both one time reporting and immediate reporting were requested, respond to the service consumer with an HTTP "200 OK" status code with the response body including the DataCollectionResp data structure; or
 - b. create a new "Individual Data Collection Subscription" resource and respond to the service consumer with an HTTP "201 Created" status code, including a Location header field containing the URI for the created resource and the response body including the DataCollectionSub data structure containing a representation of the created resource.

If errors occur when processing the HTTP POST request, the A-DCCF shall send an appropriate HTTP error response as specified in clause 7.10.13.5.

5.11.12.2.2.3 Data Collection Subscription Deletion

To unsubscribe from data collection events, the service consumer shall send an HTTP DELETE request targeting the "Individual Data Collection Subscription" resource.

Upon receiving the HTTP DELETE request, if the A-DCCF authorizes the service consumer and successfully performs the deletion of the indicated subscription shall:

1. verify the identity of the service consumer and check if the service consumer is authorised to terminate the targeted "Individual Data Collection Subscription" associated with the resource URI;
2. if the service consumer is authorized to unsubscribe from data collection events, the A-DCCF shall remove the corresponding subscription and respond with the HTTP "204 No Content" status code.

If errors occur when processing the HTTP DELETE request, the A-DCCF shall send an appropriate HTTP error response as specified in clause 7.10.13.5.

5.11.12.2.3 Notify

5.11.12.2.3.1 General

This service operation is used by the A-DCCF to notify on Data collection event(s).

The following procedures are supported by the "Notify" service operation:

- Data collection Event Notification.

5.11.12.2.3.2 Data collection Event Notification

To notify about data collection events, the A-DCCF shall send an HTTP POST request to the service consumer at the notification URI that was provided during subscription, and the body containing the DataCollectionNotif data structure as defined in clause 7.10.13.6.2.3.

Upon receiving the HTTP POST request message, the service consumer shall process the data collection events notification, and in case of success, respond with the HTTP "204 No Content" status code.

If errors occur when processing the HTTP POST request, the service consumer shall send an appropriate HTTP error response as specified in clause 7.10.13.5.

5.11.13 SS_ADAE_ServerToServerPerformanceAnalytics API

5.11.13.1 Service Description

The SS_ADAE_ServerToServerPerformanceAnalytics API enables a service consumer to:

- create/update/delete a Server to Server Performance Analytics Subscription (see also clause 8.13 of 3GPP TS 23.436 [38]); and
- receive Server to Server Performance Analytics Subscription related event(s) reporting (see also clause 8.13 of 3GPP TS 23.436 [38]).

5.11.13.2 Service Operations

5.11.13.2.1 Introduction

The service operations defined for the SS_ADAE_ServerToServerPerformanceAnalytics API are shown in the table 5.11.13.2.1-1.

Table 5.11.13.2.1-1: SS_ADAE_ServerToServerPerformanceAnalytics Service Operations

Service operation name	Description	Initiated by
SS_ADAE_ServerToServerPerformanceAnalytics_Subscribe	This service operation is used by the service consumer to create/update/delete Server to Server Performance Analytics Subscription.	VAL server, EES
SS_ADAE_ServerToServerPerformanceAnalytics_Notify	This service operation is used by the ADAE Server to notify about the subscribed Server to Server Performance Analytics event(s).	ADAE Server

5.11.13.2.2 Subscribe

5.11.13.2.2.1 General

This service operation is used by a service consumer to request the creation of a Server to Server Performance Analytics Subscription at the ADAE Server.

The following procedures are supported by the "SS_ADAE_ServerToServerPerformanceAnalytics_Subscribe" service operation:

- Server to Server Performance Analytics Subscription Creation.
- Server to Server Performance Analytics Subscription Update.
- Server to Server Performance Analytics Subscription Deletion.

5.11.13.2.2.2 Server to Server Performance Analytics Subscription Creation

To subscribe to Server to Server Performance analytics, the service consumer shall send an HTTP POST message to the ADAES targeting the URI of the "Server to Server Performance analytics Subscriptions" collection resource, with the request body containing the S2SPerfSubsc data structure as defined in clause 7.10.14.6.2.2.

Upon reception of the HTTP POST request message, the ADAE Server shall:

1. verify the identity of the service consumer and determine if the service consumer is authorized to subscribe to Server to Server Performance Analytics event(s) reporting; and
2. if the service consumer is authorized and upon successful processing of the request, the ADAES shall create a new "Individual Server to Server Performance analytics Subscription" resource and respond to the service consumer with an HTTP "201 Created" status code, including a Location header field containing the URI for the created resource and the response body including the S2SPerfSubsc data structure containing a representation of the created resource.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.10.14.7.

5.11.13.2.2.3 Server to Server Performance Analytics Subscription Update

In order to request the update of an existing Server to Server Performance analytics subscription, the service consumer shall send an HTTP PUT/PATCH request to the ADAE Server, targeting the corresponding "Individual Server to Server Performance Analytics Subscription" resource, with the request body including either:

- the updated representation of the resource within the S2SPerfSubsc data structure as defined in clause 7.10.14.6.2.2, in case the HTTP PUT method is used; or

- the requested modifications to the resource within the S2SPerfSubscPatch data structure as defined in clause 7.10.14.6.2.4, in case the HTTP PATCH method is used.

Upon reception of the HTTP PUT/PATCH request message, the ADAE Server shall:

1. verify the identity of the service consumer and determine if the service consumer is authorized to update the targeted "Individual Server to Server Performance Analytics Subscription" resource; and
2. if the service consumer is authorized and upon successful processing of the request, the ADAE Server shall update the targeted "Individual Server to Server Performance analytics Subscription" resource accordingly and respond with either:
 - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Server to Server Performance analytics Subscription" resource within the S2SPerfSubsc data structure; or
 - an HTTP "204 No Content" status code.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 7.10.14.7.

5.11.13.2.2.4 Server to Server Performance Analytics Subscription Deletion

To unsubscribe from Server to Server Performance Analytics event(s) reporting, the service consumer shall send an HTTP DELETE request targeting the URI of the corresponding "Individual Server to Server Performance Analytics Subscription" resource.

Upon reception of the HTTP DELETE request, the ADAE Server shall:

1. verify the identity of the service consumer and check if service consumer is authorised to terminate the targeted "Individual Server to Server Performance Analytics Subscription" resource; and
2. if the service consumer is authorized, the ADAE Server shall delete the corresponding subscription and respond with an HTTP "204 No Content" status code.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 7.10.14.7.

5.11.13.2.3 Notify

5.11.13.2.3.1 General

This service operation is used by the ADAE Server to notify Server to Server Performance Analytics event(s).

The following procedures are supported by the "SS_ADAE_ServerToServerPerformanceAnalytics_Notify" service operation:

- Server to Server Performance Analytics Event Notification.

5.11.13.2.3.2 Server to Server Performance Analytics Event Notification

To notify on Server to Server Performance Analytics Event(s), the ADAE Server shall send an HTTP POST request to the service consumer targeting the notification URI that was received during the creation/update of the corresponding subscription as defined in clauses 5.11.13.2.2.2 and 5.11.13.2.2.3, with the request body containing the S2SPerfNotif data structure as defined in clause 7.10.14.6.2.3.

Upon reception of the HTTP POST request message, the service consumer shall process the Server to Server Performance Analytics Notification, and in case of success, respond with an HTTP "204 No Content" status code.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.10.14.7.

5.11.14 SS_ADAE_UeRatConnectivityAnalytics API

5.11.14.1 Service Description

The SS_ADAE_UeRatConnectivityAnalytics service exposed by the ADAE Server enables a service consumer to:

- create/update/delete a UE RAT connectivity Analytics Subscription; and
- receive UE RAT Connectivity Analytics Notifications.

5.11.14.1 Service Description

The SS_ADAE_UeRatConnectivityAnalytics service exposed by the ADAE Server enables a service consumer to:

- create/update/delete a UE RAT connectivity Analytics Subscription; and
- receive UE RAT Connectivity Analytics Notifications.

5.11.14.2 Service Operations

5.11.14.2.1 Introduction

The service operations defined for the SS_ADAE_UeRatConnectivityAnalytics service are shown in table 5.11.14.2.1-1.

Table 5.11.14.2.1-1: SS_ADAE_UeRatConnectivityAnalytics Service Operations

Service Operation Name	Description	Initiated by
SS_ADAE_UeRatConnectivityAnalytics_Subscribe	This service operation enables a service consumer to create a UE RAT Connectivity Analytics Subscription.	e.g., VAL Server
SS_ADAE_UeRatConnectivityAnalytics_Update	This service operation enables a service consumer to update an existing UE RAT Connectivity Analytics Subscription.	e.g., VAL Server
SS_ADAE_UeRatConnectivityAnalytics_Unsubscribe	This service operation enables a service consumer to delete an existing UE RAT Connectivity Analytics Subscription.	e.g., VAL Server
SS_ADAE_UeRatConnectivityAnalytics_Notify	This service operation enables a service consumer to receive UE RAT Connectivity Analytics Notifications.	ADAE Server

5.11.14.2.2 SS_ADAE_UeRatConnectivityAnalytics_Subscribe

5.11.14.2.2.1 General

This service operation is used by a service consumer to request the creation of a UE RAT Connectivity Analytics Subscription at the ADAE Server.

The following procedures are supported by the "SS_ADAE_UeRatConnectivityAnalytics_Subscribe" service operation:

- UE RAT Connectivity Analytics Subscription Creation.

5.11.14.2.2.2 UE RAT Connectivity Analytics Subscription Creation

Figure 5.11.14.2.2.2-1 depicts a scenario where a service consumer sends a request to the ADAE Server to request the creation of a UE RAT Connectivity Analytics Subscription (see also clause 10.2 of 3GPP TS 23.436 [38]).

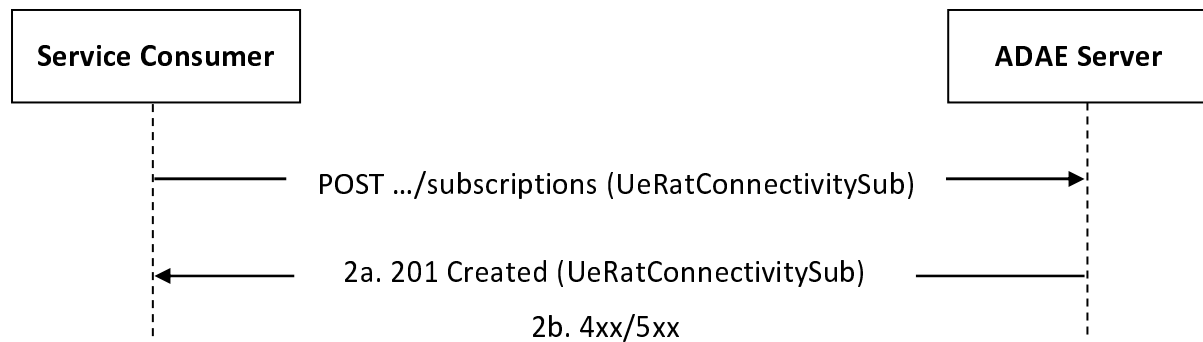


Figure 5.11.14.2.2-1: Procedure for UE RAT Connectivity Analytics Subscription Creation

1. In order to subscribe to UE RAT Connectivity Analytics related event(s) reporting, the service consumer shall send an HTTP POST request to the ADAE Server targeting the URI of the "UE RAT Connectivity Analytics Subscriptions" collection resource, with the request body including the UeRatConnectivitySub data structure.
- 2a. Upon success, the ADAE Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created "Individual UE RAT Connectivity Analytics Subscription" resource within the UeRatConnectivitySub data structure, and an HTTP "Location" header field containing the URI of the created resource.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.10.12.7.

5.11.14.2.3 SS_ADAE_UeRatConnectivityAnalytics_Update

5.11.14.2.3.1 General

This service operation is used by a service consumer to request the update of an existing UE RAT Connectivity Analytics Subscription at the ADAE Server.

The following procedures are supported by the "SS_ADAE_UeRatConnectivityAnalytics_Update" service operation:

- UE RAT Connectivity Analytics Subscription Update.

5.11.14.2.3.2 UE RAT Connectivity Analytics Subscription Update

Figure 5.11.14.2.3.2-1 depicts a scenario where a service consumer sends a request to the ADAE Server to request the update of an existing UE RAT Connectivity Analytics Subscription (see also clause 10.2 of 3GPP TS 23.436 [38]).

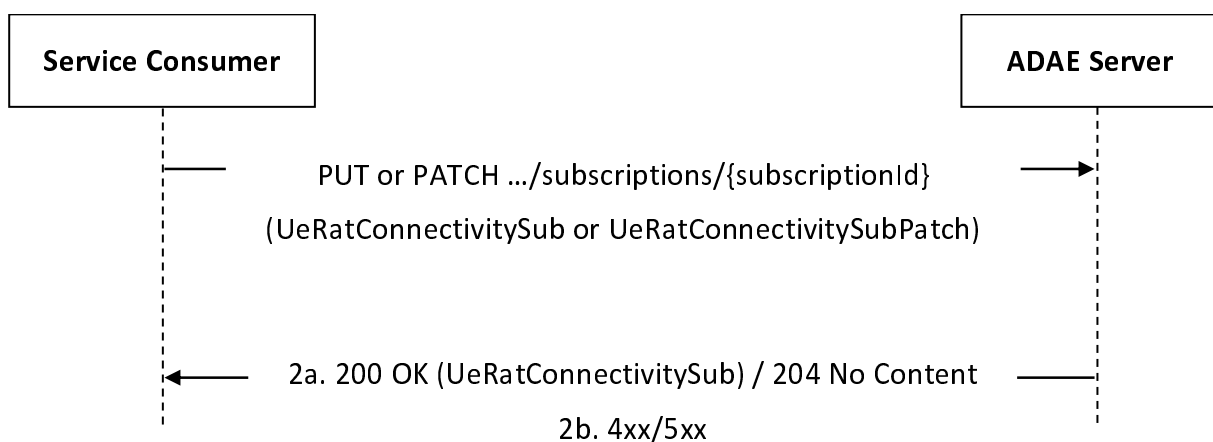


Figure 5.11.14.2.3.2-1: Procedure for UE RAT Connectivity Analytics Subscription Update

1. In order to update an existing UE RAT Connectivity Analytics Subscription, the service consumer shall send an HTTP PUT/PATCH request to the ADAE Server, targeting the URI of the corresponding "Individual UE RAT Connectivity Analytics Subscription" resource, with the request body including either:
 - the updated representation of the resource within the UeRatConnectivitySub data structure, in case the HTTP PUT method is used; or
 - the requested modifications to the resource within the UeRatConnectivitySubPatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e., other than the one that requested the creation of the targeted resource) can initiate this request.

- 2a. Upon success, the ADAE Server shall update the targeted "Individual UE RAT Connectivity Analytics Subscription" resource accordingly and respond with either:
 - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual UE RAT Connectivity Analytics Subscription" resource within the UeRatConnectivitySub data structure; or
 - an HTTP "204 No Content" status code.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 7.10.12.7.

5.11.14.2.4 SS_ADAE_UeRatConnectivityAnalytics_Unsubscribe

5.11.14.2.4.1 General

This service operation is used by a service consumer to request the deletion of an existing UE RAT Connectivity Analytics Subscription at the ADAE Server.

The following procedures are supported by the "SS_ADAE_UeRatConnectivityAnalytics_Unsubscribe" service operation:

- UE RAT Connectivity Analytics Subscription Deletion.

5.11.14.2.4.2 UE RAT Connectivity Analytics Subscription Deletion

Figure 5.11.14.2.4.2-1 depicts a scenario where a service consumer sends a request to the ADAE Server to delete an existing UE RAT Connectivity Analytics Subscription (see also clause 10.2 of 3GPP TS 23.436 [38])

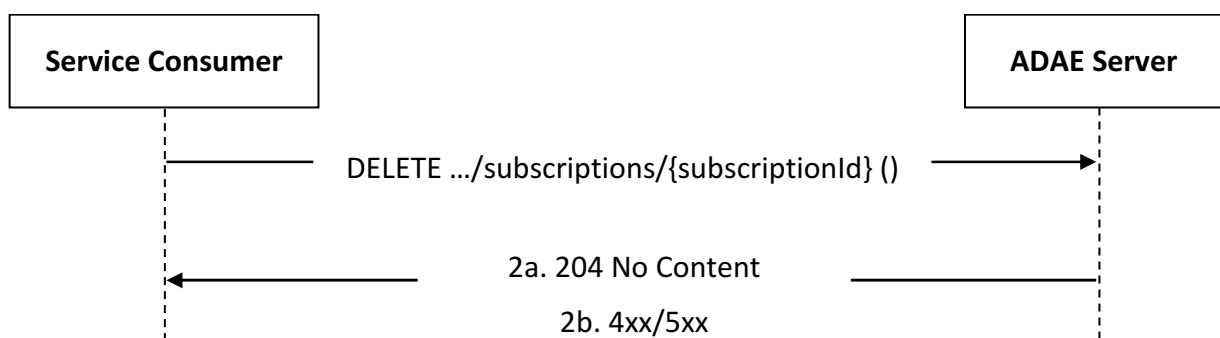


Figure 5.11.14.2.4.2-1: Procedure for UE RAT Connectivity Analytics Subscription Deletion

1. In order to request the deletion of an existing UE RAT Connectivity Analytics Subscription, the service consumer shall send an HTTP DELETE request to the ADAE Server targeting the URI of the corresponding "Individual UE RAT Connectivity Analytics Subscription" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation/update of the targeted resource) can initiate this request.

- 2a. Upon success, the ADAE Server shall respond with an HTTP "204 No Content" status code.

- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 7.10.12.7.

5.11.14.2.5 SS_ADAE_UeRatConnectivityAnalytics_Notify

5.11.14.2.5.1 General

This service operation is used by the ADAE Server to notify a previously subscribed service consumer on:

- UE RAT Connectivity Analytics report(s).

The following procedures are supported by the "SS_ADAE_UeRatConnectivityAnalytics_Notify" service operation:

- UE RAT Connectivity Analytics Notification.

5.11.14.2.5.2 UE RAT Connectivity Analytics Notification

Figure 5.11.14.2.5.2-1 depicts a scenario where the ADAE Server sends a request to notify a previously subscribed service consumer on UE RAT Connectivity Analytics report(s) (see also clause 10.2 of 3GPP TS 23.436 [38])

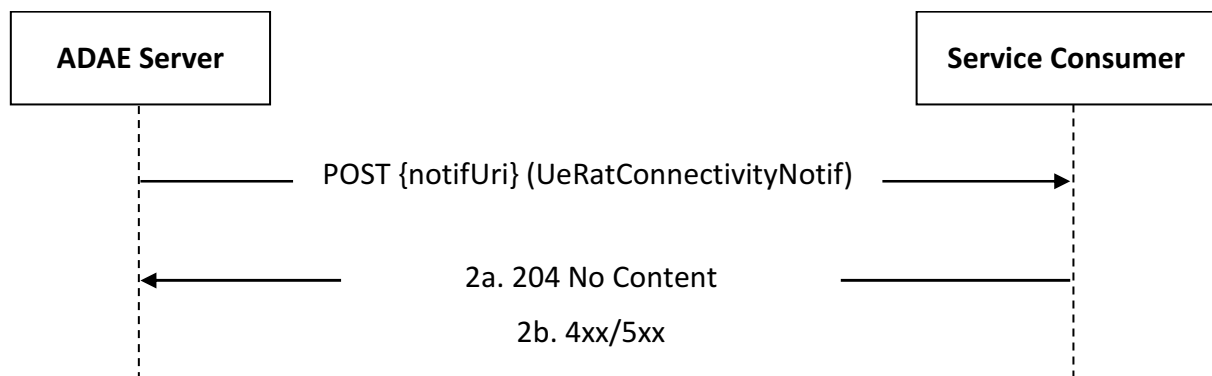


Figure 5.11.14.2.5.2-1: Procedure for UE RAT Connectivity Analytics Notification

1. In order to notify a previously subscribed service consumer on UE RAT Connectivity Analytics report(s), the ADAE Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding UE RAT Connectivity Analytics Subscription using the procedures defined in clauses 5.11.14.2.2 and 5.11.14.2.3, and the request body including the UeRatConnectivityNotif data structure.
- 2a. Upon success, the service consumer shall respond to the ADAE Server with an HTTP "204 No Content" status code to acknowledge the successful reception of the notification.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 7.10.12.7.

5.11.15 SS_ADAE_DN_energy_analytics Service

5.11.15.1 Service Description

The SS_ADAE_DN_energy_analytics Service, exposed by the VAL Server, EAS, or EES, enables a service consumer to:

- request ADAE Server to provide DN energy efficiency and consumption analytics by using filter criteria.

5.11.15.2 Service Operations

5.11.15.2.1 Introduction

The service operations defined for the SS_ADAE_DN_energy_analytics API are shown in the table 5.11.15.2.1-1.

Table 5.11.15.2.1-1: Service operations of the SS_ADAE_DN_energy_analytics API

Service Operation Name	Description	Initiated by
SS_ADAE_DN_energy_analytics_Request	This service operation enables a service consumer to obtain DN energy efficiency and consumption analytics.	e.g., VAL Server

5.11.15.2.2 SS_ADAE_DN_energy_analytics_Request

5.11.15.2.2.1 General

This service operation is used by a service consumer to perform ADAE DN Energy Analytics Request at the ADAE Server.

The following procedures are supported by the "SS_ADAE_DN_energy_analytics_Request" service operation:

- ADAE DN Energy Analytics Request.

5.11.15.2.2.2 ADAE DN Energy Analytics Request

Figure 5.11.15.2.2.2-1 depicts a scenario where a service consumer sends a request to the ADAE Server to request ADAE DN Energy Analytic (see also clause 8.18 of 3GPP TS 23.436 [38]).

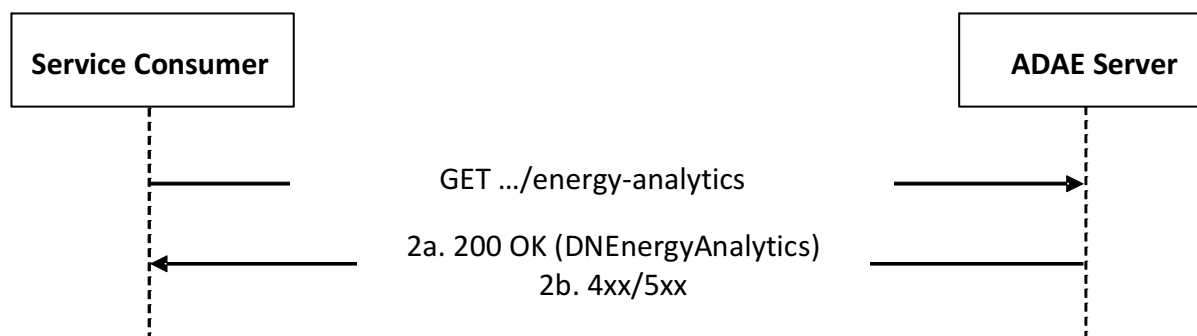


Figure 5.11.15.2.2.2-1: Procedure for ADAE DN Energy Analytics Request

1. In order to request to ADAE DN energy analytics, the service consumer shall send an HTTP GET request to the ADAE server targeting the URI of the "ADAE DN Energy Analytics" resource.
- 2a. Upon success, the ADAE Server shall respond with an HTTP "200 OK" status code with the response body containing the DNEnergyAnalytics data structure.

NOTE: ADAE Server calculates the energy efficiency and consumption analytics by using the trained ML model based on AIMLES_MLModelTraining service, obtained from AIMLE Server.

- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP GET response body, as specified in clause 7.10.15.7.

5.12 AIML Enablement APIs

AIML Enablement APIs are defined in 3GPP TS 29.482 [48].

5.13 Metaverse Enablement APIs

Spatial Anchor Server and Spatial Map Server APIs are defined in 3GPP TS 29.437 [49].

5.14 Digital Asset APIs

5.14.1 SS_DAProfileManagement API

5.14.1.1 Service Description

The SS_DAProfileManagement service exposed by the DA server enables a service consumer to:

- manage digital asset profile on a DA server.

5.14.1.2 Service Operations

5.14.1.2.1 Introduction

The service operation defined for SS_DAProfileManagement API is shown in the table 5.14.1.2.1-1.

Table 5.14.1.2.1-1: Operations of the SS_DAProfileManagement API

Service operation name	Description	Initiated by
Create	This service operation is used by VAL server to create digital asset profiles.	VAL server
Retrieve	This service operation is used by VAL server to retrieve digital asset profiles.	VAL server
Update	This service operation is used by VAL server to update digital asset profiles.	VAL server
Delete	This service operation is used by VAL server to delete digital asset profiles.	VAL server

5.14.1.2.2 Create

5.14.1.2.2.1 General

This service operation is used by a service consumer to manage digital asset profile on a DA server.

The following procedures are supported by the "Create" service operation:

- Create digital asset profile.

5.14.1.2.2.2 Create Digital Asset Profile

To create the digital asset profile, the VAL server shall send HTTP POST request message to DA server on the resource URI representing "DA Profiles" resource. The body of the HTTP POST message shall include the DigitalAssetProfile data type, as specified in the clause 7.13.1.2.2.3.1.

Upon receiving the HTTP POST message as described above, the DA server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to create DA profile;
2. if the VAL server is authorized to create DA profile, the DA server shall;
 - a. create a new resource for Individual SEAL DA profile as specified in clause 7.13.1.2.1; and
 - b. return within the response message body the created resource representation within the DigitalAssetProfile data structure, and within an HTTP Location header the created resource URI in the response message. and

If errors occur when processing the request, the DA Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.13.1.7.

5.14.1.2.3 Retrieve

5.14.1.2.3.1 General

This service operation is used by VAL server to retrieve an individual digital asset profile information.

This service operation is used by a service consumer to retrieve an individual digital asset profile information on a DA server.

The following procedures are supported by the "Retrieve" service operation:

- Retrieve digital asset profiles.

5.14.1.2.3.2 Retrieve Digital Asset Profile

To retrieve the DA profile, the VAL server shall send HTTP GET request message to DA server on the resource URI representing the "Individual DA profile", as specified in clause 7.13.1.2.3.3.1.

Upon receiving the HTTP GET message as described above, the DA server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to retrieve the DA profile;
2. if the VAL server is authorized to retrieve the DA profile, the DA server shall;
 - a. return the DA profile in DigitalAssetProfile data type, as specified in clause 7.13.1.2.1.
3. if errors occur when processing the request, the DA Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.13.1.7.

5.14.1.2.4 Update

5.14.1.2.4.1 General

The following procedures are supported by the "Update" service operation:

- Update the Digital asset profile.

5.14.1.2.4.2 Update Digital Asset Profile

To modify the DA profile, the VAL server shall send HTTP PUT message to the DA server to the Resource URI identifying the "Individual DA profile" resource representation, as specified in the clause 7.13.1.2.6.3.2. The VAL server may send an HTTP PATCH request message to the "Individual DA profile" resource URI as specified in clause 7.13.1.2.6.3.3. The body of the HTTP PATCH request message shall include the requested modifications as specified in clause 7.13.1.2.6.3.3.

When HTTP PUT is used, the "valServerId" attribute within the DigitalAssetProfile data structure shall not be updated.

Upon receiving the HTTP PUT or PATCH request message, the DA server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to modify the DA profile;
2. if the VAL server is authorized to modify the information, then the DA server shall;
 - a. if the DA profile in the request is valid, update/modify the resource identified by the Resource URI of the DA profile received in the request; and
 - b. return a 200 OK status code with the updated DA profile in the response or a 204 No Content status code.
3. if errors occur when processing the request, the DA Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.13.1.7.

5.14.1.2.5 Delete

5.14.1.2.5.1 General

The following procedures are supported by the "Delete" service operation:

- Delete the Digital asset profile.

5.14.1.2.5.2 Delete digital asset service operation

To delete the DA profile, the VAL server shall send an HTTP DELETE message to the resource representing "Individual DA profile" as specified in clause 7.13.1.2.3.3.4.

Upon receiving the HTTP DELETE message, the DA server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to delete the DA profile; and
2. if the VAL server is authorized to delete the DA profile, the DA server shall delete the resource pointed by the Resource URI for Individual SEAL DA profile.
3. if errors occur when processing the request, the DA Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.13.1.7.

5.14.2 SS_DADiscovery API

5.14.2.1 Service Description

The SS_DADiscovery service as defined 3GPP TS 23.438 [46], exposed by the DA server enables a service consumer to:

- discover digital asset on a DA server.

5.14.2.2 Service Operations

5.14.2.2.1 Introduction

The service operation defined for SS_DADiscovery API is shown in the table 5.14.2.2.1-1.

Table 5.14.2.2.1-1: Operations of the SS_DADiscovery API

Service operation name	Description	Initiated by
Discovery	This service operation is used by VAL server to discover digital assets.	VAL server

5.14.2.2.2 Discovery

5.14.2.2.2.1 General

The following procedures are supported by the "Discovery" service operation:

- Discover Digital Assets profiles.

5.14.2.2.2.2 Discover Digital Asset profiles

To discover the digital assets, the Service consumer shall send HTTP GET request message to DA server on the targeting resource URI of the DA profile with the request URI query parameters including the filter criteria to discover the matching digital assets.

Upon receiving the HTTP GET message as described above, the DA server shall:

1. verify the identity of the Service consumer and check if the Service consumer is authorized to discover the digital asset;
2. In case the Service consumer is authorized to discover the digital asset, the DA server shall;
 - a. Upon success, the DA server shall respond with an HTTP "200 OK" status code with the response body containing a list of digital assets within the DigitalAssetProfile data type, as specified in clause 7.13.2.3.2.3.1.

If the error(s) occur when processing the request, the DA Server shall respond to the Service consumer with an appropriate error response as specified in clause 7.13.2.7.

5.14.3 SS_DAMediaManagement API

5.14.3.1 Service Description

The SS_DAMediaManagement API, as defined 3GPP TS 23.438 [46], allows VAL server via DA-S reference point to manage digital asset media on a DA server.

5.14.3.2 Service Operations

5.14.3.2.1 Introduction

The service operation defined for SS_DAMediaManagement API is shown in the table 5.14.3.2.1-1.

Table 5.14.3.2.1-1: Operations of the SS_DAMediaManagement API

Service operation name	Description	Initiated by
Upload	This service enables a VAL server to manage media related to digital asset profile.	VAL server
Download	This service operation is used by VAL server to download digital asset media(s) information.	VAL server
Update	This service operation is used by VAL server to update digital asset media(s) information.	VAL server
Delete	This service operation is used by VAL server to delete digital asset media(s) information.	VAL server

5.14.3.2.2 Upload

5.14.3.2.2.1 General

The following procedures are supported by the "Upload" service operation:

- Upload Digital Asset Media.

5.14.3.2.2.2 Upload Digital Asset Media

To upload the digital asset media, the VAL server shall send HTTP POST request message to DA server. The body of the HTTP POST message shall include the DigitalAssetMedia data type, as specified in the clause 7.13.3.2.2.3.1.

Upon receiving the HTTP POST message as described above, the DA server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to upload DA media
2. if the VAL server is authorized to upload DA media information, the DA server shall;
 - a. Upload a new resource for Individual DA media as specified in clause 7.13.3.2.1; and
 - b. return within the response message body the upload resource representation within the DigitalAssetMedia data structure, and within an HTTP Location header the upload resource URI in the response message. and

3. if errors occur when processing the request, the DA Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.13.3.7.

5.14.3.2.3 Download

5.14.3.2.3.1 General

The following procedures are supported by the "Download" service operation:

- Individual Digital Asset Media download

5.14.3.2.3.2 Individual Digital Asset Media download

To download the DA media, the VAL server shall send HTTP GET request message to DA server on the resource URI representing the individual SEAL DA media, as specified in 7.13.3.2.3.3.1.

Upon receiving the HTTP GET message as described above, the DA server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to download the DA media;
2. if the VAL server is authorized to download the DA media, the DA server shall;
 - a. returns the DA media in DigitalAssetMedia data type, as specified in clause 7.13.3.2.1.
3. if errors occur when processing the request, the DA Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.13.3.7.

5.14.3.2.4 Update

5.14.3.2.4.1 General

The following procedures are supported by the "Update" service operation:

- Individual Digital Asset Media Update

5.14.3.2.4.2 Individual Digital Asset Media Update

To modify the DA media, the VAL server shall send HTTP PUT message to the DA server to the Resource URI identifying the individual SEAL DA media resource representation, as specified in the clause 7.13.3.2.6.3.2. The VAL server may send an HTTP PATCH request message to the Individual SEAL DA media resource URI as specified in clause 7.13.3.2.6.3.3. The body of the HTTP PATCH request message shall include the requested modifications as specified in clause 7.13.3.2.6.3.3.

When HTTP PUT is used, the "valServerId" attribute within the DigitalAssetMedia data structure shall not be updated.

Upon receiving the HTTP PUT or PATCH request message, the DA server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to modify the DA media;
2. if the VAL server is authorized to modify the information, then the DA server shall;
 - a. if the DA media in the request is valid, update/modify the resource identified by the Resource URI of the DA media received in the request;
 - b. returns a 200 OK status code with the updated DA media in the response or a 204 No Content status code.
3. if errors occur when processing the request, the DA Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.13.3.7.

5.14.3.2.5 Delete

5.14.3.2.5.1 General

The following procedures are supported by the "Delete" service operation:

- Individual Digital Asset Media Delete

5.14.3.2.5.2 Delete digital asset service operation

To delete the DA media, the VAL server shall send an HTTP DELETE message to the resource representing Individual SEAL DA media as specified in clause 7.13.3.2.3.3.4.

Upon receiving the HTTP DELETE message, the DA server shall:

1. verify the identity of the VAL server and check if the VAL server is authorized to delete the DA media; and
2. if the VAL server is authorized to delete the DA media, the DA server shall delete the resource pointed by the Resource URI for Individual SEAL DA media.
3. if errors occur when processing the request, the DA Server shall respond to the VAL Server with an appropriate error response as specified in clause 7.13.3.7.

6 SEAL Design Aspects Common for All APIs

6.1 General

SEAL APIs allow secure access to the capabilities provided by SEAL.

This document specifies the procedures triggered at different functional entities as a result of API invocation requests and event notifications. The stage-2 level requirements and signalling flows are defined in 3GPP TS 23.434 [2], 3GPP TS 23.433 [34] (for SEALDD), 3GPP TS 23.435 [41] (for NSCE), 3GPP TS 23.437 [45] (for Spatial Map and Spatial Anchor services) and 3GPP TS 23.438 [46] (for Digital Asset management services).

Several design aspects, as mentioned in the following clauses, are specified in 3GPP TS 29.122 [3] and referenced by this specification.

6.2 Data Types

6.2.1 General

This clause defines structured data types, simple data types and enumerations that are applicable to several APIs defined in the present specification and can be referenced from data structures defined in the subsequent clauses.

In addition, data types that are defined in OpenAPI Specification [15] can also be referenced from data structures defined in the subsequent clauses.

NOTE: As a convention, data types names in the present specification are with an upper-case letter in the beginning. Parameters are with a lower-case letter in the beginning. As an exception, data types that are also defined in OpenAPI Specification [15] can use a lower-case case letter in the beginning for consistency.

Table 6.2.1-1 specifies data types re-used by the SEAL from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the SEAL.

Table 6.2.1-1: Re-used Data Types

Data type	Reference	Comments
Uri	3GPP TS 29.122 [3]	
TestNotification	3GPP TS 29.122 [3]	Following clarifications apply: - The SCEF is the SEAL server; and - The SCS/AS is the VAL server.
WebsocketNotifConfig	3GPP TS 29.122 [3]	Following clarifications apply: - The SCEF is the SEAL server; and - The SCS/AS is the VAL server.

6.2.2 Referenced structured data types

Table 6.2.2-1 lists structured data types defined in this specification referenced by multiple services:

Table 6.2.2-1: Referenced Structured Data Types

Data type	Reference	Description
VALGroupDocument	Clause 7.2.1.4.2.2	VAL Group document information.
ProfileDoc	Clause 7.3.1.4.2.2	VAL User or VAL UE profile information.

6.2.3 Referenced Simple data types and enumerations

Following simple data types defined in Table 6.2.3-1 are applicable to several APIs in this document:

Table 6.2.3-1: Simple data types applicable to several APIs

Type name	Reference	Description

6.3 Usage of HTTP

For SEAL APIs, support of HTTP/1.1 (IETF RFC 9112 [5], IETF RFC 9110 [6] and IETF RFC 9111 [9]) over TLS is mandatory and support of HTTP/2 (IETF RFC 9113 [12]) over TLS is recommended.

A functional entity desiring to use HTTP/2 shall use the HTTP upgrade mechanism to negotiate applicable HTTP version as described in IETF RFC 9113 [12].

Usage of HTTP over TLS and the TLS profiles shall be as specified in clause 5.1.1.4 of 3GPP TS 33.434 [26].

6.4 Content type

The bodies of HTTP request and successful HTTP responses shall be encoded in JSON format (see IETF RFC 8259 [13]).

The MIME media type that shall be used within the related Content-Type header field is "application/json", as defined in IETF RFC 8259 [13].

The JSON objects defined in clause 5.2.3 of 3GPP TS 29.122 [3] for the HTTP PATCH request shall be supported.

NOTE: This release only supports the content type JSON.

6.5 URI structure

6.5.1 Resource URI structure

All API URIs of SEAL APIs shall be:

{apiRoot}/<apiName>/<apiVersion>

"apiRoot" is configured by means outside the scope of the present document. It includes the scheme ("https"), host and optional port, and an optional prefix string. "apiName" and "apiVersion" shall be set dependent on the API, as defined in the corresponding clauses below.

All resource URIs in the clauses below are defined relative to the above root API URI.

NOTE 1: The "apiVersion" will only be increased if the new API version contains backward incompatible changes. Otherwise, the supported feature mechanism defined in clause 6.8 can be used to negotiate extensions.

NOTE 2: A different root structure can be used when the resource URI is preconfigured in the API invoking entity.

The root structure may be followed by "apiSpecificSuffixes" that are dependent on the API and are defined separately for each API as resource URI where they apply:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

6.5.2 Custom operations URI structure

The custom operation definition is in Annex C of 3GPP TS 29.501 [14].

The URI of a custom operation which is associated with a resource shall have the following structure:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>/<custOpName>

Custom operations can also be associated with the service instead of a resource. The URI of a custom operation which is not associated with a resource shall have the following structure:

{apiRoot}/<apiName>/<apiVersion>/<custOpName>

In the above URI structures, "apiRoot", "apiName", "apiVersion" and "apiSpecificResourceUriPart" are as defined in clause 6.5.1 and "custOpName" represents the name of the custom operation as defined in clause 5.1.3.2 of 3GPP TS 29.501 [14]

6.6 Notifications

The functional entities

- shall support the delivery of notifications using a separate HTTP connection towards an address (see clause 5.2.5.2 of 3GPP TS 29.122 [3]);
- may support testing delivery of notifications (see clause 5.2.5.3 of 3GPP TS 29.122 [3]); and
- may support the delivery of notification using WebSocket protocol (see IETF RFC 6455 [4] and clause 5.2.5.4 of 3GPP TS 29.122 [3]),

as described in 3GPP TS 29.122 [3], with the following clarifications:

- the SCEF is the SEAL server; and
- the SCS/AS is the Subscriber.

6.7 Error Handling

Response bodies and error handling described in clause 5.2.6 of 3GPP TS 29.122 [3] are applicable to all APIs in the present specification unless specified otherwise, with the following clarifications:

- the SCEF is the SEAL server; and
- the SCS/AS is the functional entity invoking an API.

6.8 Feature negotiation

The functional entity invoking an API (i.e. the VAL server) and the SEAL server use feature negotiation procedures defined in 3GPP TS 29.122 [3] to negotiate the supported features, with the following clarifications:

- description of the SCEF applies to the SEAL server; and
- description of the SCS/AS applies to the functional entity invoking an API.

6.9 HTTP headers

The HTTP headers and the HTTP custom headers described in 3GPP TS 29.122 [3] are applicable to all APIs in this document.

6.10 Conventions for Open API specification files

The conventions for Open API specification files as specified in clause 5.2.9 of 3GPP TS 29.122 [3] shall be applicable for all APIs in this document.

7 SEAL API Definitions

7.1 Location management APIs

7.1.1 SS_LocationReporting API

7.1.1.1 API URI

The SS_LocationReporting service shall use the SS_LocationReporting API.

The request URIs used in HTTP requests from the VAL server towards the location management server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-lr".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.1.1.2.

7.1.1.2 Resources

7.1.1.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.1.1.2.1-1 depicts the resource URIs structure for the SS_LocationReporting API.

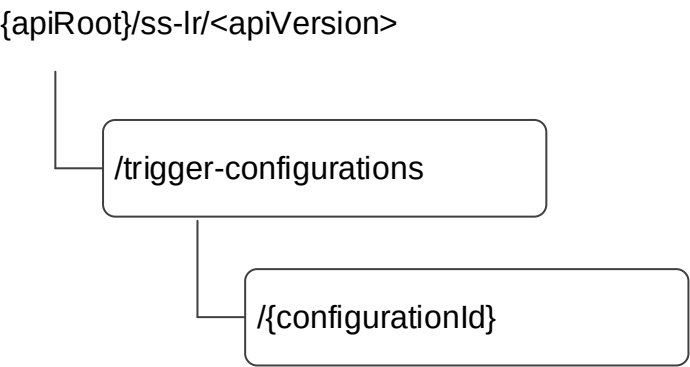


Figure 7.1.1.2.1-1: Resource URI structure of the SS_LocationReporting API

Table 7.1.1.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.1.1.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
SEAL Location Reporting Configurations	/trigger-configurations	POST	Creates a new Individual SEAL Location Reporting Configuration information.
Individual SEAL Location Reporting Configuration	/trigger-configurations/{configurationId}	GET	Retrieves an Individual SEAL Location Reporting Configuration information identified by {configurationId}.
		PUT	Updates an Individual SEAL Location Reporting Configuration information identified by {configurationId}.
		PATCH	Partially modifies an Individual SEAL Location Reporting Configuration information identified by {configurationId}.
		DELETE	Delete an Individual SEAL Location Reporting Configuration information identified by {configurationId}.

7.1.1.2.2 Resource: SEAL Location Reporting Configurations

7.1.1.2.2.1 Description

The resource allows the VAL server to request to create a new individual SEAL location reporting configuration information at the location management server.

7.1.1.2.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-lr/<apiVersion>/trigger-configurations**

This resource shall support the resource URI variables defined in the table 7.1.1.2.2.2-1.

Table 7.1.1.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.1.1.2.2.3 Resource Standard Methods

7.1.1.2.2.3.1 POST

Table 7.1.1.2.2.3.1-1: 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 7.1.1.2.2.3.1-2 and the response data structures and response codes specified in table 7.1.1.2.2.3.1-3.

Table 7.1.1.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocationReportConfiguration	M	1	Location reporting configuration information.

Table 7.1.1.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocationReportConfiguration	M	1	201 Created	Location reporting configuration is created successfully.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.1.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-lr/<apiVersion>/trigger-configurations/{configurationId}

7.1.1.2.2.4 Resource Custom Operations

None.

7.1.1.2.3 Resource: Individual SEAL Location Reporting Configuration

7.1.1.2.3.1 Description

The resource represents an individual SEAL location reporting configuration that is created at the location management server.

7.1.1.2.3.2 Resource Definition

Resource URI: {apiRoot}/ss-lr/<apiVersion>/trigger-configurations/{configurationId}

This resource shall support the resource URI variables defined in the table 7.1.1.2.3.2-1.

Table 7.1.1.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
configurationId	string	Represents an individual SEAL location reporting configuration resource.

7.1.1.2.3.3 Resource Standard Methods

7.1.1.2.3.3.1 GET

This operation retrieves an individual SEAL location reporting configuration information. This method shall support the URI query parameters specified in table 7.1.1.2.3.3.1-1.

Table 7.1.1.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.1.1.2.3.3.1-2 and the response data structures and response codes specified in table 7.1.1.2.3.3.1-3.

Table 7.1.1.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.1.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocationReportConfiguration	M	1	200 OK	The location reporting configuration information.
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative location management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative location management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.1.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative location management server.

Table 7.1.1.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative location management server.

7.1.1.2.3.3.2 PUT

This operation updates the individual SEAL location reporting configuration. This method shall support the URI query parameters specified in table 7.1.1.2.3.3.2-1.

Table 7.1.1.2.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.1.1.2.3.3.2-2 and the response data structures and response codes specified in table 7.1.1.2.3.3.2-3.

Table 7.1.1.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
LocationReportConfiguration	M	1	Updated details of the location reporting configuration.

Table 7.1.1.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocationReportConfiguration	M	1	200 OK	The configuration is updated successfully and the updated configuration information returned in the response.
n/a			204 No Content	The location reporting configuration updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative location management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative location management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.1.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative location management server.

Table 7.1.1.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative location management server.

7.1.1.2.3.3.3 DELETE

This operation deletes the individual SEAL location reporting configuration. This method shall support the URI query parameters specified in table 7.1.1.2.3.3.3-1.

Table 7.1.1.2.3.3.3-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.1.1.2.3.3.3-2 and the response data structures and response codes specified in table 7.1.1.2.3.3.3-3.

Table 7.1.1.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.1.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual configuration matching the configurationId is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative location management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative location management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.1.2.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative location management server.

Table 7.1.1.2.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative location management server.

7.1.1.2.3.3.4 PATCH

This method shall support the URI query parameters specified in table 7.1.1.2.3.3.4-1.

Table 7.1.1.2.3.3.4-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.1.1.2.3.3.4-2 and the response data structures and response codes specified in table 7.1.1.2.3.3.4-3.

Table 7.1.1.2.3.3.4-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
LocationReportConfigurationPatch	M	1	Contains the modifications to be applied to the Individual SEAL Location Reporting Configuration resource.

Table 7.1.1.2.3.3.4-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocationReportConfiguration	M	1	200 OK	Individual SEAL Location Reporting Configuration resource is modified successfully and representation of the modified Individual SEAL Location Reporting Configuration resource is returned.
n/a			204 No Content	The Individual SEAL Location Reporting Configuration resource is modified successfully.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.1.2.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

Table 7.1.1.2.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

7.1.1.2.3.4 Resource Custom Operations
None.

7.1.1.3 Notifications

7.1.1.3.1 General

Table 7.1.1.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Location Reporting Notification	{notifUri}	POST	Notify on location event.
Adaptive Location Configuration Notification	{notifUri}/configure	configure (POST)	Notify the suggested adaptive location configuration and request feedback.

7.1.1.3.2 Location Trigger Event Notification

7.1.1.3.2.1 Description

7.1.1.3.2.2 Notification definition

Callback URI: {**notifUri**}

This method shall support the URI query parameters specified in table 7.1.1.3.2.2-1.

Table 7.1.1.3.2.2-1: 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 7.1.1.3.2.2-2 and the response data structures and response codes specified in table 7.1.1.3.2.2-3.

Table 7.1.1.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocationReport	M	1	Represents the reported location event.

Table 7.1.1.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The notification is successfully received.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative VAL server where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative VAL server where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.1.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative VAL server towards which the notification should be redirected.

Table 7.1.1.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative VAL server towards which the notification should be redirected.

7.1.1.3.3 Adaptive Location Configuration Notification

7.1.1.3.3.1 Description

The Adaptive Location Configuration Notification is used by the LM Server to notify the suggested adaptive location configuration and request feedback.

7.1.1.3.3.2 Target URI

The Callback URI "{notifUri}/configure" shall be used with the callback URI variables defined in table 7.1.1.3.3.2-1.

Table 7.1.1.3.3.2-1: Callback URI variables

Name	Data type	Definition
notifUri	Uri	Contains a string formatted as a URI containing the Callback URI.

7.1.1.3.3.3 Standard Methods

7.1.1.3.3.3.1 POST

This method shall support the request data structures specified in table 7.1.1.3.3.3.1-1 and the response data structures and response codes specified in table 7.1.1.3.3.3.1-2.

Table 7.1.1.3.3.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
AdaptConfigNotif	M	1	Contains the Adaptive Location Configuration Notification.

Table 7.1.1.3.3.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
AdaptConfigNotifResp	M	1	200 OK	Successful case. The Adaptive Location Configuration Notification is successfully received and Adaptive Location Configuration related information is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.1.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative VAL Server towards which the notification should be redirected.

Table 7.1.1.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative VAL Server towards which the notification should be redirected.

7.1.1.4 Data Model

7.1.1.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.1.1.4.1-1 specifies the data types defined specifically for the SS_LocationReporting API service.

Table 7.1.1.4.1-1: SS_LocationReporting API specific Data Types

Data type	Section defined	Description	Applicability
AdaptConfigNotif	7.1.1.4.2.6	Represents the adaptive reporting notification.	
AdaptConfigNotifResp	7.1.1.4.2.7	Represents the adaptive reporting notification response.	
AdaptiveReporting	7.1.1.4.3.5	Represents a desired adaptive reporting configuration mode.	eLSApp
Confirmation	7.1.1.4.3.6	Represents a confirmation response.	
InsideOutsideInd	7.1.1.4.3.3	Represents a desired condition of the location reporting, e.g., inside or outside the given area.	TriggeringCriteria
LocChangeCond	7.1.1.4.3.4	Represents a desired condition of the requested location change	TriggeringCriteria
LocationReport	7.1.1.4.2.5	Represents the location trigger report.	NotifSupport
LocationReportConfiguration	7.1.1.4.2.2	Represents the location reporting configuration information.	
LocationReportConfigurationPatch	7.1.1.4.2.3	Represents the requested modifications to the location reporting configuration information. Used to partially update Individual SEAL Location Reporting Configuration resource.	PatchUpdate
TriggeringCriteria	7.1.1.4.2.4	Represents the location reporting triggering criteria.	TriggeringCriteria

Table 7.1.1.4.1-2 specifies data types re-used by the SS_LocationReporting API service.

Table 7.1.1.4.1-2: SS_LocationReporting API Re-used Data Types

Data type	Reference	Comments	Applicability
Accuracy	3GPP TS 29.122 [3]	Used to represent the desired level of accuracy of the requested location information.	
DateTime	3GPP TS 29.122 [3]	Used to represent the date and time.	
DurationSec	3GPP TS 29.571 [21]	Used to represent the time interval between successive location reports.	
LocationInfo	3GPP TS 29.122 [3]	Used to represent the location information.	NotifSupport
ScheduledCommunicationTime	3GPP TS 29.571 [21]	Used to represent the scheduled location reporting time interval.	TriggeringCriteria
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the applicability of optional features defined in table 7.1.1.6-1.	
ValTargetUe	Clause 7.3.1.4.2.3	Used to indicate either VAL User ID or VAL UE ID, to which location reporting applies.	
ValSvcAreaId	Clause 7.1.3.4.3.2	Used to represent the VAL service area identifier.	ValSrvArea
Uri	3GPP TS 29.122 [3]	Represents a URI.	NotifSupport

7.1.1.4.2 Structured data types

7.1.1.4.2.1 Introduction

7.1.1.4.2.2 Type: LocationReportConfiguration

Table 7.1.1.4.2.2-1: Definition of type LocationReportConfiguration

Attribute name	Data type	P	Cardinality	Description	Applicability
valServerId	string	M	1	Represents the VAL server identifier.	
valTgtUe	ValTargetUe	M	1	Represents the VAL User ID or VAL UE ID to which the location reporting applies.	
immRep	boolean	O	0..1	Indication of immediate reporting. If included, when it is set to true it indicates immediate reporting of the subscribed events, if available. Otherwise, reporting will occur when the event is met.	
monDur	DateTime	O	0..1	Represents the time at which the subscription ceases to exist (i.e the reporting trigger becomes invalid). If omitted, there is no time limit.	
repPeriod	DurationSec	O	0..1	Indicates the minimum time interval between successive location reports.	
notifUri	Uri	C	0..1	Represents the notification URI. This attribute shall be provided when the "NotifSupport" feature is supported.	NotifSupport
accuracy	Accuracy	O	0..1	Represents the desired level of accuracy of the requested location information.	
triggCriteria	TriggeringCriteria	O	0..1	Represents the location report triggering criteria based on the VAL service area information.	TriggeringCriteria
adaptRep	AdaptiveReporting	O	0..1	Indicates that adaptive location reporting is requested and includes the adaptive location configuration mode.	eLSApp
valSvcAreaIds	array(ValSvcAreaId)	O	1..N	Represents the VAL service area ID(s).	ValSrvArea
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features as defined in clause 7.1.1.6. This attribute shall be provided only if feature negotiation needs to take place.	
report	LocationReport	O	0..1	Represents location report. This attribute may be present only in the response to a Location Trigger creation/update request.	NotifSupport

7.1.1.4.2.3 Type: LocationReportConfigurationPatch

Table 7.1.1.4.2.3-1: Definition of type LocationReportConfigurationPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
valTgtUe	ValTargetUe	O	1	Represents the VAL User ID or VAL UE ID to which the location reporting applies.	
monDur	DateTime	O	0..1	Represents the time at which the subscription ceases to exist (i.e the reporting trigger becomes invalid). If omitted, there is no time limit.	
repPeriod	DurationSec	O	0..1	Indicates the minimum time interval between successive location reports.	
notifUri	Uri	O	0..1	Represents the notification URI.	NotifSupport
accuracy	Accuracy	O	0..1	Represents the desired level of accuracy of the requested location information.	
valSvcAreaIds	array(ValSvcAreaId)	O	1..N	Represents the VAL service area ID(s).	ValSrvArea
triggCriteria	TriggeringCriteria	O	0..1	Represents the location report triggering criteria.	TriggeringCriteria

7.1.1.4.2.4 Type: TriggeringCriteria

Table 7.1.1.4.2.4-1: Definition of type TriggeringCriteria

Attribute name	Data type	P	Cardinality	Description	Applicability
reportingMode	NotificationMethod	M	1	The indication of the requested reporting mode: periodic or event-triggered. The "ONE_TIME" value is not applicable for this attribute.	
repPer	DurationSec	C	0..1	Indicates the reporting periodicity. This attribute shall be present if the "reportingMode" attribute is set to the "PERIODIC".	
locChgCond	LocChangeEventCond	C	0..1	Identifies the location change condition for the event-triggered reporting. This attribute shall be present if the "reportingMode" attribute is set to the "ON_EVENT_DETECTION".	
ioInd	InsideOutsideInd	O	0..1	Indicates the condition when the reporting shall occur.	
repSchedules	array(ScheduledCommunicationTime)	O	1..N	Indicates the requested reporting schedule, e.g., day(s) of the week and/or time period(s) for the location reporting.	

7.1.1.4.2.5 Type: LocationReport

Table 7.1.1.4.2.5-1: Definition of type LocationReport

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriptionId	string	M	1	Represents the identifier of the "Individual SEAL Location Reporting Configuration" resource to which the location reporting notification is related.	
valTgtUe	ValTargetUe	M	1	VAL User ID or UE ID whose location information is notified.	
locInfo	LocationInfo	M	1	The location information associated with the valTgtUe.	
timeStamp	DateTime	O	0..1	Timestamp of the location report.	

7.1.1.4.2.6 Type: AdaptConfigNotif

Table 7.1.1.4.2.6-1: Definition of type AdaptConfigNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
valTgtUe	ValTargetUe	M	1	Represents VAL User ID or UE ID.	
suggConfig	Triggering Criteria	M	1	Contains the suggested adaptive location configuration.	

7.1.1.4.2.7 Type: AdaptConfigNotifResp

Table 7.1.1.4.2.7-1: Definition of type AdaptConfigNotifResp

Attribute name	Data type	P	Cardinality	Description	Applicability
confirmation	Confirmation	M	1	Represents the confirmation of the Adaptive Location Configuration.	

7.1.1.4.3 Simple data types and enumerations

7.1.1.4.3.1 Introduction

This clause defines simple data types and enumerations that are referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 6.2.1 can be referenced.

7.1.1.4.3.2 Simple data types

The simple data types defined in table 7.1.1.4.3.2-1 shall be supported.

Table 7.1.1.4.3.2-1: Simple data types

Type name	Description

7.1.1.4.3.3 Enumeration: InsideOutsideInd

The enumeration InsideOutsideInd represents a desired condition of the location reporting, e.g., inside or outside the given area. It shall comply with the provisions defined in table 7.1.1.4.3.3-1.

Table 7.1.1.4.3.3-1: Enumeration InsideOutsideInd

Enumeration value	Description	Applicability
INSIDE	Indicates that the reporting shall occur when the UE is inside the given location.	
OUTSIDE	Indicates that the reporting shall occur when the UE is outside the given location.	

7.1.1.4.3.4 Enumeration: LocChangeCond

The enumeration LocChangeCond represents a desired condition of the requested location change. It shall comply with the provisions defined in table 7.1.1.4.3.4-1.

Table 7.1.1.4.3.4-1: Enumeration LocChangeCond

Enumeration value	Description	Applicability
CELL	The condition is cell change.	
NODEB	The condition is eNodeB or gNodeB change.	
TA_RA	The condition is TA or RA change.	
WLAN_AN	The condition is WLAN access network change (e.g., SSID or BSSID change).	
CIVIC_ADDR	The condition is civic address change.	
GPS	The condition is GPS coordinate change. (NOTE)	
SAI	The condition is SAI change.	
ECGI	The condition is ECGI change.	
RAT	The condition is RAT change.	
VAL_SERVICE_AREA	The condition is VAL service area change.	ValSrvArea
NOTE: Care needs to be taken with regards to load and signalling cost when using the "GPS" condition.		

7.1.1.4.3.5 Enumeration: AdaptiveReporting

The enumeration AdaptiveReporting represents the adaptive location configuration mode. It shall comply with the provisions defined in table 7.1.1.4.3.5-1.

Table 7.1.1.4.3.5-1: Enumeration AdaptiveReporting

Enumeration value	Description	Applicability
DIRECT_UPDATE	Indicates that the adaptive location configuration mode is to directly update the LM Client once configuration is adjusted without prior validation.	
SUGGESTIVE_UPDATE	Indicates that the adaptive location configuration mode is to suggest and validate the planned updates with the service consumer prior to applying them to the LM Client.	

7.1.1.4.3.6 Enumeration: Confirmation

The enumeration Confirmation represents a confirmation response. It shall comply with the provisions defined in table 7.1.1.4.3.6-1.

Table 7.1.1.4.3.6-1: Enumeration Confirmation

Enumeration value	Description	Applicability
ACCEPT	Indicates the acceptance of the proposed action.	
REJECT	Indicates the rejection of the proposed action.	

7.1.1.5 Error Handling

7.1.1.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.1.1.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_LocationReporting API.

7.1.1.5.3 Application Errors

The application errors defined for SS_LocationReporting API are listed in table 7.1.1.5.3-1.

Table 7.1.1.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.1.1.6 Feature negotiation

General feature negotiation procedures are defined in clause 6.8.

Table 7.1.1.6-1: Supported Features

Feature number	Feature Name	Description
1	PatchUpdate	Indicates the support of the PATCH method for updating an Individual SEAL Location Reporting Configuration resource.
2	ValSrvArea	This feature indicates the support of VAL service area ID functionality as part of phase-3 of the enhancements to the SEAL framework. The following functionalities are supported: - Support the usage of the VAL service area identifier to identify a VAL service area.
3	TriggeringCriteria	Indicates the support of the triggering criteria for the location reporting trigger as a part of the enhancements to the SEAL framework. The following functionalities are supported: - Support location reporting based on triggering criteria information.
4	NotifSupport	Indicates the support of the notification service operation.
5	eLSApp	This feature indicates the support of the enhancement to enable application layer support for location services. The following functionalities are supported: - Support of adaptive location reporting.

7.1.2 SS_LocationAreaInfoRetrieval API

7.1.2.1 API URI

The request URI used in each HTTP request from the VAL server towards the location management server shall have the structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-lair".
- The <apiVersion> shall be "v1".

- The <apiSpecificSuffixes> shall be set as described in clause 7.1.2.2.

7.1.2.2 Resources

7.1.2.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.1.2.2.1-1 depicts the resource URIs structure for the SS_LocationAreaInfoRetrieval API.

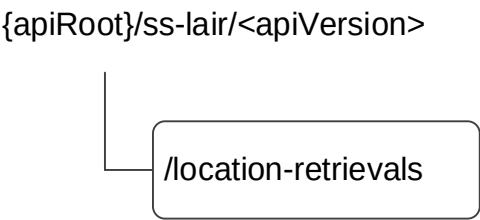


Figure 7.1.2.2.1-1: Resource URI structure of the SS_LocationAreaInfoRetrieval API

Table 7.1.2.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.1.2.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Location Information	/location-retrievals	GET	Obtains the UE(s) information in an application defined proximity range of a location.

7.1.2.2.2 Resource: Location Information

7.1.2.2.2.1 Description

The Location Information resource represents the collection of UE(s) location information at the location management server.

7.1.2.2.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-lair/<apiVersion>/location-retrievals**

This resource shall support the resource URI variables defined in the table 7.1.2.2.2.2-1.

Table 7.1.2.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.1.2.2.2.3 Resource Standard Methods

7.1.2.2.2.3.1 GET

This operation obtains the UE(s) information in an application defined proximity range of a location. This method shall support the URI query parameters specified in table 7.1.2.2.2.3.1-1.

Table 7.1.2.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
location-info	LocationInfo	M	1	Location information around which the UE(s) information is requested. (NOTE)	
val-svc-area-id	ValSvcAreaId	O	0..1	Contains the identifier of the VAL service area around which the UE(s) information is requested. (NOTE)	ValSrvArea
range	Float	M	1	The range information over which the UE(s) information is required, expressed in meters. Minimum = 0	
NOTE: If the "ValSrvArea" feature is supported and the "val-svc-area-id" query parameter is provided, then the LM server shall ignore the "location-info" query parameter.					

This method shall support the request data structures specified in table 7.1.2.2.3.1-2 and the response data structures and response codes specified in table 7.1.2.2.3.1-3.

Table 7.1.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.2.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(LMInformation)	O	1..N	200 OK	The UE(s) information in an application defined proximity range of a location
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative location management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative location management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.2.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative location management server.

Table 7.1.2.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative location management server.

7.1.2.2.2.4 Resource Custom Operations

None.

7.1.2.3 Notifications

None.

7.1.2.4 Data Model

7.1.2.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.1.2.4.1-1 specifies the data types defined specifically for the SS_LocationAreaInfoRetrieval API service.

Table 7.1.2.4.1-1: SS_LocationAreaInfoRetrieval API specific Data Types

Data type	Section defined	Description	Applicability

Table 7.1.2.4.1-2 specifies data types re-used by the SS_LocationAreaInfoRetrieval API service.

Table 7.1.2.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
Float	3GPP TS 29.571 [21]	Used to represent the value of the range.	
LMInformation	7.5.1.4.2.8	Used to represent the location information for a VAL User ID or a VAL UE ID.	
LocationInfo	3GPP TS 29.122 [3]	Used to represent the location information.	
ValSvcAreaId	Clause 7.1.3.4.3.2	Used to represent the VAL service area identifier.	ValSrvArea

7.1.2.4.2 Structured Data Types

None.

7.1.2.4.3 Simple data types and enumerations

None.

7.1.2.5 Error Handling

7.1.2.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.1.2.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_LocationAreaInfoRetrieval API.

7.1.2.5.3 Application Errors

The application errors defined for SS_LocationAreaInfoRetrieval API are listed in table 7.1.2.5.3-1.

Table 7.1.2.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.1.2.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8.

Table 7.1.2.6-1: Supported Features

Feature number	Feature Name	Description
1	ValSrvArea	This feature indicates the support of VAL service area ID functionality as part of the enhancements to SEAL. The following functionalities are supported: - Support the usage of the VAL service area identifier to identify a VAL service area.

7.1.3 SS_VALServiceAreaConfiguration API

7.1.3.1 API URI

The SS_VALServiceAreaConfiguration service shall use the SS_VALServiceAreaConfiguration API.

The API URI of the SS_VALServiceAreaConfiguration API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-vsac".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.1.3.2.

7.1.3.1A Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_VALServiceAreaConfiguration API.

7.1.3.2 Resources

7.1.3.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.1.3.2.1-1 depicts the resource URIs structure for the SS_VALServiceAreaConfiguration API.

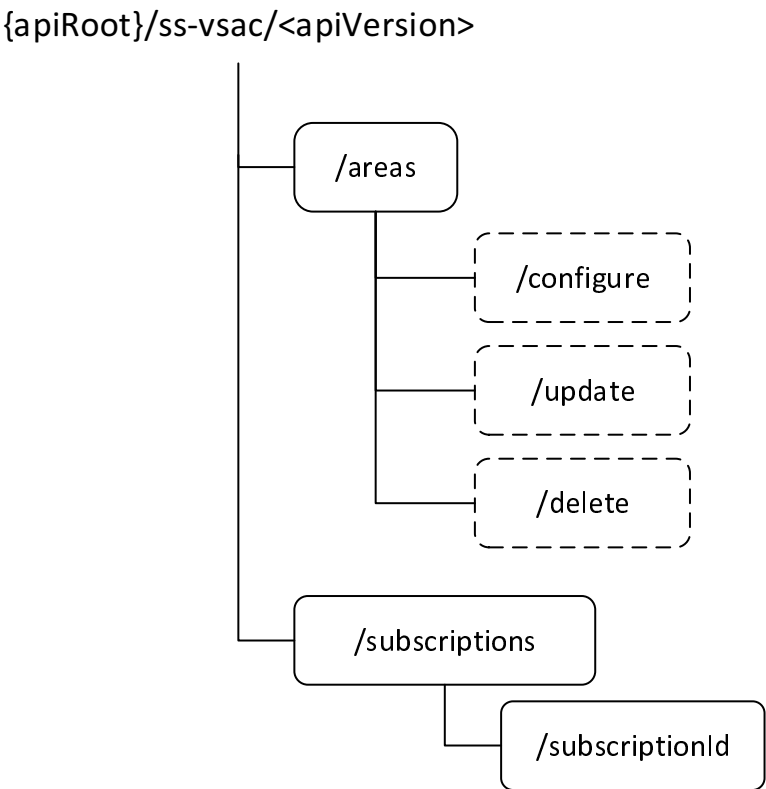


Figure 7.1.3.2.1-1: Resource URI structure of the SS_VALServiceAreaConfiguration API

Table 7.1.3.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.1.3.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
VAL Service Areas	/areas	GET	Obtain the VAL service area(s) according to the provided filtering criteria.
	/areas/configure	Configure	Configure VAL service area(s).
	/areas/update	Update	Update existing VAL service area(s).
	/areas/delete	Delete	Delete existing VAL service area(s).
VAL Service Area Change Subscriptions	/subscriptions	POST	Create a new VAL service area change event(s) subscription.
Individual VAL Service Area Change Subscription	/subscriptions/{subscriptionId}	GET	Retrieve the individual VAL service area change event(s) subscription resource according to the subscriptionId.
		DELETE	Delete an existing VAL service area change event(s) subscription resource according to the subscriptionId.

7.1.3.2.2 Resource: VAL Service Areas

7.1.3.2.2.1 Description

7.1.3.2.2.2 Resource Definition

Resource URI: {**apiRoot**}/ss-vsac/<**apiVersion**>/areas

This resource shall support the resource URI variables defined in table 7.1.3.2.2.2-1.

Table 7.1.3.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.1.3.1.

7.1.3.2.2.3 Resource Standard Methods

7.1.3.2.2.3.1 GET

This operation enables to retrieve one or several "Individual VAL Service Area" resources managed by the LM Server. This method shall support the URI query parameters specified in table 7.1.3.2.2.3.1-1.

Table 7.1.3.2.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
val-svc-area-ids	array(ValSvcAreaId)	O	1..N	Represents the requested VAL service area(s).
supp-feats	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.1.3.6. This query parameter shall be present only when feature negotiation needs to take place.
NOTE: At least one of these query parameters shall be present, unless the request targets to retrieve all the VAL service area(s) available for the VAL server at the LM Server.				

This method shall support the request data structures specified in table 7.1.3.2.2.3.1-2 and the response data structures and response codes specified in table 7.1.3.2.2.3.1-3.

Table 7.1.3.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ValServiceAreaData	M	1	200 OK	The requested VAL service area(s) information is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM Server.

Table 7.1.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM Server.

7.1.3.2.2.4 Resource Custom Operations

7.1.3.2.2.4.1 Overview

Table 7.1.3.2.2.4.1-1: Custom operations

Operation name	Custom operation URI	Mapped HTTP method	Description
Configure	/areas/configure	POST	Enables to configure VAL Service Area(s).
Update	/areas/update	POST	Enables to update existing VAL Service Area(s).
Delete	/areas/delete	POST	Enables to delete existing VAL Service Area(s).

7.1.3.2.2.4.2 Operation: Configure

This custom operation enables to configure VAL Service Area(s).

This operation shall support the request data structures specified in table 7.1.3.2.2.4.2-2 and the response data structures and response codes specified in table 7.1.3.2.2.4.2-3.

Table 7.1.3.2.2.4.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ValServiceAreaReq	M	1	Represents the VAL service area(s) configuration information.

Table 7.1.3.2.2.4.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ValServiceAreaResp	M	1	200 OK	Indicates the successfully configured VAL service area ID(s).
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.3.2.2.4.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM Server.

Table 7.1.3.2.2.4.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM Server.

7.1.3.2.2.4.3 Operation: Update

This custom operation enables to update existing VAL Service Area(s).

This operation shall support the request data structures specified in table 7.1.3.2.2.4.3-2 and the response data structures and response codes specified in table 7.1.3.2.2.4.3-3.

Table 7.1.3.2.2.4.3-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ValServiceAreaReq	M	1	Represents the VAL service area(s) information that shall be updated.

Table 7.1.3.2.2.4.3-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ValServiceAreaResp	M	1	200 OK	Indicates the successfully updated VAL service area ID(s).
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.3.2.2.4.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM Server.

Table 7.1.3.2.2.4.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM Server.

7.1.3.2.2.4.4 Operation: Delete

This custom operation enables to delete existing VAL Service Area(s).

This operation shall support the request data structures specified in table 7.1.3.2.2.4.4-2 and the response data structures and response codes specified in table 7.1.3.2.2.4.4-3.

Table 7.1.3.2.2.4.4-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ValServiceAreaReq	M	1	Represents the VAL service area(s) information that shall be deleted.

Table 7.1.3.2.2.4.4-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ValServiceAreaResp	M	1	200 OK	Indicates the successfully deleted VAL service area ID(s).
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.3.2.2.4.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM Server.

Table 7.1.3.2.2.4.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM Server.

7.1.3.2.3 Resource: VAL Service Area Change Subscriptions

7.1.3.2.3.1 Description

7.1.3.2.3.2 Resource Definition

Resource URI: {apiRoot}/ss-vsac/<apiVersion>/subscriptions

This resource shall support the resource URI variables defined in table 7.1.3.2.3.2-1.

Table 7.1.3.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.1.3.1.

7.1.3.2.3.3 Resource Standard Methods

7.1.3.2.3.3.1 POST

This method enables a SEAL Server to request the creation of the individual VAL service area change subscription at the LM Server. This method shall support the URI query parameters specified in table 7.1.3.2.3.3.1-1.

Table 7.1.3.2.3.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.1.3.2.3.3.1-2 and the response data structures and response codes specified in table 7.1.3.2.3.3.1-3.

Table 7.1.3.2.3.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ValServiceAreaSubsc	M	1	Represents the requested VAL service area change subscription parameters.

Table 7.1.3.2.3.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ValServiceAreaSubsc	M	1	201 Created	Successful case. The requested individual VAL service area change event(s) subscription resource is successfully created and a representation of the created resource is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.3.2.3.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-vsac/<apiVersion>/subscriptions{subscriptionId}

Table 7.1.3.2.3.3.1-5: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM Server.

Table 7.1.3.2.3.3.1-6: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM Server.

7.1.3.2.3.4 Resource Custom Operations

None.

7.1.3.2.4 Resource: Individual VAL Service Area Change Subscription

7.1.3.2.4.1 Description

7.1.3.2.4.2 Resource Definition

Resource URI: {**apiRoot**}/ss-vsac/<**apiVersion**>/subscriptions/{**subscriptionId**}

This resource shall support the resource URI variables defined in table 7.1.3.2.4.2-1.

Table 7.1.3.2.4.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.1.3.1.
subscriptionId	string	Represents the identifier of an individual VAL service area change event(s) subscription resource.

7.1.3.2.4.3 Resource Standard Methods

7.1.3.2.4.3.1 GET

This operation reads the Individual VAL Service Area Change Subscription resource. This method shall support the URI query parameters specified in table 7.1.3.2.4.3.1-1.

Table 7.1.3.2.4.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.1.3.2.4.3.1-2 and the response data structures and response codes specified in table 7.1.3.2.4.3.1-3.

Table 7.1.3.2.4.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.3.2.4.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ValServiceAreaSubsc	M	1	200 OK	The requested individual VAL service area change event(s) subscription is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.3.2.4.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM server.

Table 7.1.3.2.4.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM server.

7.1.3.2.4.3.2 PUT

This operation updates the Individual VAL Service Area Change Subscription resource. This method shall support the URI query parameters specified in table 7.1.3.2.4.3.2-1.

Table 7.1.3.2.4.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.1.3.2.4.3.2-2 and the response data structures and response codes specified in table 7.1.3.2.4.3.2-3.

Table 7.1.3.2.4.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
ValServiceAreaSubsc	M	1	Represents the updated representation of the VAL service area change event(s) subscription.

Table 7.1.3.2.4.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ValServiceAreaSubscription	M	1	200 OK	The individual VAL service area change event(s) subscription is updated successfully, and the representation of the updated resource is returned.
n/a			204 No Content	The individual VAL service area change event(s) subscription is updated successfully and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative VAL server where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative VAL server where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.3.2.4.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.3.2.4.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.3.2.4.3.3 PATCH

This operation modifies the Individual VAL Service Area Change Subscription resource. This method shall support the URI query parameters specified in table 7.1.3.2.4.3.3-1.

Table 7.1.3.2.4.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.1.3.2.4.3.3-2 and the response data structures and response codes specified in table 7.1.3.2.4.3.3-3.

Table 7.1.3.2.4.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
ValServiceAreaSubscPatch	M	1	Represents the requested modifications to the VAL service area change event(s) subscription.

Table 7.1.3.2.4.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ValServiceAreaSubsc	M	1	200 OK	The individual VAL service area change event(s) subscription is modified successfully, and the representation of the modified resource is returned.
n/a			204 No Content	The individual VAL service area change event(s) subscription is modified successfully and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.3.2.4.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.3.2.4.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.3.2.4.3.4 DELETE

This operation deletes the Individual VAL Service Area Change Subscription resource. This method shall support the URI query parameters specified in table 7.1.3.2.4.3.4-1.

Table 7.1.3.2.4.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.1.3.2.4.3.4-2 and the response data structures and response codes specified in table 7.1.3.2.4.3.4-3.

Table 7.1.3.2.4.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.3.2.4.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual VAL service area change event(s) subscription resource matching the subscriptionId is deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.3.2.4.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM server.

Table 7.1.3.2.4.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative LM server.

7.1.3.3 Notifications

7.1.3.3.1 General

Table 7.1.3.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
VAL Service Area Change Notification	{notifUri}	POST	Notify on changes of the VAL service area(s).

7.1.3.3.2 Individual Unicast Monitoring Notification

7.1.3.3.2.1 Description

7.1.3.3.2.2 Notification definition

Callback URI: {notifUri}

This method shall support the URI query parameters specified in table 7.1.3.3.2.2-1.

Table 7.1.3.3.2.2-1: 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 7.1.3.3.2.2-2 and the response data structures and response codes specified in table 7.1.3.3.2.2-3.

Table 7.1.3.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ValServiceAreaNotif	M	1	Represents the reported VAL service area data.

Table 7.1.3.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The notification is successfully received.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative VAL server where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative VAL server where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.1.3.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative VAL server towards which the notification should be redirected.

Table 7.1.3.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative VAL server towards which the notification should be redirected.

7.1.3.4 Data Model

7.1.3.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API

Table 7.1.3.4.1-1 specifies the data types defined specifically for the SS_VALServiceAreaConfiguration API service.

Table 7.1.3.4.1-1: SS_VALServiceAreaConfiguration API specific Data Types

Data type	Section defined	Description	Applicability
ValServiceArea	7.1.3.4.2.2	Represents the VAL service area.	
ValServiceAreaReq	7.1.3.4.2.3	Represents the VAL service area configuration/update/delete request.	
ValServiceAreaData	7.1.3.4.2.4	Represents the VAL service area retrieval information.	
ValServiceAreaResp	7.1.3.4.2.5	Represents the VAL service area configuration/update/delete response.	
ValServiceAreaSubsc	7.1.3.4.2.6	Represents the VAL service area change event(s) subscription.	
ValServiceAreaEventType	7.1.3.4.2.7	Represents the VAL service area change event type.	
ValServiceAreaNotif	7.1.3.4.2.8	Represents the VAL service area change event(s) notification.	
ValServiceAreaEventInfo	7.1.3.4.2.9	Represents the VAL service area change event(s) content.	
ValServiceAreaEvent	7.1.3.4.3.3	Represents the VAL service area change event.	
ValServiceAreaSubscPatch	7.1.3.4.2.10	Represents the VAL service area change event(s) modification request.	
ValSvcAreaId	Clause 7.1.3.4.3.2	Used to represent the VAL service area identifier.	

Table 7.1.3.4.1-2 specifies data types re-used by the SS_VALServiceAreaConfiguration API service.

Table 7.1.3.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
DurationSec	3GPP TS 29.571 [21]	Used to indicate the subscription duration.	
LocationArea5G	3GPP TS 29.122 [3]	Used to indicate the location information.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the applicability of optional features defined in table 7.1.3.6-1.	
Uri	3GPP TS 29.122 [3]	Used to indicate the notification URI.	

7.1.3.4.2 Structured data types

7.1.3.4.2.1 Introduction

7.1.3.4.2.2 Type: ValServiceArea

Table 7.1.3.4.2.2-1: Definition of type ValServiceArea

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcAreaId	ValSvcAreaId	M	1	Represents the VAL service area ID.	
locations	array(LocationArea5G)	M	1..N	Represents the locations associated with the VAL service area. (NOTE)	
NOTE: The "nwAreaInfo" attribute within the LocationArea5G data type provided within this attribute is not applicable and shall not be present.					

7.1.3.4.2.3 Type: ValServiceAreaReq

Table 7.1.3.4.2.3-1: Definition of type ValServiceAreaReq

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcAreas	array(ValServiceArea)	M	1..N	Represents the VAL service area(s).	
suppFeat	Supported Features	C	0..1	Represents the supported features. This attribute shall be provided when feature negotiation needs to take place.	

7.1.3.4.2.4 Type: ValServiceAreaData

Table 7.1.3.4.2.4-1: Definition of type ValServiceAreaData

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcAreas	array(ValServiceArea)	O	1..N	Represents the requested VAL service area(s). If this attribute is not present, this means that no VAL service data instance satisfies the provided query parameter(s) in the request.	
suppFeats	Supported Features	C	0..1	Used to negotiate the applicability of optional features defined in table 7.1.3.6-1. This attribute shall be present only if feature negotiation needs to take place.	

7.1.3.4.2.5 Type: ValServiceAreaResp

Table 7.1.3.4.2.5-1: Definition of type ValServiceAreaResp

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcAreaIds	array(ValSvcAreaId)	M	1..N	Represents the successfully handled VAL service area ID(s).	
suppFeat	Supported Features	C	0..1	Represents the supported features. This attribute shall be provided when feature negotiation needs to take place.	

7.1.3.4.2.6 Type: ValServiceAreaSubsc

Table 7.1.3.4.2.6-1: Definition of type ValServiceAreaSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
events	array(ValServiceAreaEventInfoType)	M	1..N	Represents the subscribed VAL service area change event(s).	
notifUri	Uri	M	1	Indicates the URI towards which the notification should be delivered.	
subscDur	DurationSec	O	0..1	Indicates the subscription duration. If omitted, there is no time limit.	
suppFeat	SupportedFeatures	C	0..1	Represents the supported features. This attribute shall be provided when feature negotiation needs to take place.	

7.1.3.4.2.7 Type: ValServiceAreaEventType

Table 7.1.3.4.2.7-1: Definition of type ValServiceAreaEventType

Attribute name	Data type	P	Cardinality	Description	Applicability
event	ValServiceAreaEvent	M	1	Represents the requested VAL service area change event.	
valSvcAreaIds	array(ValSvcAreaId)	M	1..N	Represents the VAL service area ID(s) associated with the event.	

7.1.3.4.2.8 Type: ValServiceAreaNotif

Table 7.1.3.4.2.8-1: Definition of type ValServiceAreaNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcAreaContents	array(ValServiceAreaEventInfo)	M	1..N	Represents the VAL service area change event(s) content.	

7.1.3.4.2.9 Type: ValServiceAreaEventInfo

Table 7.1.3.4.2.9-1: Definition of type ValServiceAreaEventInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
event	ValServiceAreaEvent	M	1	Represents the VAL service area change event.	
valSvcAreas	array(ValServiceArea)	C	1..N	Represents the VAL service area(s) associated with the event. This attribute shall be provided if the "event" is "UPDATE".	
valSvcAreaIds	array(ValSvcAreaId)	C	1..N	Represents the VAL service area ID(s) associated with the event. This attribute shall be provided if the "event" is "DELETE".	

7.1.3.4.2.10 Type: ValServiceAreaSubscPatch

Table 7.1.3.4.2.10-1: Definition of type ValServiceAreaSubscPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
events	array(ValServiceAreaEventType)	O	1..N	Represents the subscribed VAL service area change event(s).	
notifUri	Uri	O	0..1	Indicates the URI towards which the notification should be delivered.	
subscDur	DurationSec	O	0..1	Indicates the subscription duration.	

7.1.3.4.3 Simple data types and enumerations

7.1.3.4.3.1 Introduction

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

7.1.3.4.3.2 Simple data types

The simple data types defined in table 7.1.3.4.3.2-1 shall be supported.

Table 7.1.3.4.3.2-1: Simple data types

Type name	Description
ValSvcAreald	Represents the VAL Service Area identifier encoded as a string and generated either based on VAL Server ID or using the Universally Unique Identifier (UUID) version 4 as described in IETF RFC 9562 [40].

7.1.3.4.3.3 Enumeration: ValServiceAreaEvent

Table 7.1.3.4.3.3-1: Enumeration ValServiceAreaEvent

Enumeration value	Description	Applicability
UPDATE	Indicates that the VAL service area change event is VAL service area update.	
DELETE	Indicates that the VAL service area change event is VAL service area delete.	

7.1.3.5 Error Handling

7.1.3.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.1.3.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_VALServiceAreaConfiguration API.

7.1.3.5.3 Application Errors

The application errors defined for SS_VALServiceAreaConfiguration API are listed in table 7.1.3.5.3-1.

Table 7.1.3.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability
n/a			

7.1.3.6 Feature negotiation

The optional features in table 7.1.3.6-1 are defined for the SS_VALServiceAreaConfiguration API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.1.3.6-1: Supported Features

Feature number	Feature Name	Description

7.1.4 SS_LocationHistoryInfoEvent API

7.1.4.1 Introduction

The SS_LocationHistoryInfoEvent service shall use the SS_LocationHistoryInfoEvent API.

The API URI of the SS_LocationHistoryInfoEvent Service API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-lhie".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5.

NOTE: When 3GPP TS 29.122 [3] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 7.1.4, the LM Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.1.4.2 Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_LocationHistoryInfoEvent API.

7.1.4.3 Resources

7.1.4.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.1.4.3.1-1 depicts the resource URIs structure for the SS_LocationHistoryInfoEvent API.

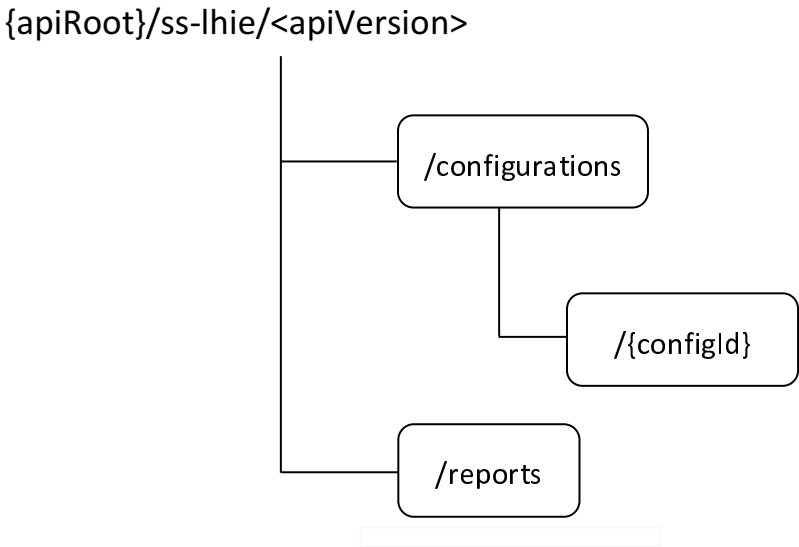


Figure 7.1.4.3.1-1: Resource URIs structure of the SS_LocationHistoryInfoEvent API

Table 7.1.4.3.1-1 provides an overview of the resources and applicable HTTP methods for the SS_LocationHistoryInfoEvent API.

Table 7.1.4.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Location Tracing Configurations	/configurations	POST	Request the creation of a Location Tracing Configuration.
Individual Location Tracing Configuration	/configurations/{configId}	GET	Retrieve an existing "Individual Location Tracing Configuration" resource.
		PUT	Request the update of an existing "Individual Location Tracing Configuration" resource.
		PATCH	Request the modification of an existing "Individual Location Tracing Configuration" resource.
		DELETE	Request the deletion of an existing "Individual Location Tracing Configuration" resource.
Location History Reports	/reports	GET	Retrieve location history report(s).

7.1.4.3.2 Resource: Location Tracing Configurations

7.1.4.3.2.1 Description

This resource represents the collection of Location Tracing Configurations managed by the LM Server.

7.1.4.3.2.2 Resource Definition

Resource URI: {apiRoot}/ss-lhie/<apiVersion>/configurations

This resource shall support the resource URI variables defined in table 7.1.4.3.2.2-1.

Table 7.1.4.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 7.1.4.1.

7.1.4.3.2.3 Resource Standard Methods

7.1.4.3.2.3.1 POST

The HTTP POST method allows a service consumer to request the creation of a Location Tracing Configuration at the LM Server.

This method shall support the URI query parameters specified in table 7.1.4.3.2.3.1-1.

Table 7.1.4.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.4.3.2.3.1-2 and the response data structures and response codes specified in table 7.1.4.3.2.3.1-3.

Table 7.1.4.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocTracingConfig	M	1	Represents the parameters to request the creation of a Location Tracing Configuration.

Table 7.1.4.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocTracingConfig	M	1	201 Created	Successful case. The Location Tracing Configuration is successfully created and a representation of the created "Individual Location Tracing Configuration" resource shall be returned. An HTTP "Location" header that contains the URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.4.3.2.3.1-4: 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}/ss-lhie/<apiVersion>/configurations/{configId}

7.1.4.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.1.4.3.3 Resource: Individual Location Tracing Configuration

7.1.4.3.3.1 Description

This resource represents a Location Tracing Configuration managed by the LM Server.

7.1.4.3.3.2 Resource Definition

Resource URI: {apiRoot}/ss-lhie/<apiVersion>/configurations/{configId}

This resource shall support the resource URI variables defined in table 7.1.4.3.3.2-1.

Table 7.1.4.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 7.1.4.1.
configId	string	Represents the identifier of the "Individual Location Tracing Configuration" resource.

7.1.4.3.3.3 Resource Standard Methods

7.1.4.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual Location Tracing Configuration" resource at the LM Server.

This method shall support the URI query parameters specified in table 7.1.4.3.3.3.1-1.

Table 7.1.4.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.4.3.3.3.1-2 and the response data structures and response codes specified in table 7.1.4.3.3.3.1-3.

Table 7.1.4.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.4.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocTracingConfig	M	1	200 OK	Successful case. The requested "Individual Location Tracing Configuration" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.4.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.4.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.4.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual Location Tracing Configuration" resource at the LM Server.

This method shall support the URI query parameters specified in table 7.1.4.3.3.2-1.

Table 7.1.4.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.4.3.3.2-2 and the response data structures and response codes specified in table 7.1.4.3.3.2-3.

Table 7.1.4.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
LocTracingConfig	M	1	Represents the updated representation of the "Individual Location Tracing Configuration" resource.

Table 7.1.4.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocTracingConfig	M	1	200 OK	Successful case. The "Individual Location Tracing Configuration" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Location Tracing Configuration" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.4.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.4.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.4.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual Location Tracing Configuration" resource at the LM Server.

This method shall support the URI query parameters specified in table 7.1.4.3.3.3-1.

Table 7.1.4.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.4.3.3.3-2 and the response data structures and response codes specified in table 7.1.4.3.3.3-3.

Table 7.1.4.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
LocTracingConfigPatch	M	1	Represents the parameters to request the modification of the "Individual Location Tracing Configuration" resource.

Table 7.1.4.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocTracingConfig	M	1	200 OK	Successful case. The "Individual Location Tracing Configuration" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Location Tracing Configuration" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.4.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.4.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.4.3.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual Location Tracing Configuration" resource at the LM Server.

This method shall support the URI query parameters specified in table 7.1.4.3.3.3.4-1.

Table 7.1.4.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.4.3.3.4-2 and the response data structures and response codes specified in table 7.1.4.3.3.4-3.

Table 7.1.4.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.4.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual Location Tracing Configuration" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.4.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.4.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.4.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.1.4.3.4 Resource: Location History Reports

7.1.4.3.4.1 Description

This resource represents the collection of Location History Report(s) managed by the LM Server.

7.1.4.3.4.2 Resource Definition

Resource URI: {apiRoot}/ss-lhie/<apiVersion>/reports

This resource shall support the resource URI variables defined in table 7.1.4.3.4.2-1.

Table 7.1.4.3.4.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 7.1.4.1.

7.1.4.3.4.3 Resource Standard Methods

7.1.4.3.4.3.1 GET

The HTTP GET method allows a service consumer to retrieve Location History Report(s) from the LM Server.

This method shall support the URI query parameters specified in table 7.1.4.3.4.3.1-1.

Table 7.1.4.3.4.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
target-id	ValTargetUe	M	1	Contains the identifier of the target VAL UE or VAL user.	
val-service-id	string	O	0..1	Contains the identifier of the target VAL service.	
req-loc-history	ReqLocHistory	O	0..1	Contains the requested location history filtering information.	
supp-feat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.1.4.7. This query parameter shall be present only when feature negotiation is required.	

This method shall support the request data structures specified in table 7.1.4.3.4.3.1-2 and the response data structures and response codes specified in table 7.1.4.3.4.3.1-3.

Table 7.1.4.3.4.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.4.3.4.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocHistoryReports	M	1	200 OK	Successful case. The requested Location History Report(s), if any, shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.4.3.4.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.4.3.4.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.4.3.4.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.1.4.4 Custom Operations without associated resources

There are no custom Operations without associated resources defined for this resource in this release of the specification.

7.1.4.5 Notifications

There are no notifications defined for this resource in this release of the specification.

7.1.4.6 Data Model

7.1.4.6.1 General

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

Table 7.1.4.6.1-1 specifies the data types defined for the SS_LocationHistoryInfoEvent API.

Table 7.1.4.6.1-1: SS_LocationHistoryInfoEvent API specific Data Types

Data type	Clause defined	Description	Applicability
LocTracingConfig	7.1.4.6.2.2	Represents a Location Tracing Configuration.	
LocTracingConfigPatch	7.1.4.6.2.3	Represents the parameters to request the modification of a Location Tracing Configuration.	
ReqLocHistory	7.1.4.6.2.4	Represents the requested location history filtering information.	
LocHistoryReport	7.1.4.6.2.6	Represents a location history report.	
LocHistoryReports	7.1.4.6.2.5	Represents the location history report(s).	

Table 7.1.4.6.1-2 specifies data types re-used by the SS_LocationHistoryInfoEvent API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SS_LocationHistoryInfoEvent API.

Table 7.1.4.6.1-2: SS_LocationHistoryInfoEvent API re-used Data Types

Data type	Reference	Comments	Applicability
DateTime	3GPP TS 29.122 [3]	Represents a date and a time.	
DurationSec	3GPP TS 29.122 [3]	Represents a time duration expressed in units of seconds.	
LocationArea5G	3GPP TS 29.122 [3]	Represents a location area.	
LocationInfo	3GPP TS 29.122 [3]	Represents user location information.	
LocationQoS	3GPP TS 29.572 [31]	Represents the location QoS.	
PositioningMethod	3GPP TS 29.572 [31]	Represents the positioning method.	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
TriggeringCriteria	Clause 7.1.1.4.2.4	Represents the location reporting triggering criteria.	
ValTargetUe	Clause 7.3.1.4.2.3	Represents the identifier of a VAL UE or VAL user.	

7.1.4.6.2 Structured data types

7.1.4.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

7.1.4.6.2.2 Type: LocTracingConfig

Table 7.1.4.6.2.2-1: Definition of type LocTracingConfig

Attribute name	Data type	P	Cardinality	Description	Applicability
target	ValTargetUe	M	1	Contains the identifier of the targeted VAL UE or VAL user.	
valServiceId	string	O	0..1	Contains the identifier of the targeted VAL service.	
locArea	LocationArea5G	O	0..1	Contains the location area where the location tracing configuration shall apply.	
locQoS	LocationQoS	O	0..1	Contains the requested location QoS.	
triggerConds	TriggeringCriteria	O	0..1	Contains the triggering conditions of the location tracing configuration.	
duration	DurationSec	O	0..1	Contains the time duration within which the location tracing configuration stays valid.	
posMethod	PositioningMethod	O	0..1	Contains the requested positioning method.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.1.4.8. This attribute shall be present only when feature negotiation is required.	

7.1.4.6.2.3 Type: LocTracingConfigPatch

Table 7.1.4.6.2.3-1: Definition of type LocTracingConfigPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
locArea	LocationArea5G	O	0..1	Contains the location area where the location tracing configuration shall apply.	
locQoS	LocationQoS	O	0..1	Contains the requested location QoS.	
triggerConds	TriggeringCriteria	O	0..1	Contains the triggering conditions of the location tracing configuration.	
duration	DurationSec	O	0..1	Contains the time duration within which the location tracing configuration stays valid.	
posMethod	PositioningMethod	O	0..1	Contains the requested positioning method.	

7.1.4.6.2.4 Type: ReqLocHistory

Table 7.1.4.6.2.4-1: Definition of type ReqLocHistory

Attribute name	Data type	P	Cardinality	Description	Applicability
locArea	LocationArea5G	C	0..1	Contains the location area where the location history report(s) is/are requested. (NOTE)	
time	DateTime	C	0..1	Contains the time at which the location history report(s) is/are requested. (NOTE)	
duration	DurationSec	C	0..1	Contains the time duration within which the location history report(s) is/are requested. (NOTE)	
NOTE 1: At least one of these attributes shall be present.					

7.1.4.6.2.5 Type: LocHistoryReports

Table 7.1.4.6.2.5-1: Definition of type LocHistoryReports

Attribute name	Data type	P	Cardinality	Description	Applicability
reports	array(LocHistoryReport)	M	0..N	Contains the Location History Report(s). If there are no Location History Report(s) fulfilling the request, this attribute shall contain an empty array.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.1.4.7. This attribute shall be present only when feature negotiation is required.	

7.1.4.6.2.6 Type: LocHistoryReport

Table 7.1.4.6.2.6-1: Definition of type LocHistoryReport

Attribute name	Data type	P	Cardinality	Description	Applicability
targets	array(ValTargetUe)	C	1..N	Contains the identifier(s) of the VAL UE/user(s) to which the location history report is related. (NOTE)	
locData	map(LocationInfo)	M	1..N	Contains the location history information report. The key of the map shall be set to the identifier of the VAL UE/user (among the ones provided within the "targets" attribute) to which the provided location history information provided within the map value is related.	
timestamp	DateTime	O	0..1	Contains the timestamp of the location history report.	

7.1.4.6.3 Simple data types and enumerations

7.1.4.6.3.1 Introduction

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

7.1.4.6.3.2 Simple data types

The simple data types defined in table 7.1.4.6.3.2-1 shall be supported.

Table 7.1.4.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.1.4.6.5 Binary data

7.1.4.6.5.1 Binary Data Types

Table 7.1.4.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

7.1.4.7 Error Handling

7.1.4.7.1 General

For the SS_LocationHistoryInfoEvent API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses are applicable for the SS_LocationHistoryInfoEvent API.

7.1.4.7.2 Protocol Errors

No specific protocol errors for the SS_LocationHistoryInfoEvent API are specified.

7.1.4.7.3 Application Errors

The application errors defined for the SS_LocationHistoryInfoEvent API are listed in Table 7.1.4.7.3-1.

Table 7.1.4.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.1.4.8 Feature negotiation

The optional features listed in table 7.1.4.8-1 are defined for the SS_LocationHistoryInfoEvent API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.1.4.8-1: Supported Features

Feature number	Feature Name	Description

7.1.4.9 Security

The provisions of clause 9 shall apply for the SS_LocationHistoryInfoEvent API.

7.1.5 SS_ConfirmLocation Service API

7.1.5.1 Introduction

The SS_ConfirmLocation service shall use the SS_ConfirmLocation API.

The API URI of the SS_ConfirmLocation Service API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-cl".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5.

NOTE: When 3GPP TS 29.122 [3] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 7.1.5, the LM Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.1.5.2 Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_ConfirmLocation API.

7.1.5.3Resources

7.1.5.3.1Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.1.5.3.1-1 depicts the resource URIs structure for the SS_ConfirmLocation API.

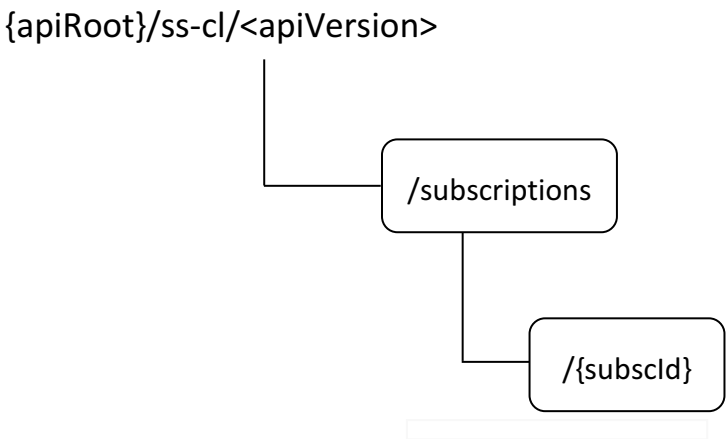


Figure 7.1.5.3.1-1: Resource URIs structure of the SS_ConfirmLocation API

Table 7.1.5.3.1-1 provides an overview of the resources and applicable HTTP methods for the SS_ConfirmLocation API.

Table 7.1.5.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Location Confirmation Service Subscriptions	/subscriptions	POST	Request the creation of a Location Confirmation Service Subscription.
Individual Location Confirmation Service Subscription	/subscriptions/{subscId}	GET	Retrieve an existing "Individual Location Confirmation Service Subscription" resource.
		PUT	Request the update of an existing "Individual Location Confirmation Service Subscription" resource.
		PATCH	Request the modification of an existing "Individual Location Confirmation Service Subscription" resource.
		DELETE	Request the deletion of an existing "Individual Location Confirmation Service Subscription" resource.

7.1.5.3.2Resource: Location Confirmation Service Subscriptions

7.1.5.3.2.1Description

This resource represents the collection of Location Confirmation Service Subscriptions managed by the LM Server.

7.1.5.3.2.2Resource Definition

Resource URI: {apiRoot}/ss-cl/<apiVersion>/subscriptions

This resource shall support the resource URI variables defined in table 7.1.5.3.2.2-1.

Table 7.1.5.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 7.1.5.1.

7.1.5.3.2.3 Resource Standard Methods

7.1.5.3.2.3.1 POST

The HTTP POST method allows a service consumer to request the creation of a Location Confirmation Service Subscription at the LM Server.

This method shall support the URI query parameters specified in table 7.1.5.3.2.3.1-1.

Table 7.1.5.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.5.3.2.3.1-2 and the response data structures and response codes specified in table 7.1.5.3.2.3.1-3.

Table 7.1.5.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocConfirmSubsc	M	1	Represents the parameters to request the creation of a Location Confirmation Service Subscription.

Table 7.1.5.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocConfirmSubsc	M	1	201 Created	Successful case. The Location Confirmation Service Subscription is successfully created and a representation of the created "Individual Location Confirmation Service Subscription" resource shall be returned. An HTTP "Location" header that contains the URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.5.3.2.3.1-4: 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}/ss-cl/<apiVersion>/subscriptions/{subscId}

7.1.5.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.1.5.3.3 Resource: Individual Location Confirmation Service Subscription

7.1.5.3.3.1 Description

This resource represents a Location Confirmation Service Subscription managed by the LM Server.

7.1.5.3.3.2 Resource Definition

Resource URI: **{apiRoot}/ss-cl/<apiVersion>/subscriptions/{subscId}**

This resource shall support the resource URI variables defined in table 7.1.5.3.3.2-1.

Table 7.1.5.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 7.1.5.1.
subscId	string	Represents the identifier of the "Individual Location Confirmation Service Subscription" resource.

7.1.5.3.3.3 Resource Standard Methods

7.1.5.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual Location Confirmation Service Subscription" resource at the LM Server.

This method shall support the URI query parameters specified in table 7.1.5.3.3.3.1-1.

Table 7.1.5.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.5.3.3.3.1-2 and the response data structures and response codes specified in table 7.1.5.3.3.3.1-3.

Table 7.1.5.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.5.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocConfirmSubsc	M	1	200 OK	Successful case. The requested "Individual Location Confirmation Service Subscription" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.5.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.5.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.5.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual Location Confirmation Service Subscription" resource at the LM Server.

This method shall support the URI query parameters specified in table 7.1.5.3.3.2-1.

Table 7.1.5.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.5.3.3.2-2 and the response data structures and response codes specified in table 7.1.5.3.3.2-3.

Table 7.1.5.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
LocConfirmSubsc	M	1	Represents the updated representation of the "Individual Location Confirmation Service Subscription" resource.

Table 7.1.5.3.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocConfirmSubsc	M	1	200 OK	Successful case. The "Individual Location Confirmation Service Subscription" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Location Confirmation Service Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.5.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.5.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.5.3.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual Location Confirmation Service Subscription" resource at the LM Server.

This method shall support the URI query parameters specified in table 7.1.5.3.3.3.3-1.

Table 7.1.5.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.5.3.3.3.3-2 and the response data structures and response codes specified in table 7.1.5.3.3.3.3-3.

Table 7.1.5.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
LocConfirmSubscPatch	M	1	Represents the parameters to request the modification of the "Individual Location Confirmation Service Subscription" resource.

Table 7.1.5.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocConfirmSubsc	M	1	200 OK	Successful case. The "Individual Location Confirmation Service Subscription" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Location Confirmation Service Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.5.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.5.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.5.3.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual Location Confirmation Service Subscription" resource at the LM Server.

This method shall support the URI query parameters specified in table 7.1.5.3.3.3.4-1.

Table 7.1.5.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.5.3.3.4-2 and the response data structures and response codes specified in table 7.1.5.3.3.4-3.

Table 7.1.5.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.5.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual Location Confirmation Service Subscription" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.5.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.5.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.5.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.1.5.4 Custom Operations without associated resources

There are no custom Operations without associated resources defined for this resource in this release of the specification.

7.1.5.5 Notifications

7.1.5.5.1 General

Notifications shall comply to clause 6.6.

Table 7.1.5.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Location Confirmation Service Usage Notification	{notifUri}	POST	This service operation enables an LM Server to notify a previously subscribed service consumer on location confirmation service usage related event(s).

7.1.5.5.2 Location Confirmation Service Usage Notification

7.1.5.5.2.1 Description

The Location Confirmation Service Usage Notification is used by an LM Server to notify a previously subscribed service consumer on location confirmation service usage related event(s).

7.1.5.5.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 7.1.5.5.2.2-1.

Table 7.1.5.5.2.2-1: Callback URI variables

Name	Data type	Definition
notifUri	Uri	Represents the callback URI encoded as a string formatted as a URI.

7.1.5.5.2.3 Standard Methods

7.1.5.5.2.3.1 POST

This method shall support the request data structures specified in table 7.1.5.5.2.3.1-1 and the response data structures and response codes specified in table 7.1.5.5.2.3.1-2.

Table 7.1.5.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
LocConfirmUsageNotif	M	1	Represents the Location Confirmation Service Usage Notification.

Table 7.1.5.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The Location Confirmation Service Usage Notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.5.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 7.1.5.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

7.1.5.6 Data Model

7.1.5.6.1 General

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

Table 7.1.5.6.1-1 specifies the data types defined for the SS_ConfirmLocation API.

Table 7.1.5.6.1-1: SS_ConfirmLocation API specific Data Types

Data type	Clause defined	Description	Applicability
LocConfirmSubsc	7.1.5.6.2.2	Represents a Location Confirmation Service Subscription.	
LocConfirmSubscPatch	7.1.5.6.2.3	Represents the parameters to request the modification of a Location Confirmation Service Subscription.	
LocConfirmUsageNotif	7.1.5.6.2.4	Represents a Location Confirmation Service Usage Notification.	
LocConfirmUsageReport	7.1.5.6.2.5	Represents a location confirmation service usage report.	

Table 7.1.5.6.1-2 specifies data types re-used by the SS_ConfirmLocation API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SS_ConfirmLocation API.

Table 7.1.5.6.1-2: SS_ConfirmLocation API re-used Data Types

Data type	Reference	Comments	Applicability
DateTime	3GPP TS 29.122 [3]	Represents a date and a time.	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	

7.1.5.6.2 Structured data types

7.1.5.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

7.1.5.6.2.2 Type: LocConfirmSubsc

Table 7.1.5.6.2.2-1: Definition of type LocConfirmSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
applds	array(string)	C	1..N	Contains the identifier(s) of the application(s) to which the subscription shall apply. (NOTE)	
valServiceIds	array(string)	C	1..N	Contains the identifier(s) of the VAL service(s) to which the subscription shall apply. (NOTE)	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.1.5.8. This attribute shall be present only when feature negotiation is required.	
NOTE: These attributes are mutually exclusive and only one of them shall be present.					

7.1.5.6.2.3 Type: LocConfirmSubscPatch

Table 7.1.5.6.2.3-1: Definition of type LocConfirmSubscPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
applds	array(string)	O	1..N	Contains the identifier(s) of the application(s) to which the subscription shall apply.	
valServiceIds	array(string)	O	1..N	Contains the identifier(s) of the VAL service(s) to which the subscription shall apply.	

7.1.5.6.2.4 Type: LocConfirmUsageNotif

Table 7.1.5.6.2.4-1: Definition of type LocConfirmUsageNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
reports	array(LocConfirmUsageReport)	M	0..N	Contains the location confirmation service usage report(s).	
timestamp	DateTime	O	0..1	Contains the timestamp of the notification.	

7.1.5.6.2.5 Type: LocConfirmUsageReport

Table 7.1.5.6.2.5-1: Definition of type LocConfirmUsageReport

Attribute name	Data type	P	Cardinality	Description	Applicability
appld	string	C	0..1	Contains the identifier of the application to which the location confirmation service report is related.	
valServiceId	string	C	0..1	Contains the identifier of the VAL service to which the location confirmation service report is related.	
valUeId	string	M	1	Contains the identifier of the VAL UE that requested the location confirmation service.	
timestamp	DateTime	O	0..1	Contains the time at which the location confirmation service was triggered by the VAL UE identified by the "valUeId" attribute.	
NOTE: These attributes are mutually exclusive and either one of them shall be present.					

7.1.5.6.3 Simple data types and enumerations

7.1.5.6.3.1 Introduction

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

7.1.5.6.3.2 Simple data types

The simple data types defined in table 7.1.5.6.3.2-1 shall be supported.

Table 7.1.5.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.1.5.6.5 Binary data

7.1.5.6.5.1 Binary Data Types

Table 7.1.5.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

7.1.5.7 Error Handling

7.1.5.7.1 General

For the SS_ConfirmLocation API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses are applicable for the SS_ConfirmLocation API.

7.1.5.7.2 Protocol Errors

No specific protocol errors for the SS_ConfirmLocation API are specified.

7.1.5.7.3 Application Errors

The application errors defined for the SS_ConfirmLocation API are listed in Table 7.1.5.7.3-1.

Table 7.1.5.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.1.5.8 Feature negotiation

The optional features listed in table 7.1.5.8-1 are defined for the SS_ConfirmLocation API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.1.5.8-1: Supported Features

Feature number	Feature Name	Description

7.1.5.9 Security

The provisions of clause 9 shall apply for the SS_ConfirmLocation API.

7.1.6 SS_SLPositioningManagement Service API

7.1.6.1 Introduction

The SS_SLPositioningManagement service shall use the SS_SLPositioningManagement API.

The API URI of the SS_SLPositioningManagement API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-slp".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5.

NOTE: When 3GPP TS 29.122 [3] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 7.1.6, the LM Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.1.6.2 Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_SLPositioningManagement API.

7.1.6.3 Resources

7.1.6.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.1.6.3.1-1 depicts the resource URIs structure for the SS_SLPositioningManagement API.

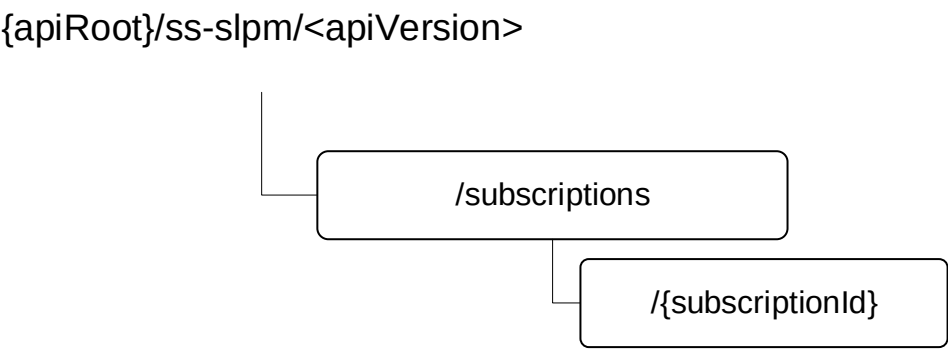


Figure 7.1.6.3.1-1: Resource URI structure of the SS_SLPositioningManagement API

Table 7.1.6.3.1-1 provides an overview of the resources and applicable HTTP methods for the SS_SLPositioningManagement API.

Table 7.1.6.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
SL Positioning Management Subscriptions	/subscriptions	POST	Create a new SL Positioning Management Subscription.
Individual SL Positioning Management Subscription	/subscriptions/{subscriptionId}	GET	Retrieve an existing "Individual SL Positioning Management Subscription" resource.
		PUT	Update an existing "Individual SL Positioning Management Subscription" resource.
		PATCH	Modify an existing "Individual SL Positioning Management Subscription" resource.
		DELETE	Delete an existing "Individual SL Positioning Management Subscription" resource.

7.1.6.3.2 Resource: SL Positioning Management Subscriptions

7.1.6.3.2.1 Description

This resource represents the collection of SL Positioning Management Subscriptions managed by the LM Server.

7.1.6.3.2.2 Resource Definition

Resource URI: {apiRoot}/ss-slpm/<apiVersion>/subscriptions

This resource shall support the resource URI variables defined in table 7.1.6.3.2.2-1.

Table 7.1.6.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.1.6.1.

7.1.6.3.2.3 Resource Standard Methods

7.1.6.3.2.3.1 POST

The HTTP POST method enables a service consumer to request the creation of a new SL Positioning Management Subscription at the LM Server.

This method shall support the URI query parameters specified in table 7.1.6.3.2.3.1-1.

Table 7.1.6.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.1.6.3.2.3.1-2 and the response data structures and response codes specified in table 7.1.6.3.2.3.1-3.

Table 7.1.6.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SIPositionMgmtSubsc	M	1	Represents the parameters to request the creation of an SL Positioning Management Subscription.

Table 7.1.6.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SLPositionMgmtSubscription	M	1	201 Created	Successful case. The SL Position Management Subscription is successfully created, and a representation of the created "Individual SL Positioning Management Subscription" resource is returned in the response body. An HTTP "Location" header that contains the URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.6.3.2.3.1-4: 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}/ss-slp/ <apiVersion>/subscriptions{subscriptionId}

7.1.6.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.1.6.3.3 Resource: Individual SL Positioning Management Subscription

7.1.6.3.3.1 Description

7.1.6.3.3.2 Resource Definition

Resource URI: {apiRoot}/ss-slp/ <apiVersion>/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 7.1.6.3.3.2-1.

Table 7.1.6.3.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.1.6.1.
subscriptionId	string	Represents the identifier of an "Individual SL Positioning Management Subscription" resource.

7.1.6.3.3.3 Resource Standard Methods

7.1.6.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual SL Positioning Management Subscription" resource at the LM Server.

This method shall support the URI query parameters specified in table 7.1.6.3.3.3.1-1.

Table 7.1.6.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 7.1.6.3.3.3.1-2 and the response data structures and response codes specified in table 7.1.6.3.3.3.1-3.

Table 7.1.6.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.6.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SIPositionMgmtSubsc	M	1	200 OK	Successful case. The requested "Individual SL Positioning Management Subscription" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.6.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.6.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.6.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual SL Positioning Management Subscription" resource.

This method shall support the URI query parameters specified in table 7.1.6.3.3.3.2-1.

Table 7.1.6.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.1.6.3.3.3.2-2 and the response data structures and response codes specified in table 7.1.6.3.3.3.2-3.

Table 7.1.6.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
SIPositionMgmtSubsc	M	1	Represents the updated representation of the "Individual SL Positioning Management Subscription" resource.

Table 7.1.6.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SIPositionMgmtSubsc	M	1	200 OK	Successful case. The "Individual SL Positioning Management Subscription" resource is updated successfully, and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual SL Positioning Management Subscription" resource is updated successfully, and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.6.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.6.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.6.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual SL Positioning Management Subscription" resource.

This method shall support the URI query parameters specified in table 7.1.6.3.3.3-1.

Table 7.1.6.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.1.6.3.3.3.3-2 and the response data structures and response codes specified in table 7.1.6.3.3.3.3-3.

Table 7.1.6.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
SIPositionMgmtSubscPatch	M	1	Represents the requested modifications to the "Individual SL Positioning Management Subscription" resource.

Table 7.1.6.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SIPositionMgmtSubsc	M	1	200 OK	Successful case. The "Individual SL Positioning Management Subscription" resource is modified successfully, and the representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual SL Positioning Management Subscription" resource is modified successfully, and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.6.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

Table 7.1.6.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM Server.

7.1.6.3.3.3.4 DELETE

The HTTP PATCH method allows a service consumer to request the deletion of an existing "Individual SL Positioning Management Subscription" resource.

Table 7.1.6.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.1.6.3.3.3.4-2 and the response data structures and response codes specified in table 7.1.6.3.3.3.4-3.

Table 7.1.6.3.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.1.6.3.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual SL Positioning Management Subscription" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.6.3.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM server.

Table 7.1.6.3.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative LM server.

7.1.6.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.1.6.4 Custom Operations without associated resources

7.1.6.4.1 Overview

The structure of the custom operation URIs of the SS_SLPositioningManagement API is shown in Figure 7.1.6.4.1-1.

Figure 7.1.6.4.1-1 depicts the resource URIs structure for the SS_SLPositioningManagement API.

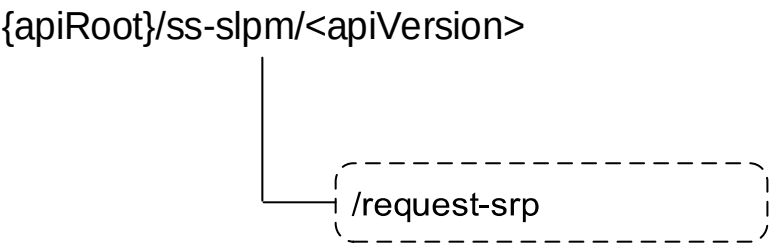


Figure 7.1.6.4.1-1: Custom operation URI structure of the SS_SLPositioningManagement API

Table 7.1.6.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the SS_SLPositioningManagement API.

Table 7.1.6.4.1-1: Custom operations without associated resources

Custom operation name	Custom operation URI	Mapped HTTP method	Description
SR Positioning Information Request	/request-srp	POST	Enables to request SR Positioning Information.

The custom operations shall support the URI variables defined in table 7.1.6.4.1-2.

Table 7.1.6.4.1-2: URI variables for this custom operation

Name	Data type	Definition
apiRoot	string	See clause 7.6.2.1.

7.1.6.4.2 Operation: SR Positioning Information Request

7.1.6.4.2.1 Description

This custom operation enables a service consumer to request SR based positioning information to the LM Server.

7.1.6.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 7.1.6.4.2.2-1 and the response data structures and response codes specified in table 7.1.6.4.2.2-2.

Table 7.1.6.4.2.2-1: Data structures supported by the POST Request Body on this custom operation

Data type	P	Cardinality	Description
SrPosInfoReq	M	1	Contains the SR Positioning Information Request.

Table 7.1.6.4.2.2-2: Data structures supported by the POST Response Body on this custom operation

Data type	P	Cardinality	Response codes	Description
SrPosInfoResp			200 OK	Successful case. The Positioning Information Request is successfully received and processed, and the requested SR based positioning information is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative LM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status code for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.6.4.2.2-3: Headers supported by the 307 Response Code on this custom operation

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative LM Server.

Table 7.1.6.4.2.2-4: Headers supported by the 308 Response Code on this custom operation

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative LM Server.

7.1.6.5 Notifications

7.1.6.5.1 General

Notifications shall comply to clause 6.6.

Table 7.1.6.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
SL Positioning Management Event Notification	{notifUri}	POST	This service operation enables an LM Server to notify a previously subscribed service consumer on SL Positioning related event(s).

7.1.6.5.2 SL Positioning Management Event Notification

7.1.6.5.2.1 Description

The SL Positioning Management Event Notification is used by the LM Server to notify a previously subscribed service consumer on SL Positioning related event(s).

7.1.6.5.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 7.1.6.5.2.2-1.

Table 7.1.6.5.2.2-1: Callback URI variables

Name	Definition
notifUri	Represents the callback URI encoded as a string formatted as a URI.

7.1.6.5.2.3 Standard Methods

7.1.6.5.2.3.1 POST This method shall support the request data structures specified in table 7.1.6.5.2.3-1 and the response data structures and response codes specified in table 7.1.6.5.2.3-2.

Table 7.1.6.5.2.3-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SIPositionMgmtNotif	M	1	Represents the SL Positioning Management Event Notification.

Table 7.1.6.5.2.3-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The SL Positioning Management Event Notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.1.6.5.2.3-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 7.1.6.5.2.3-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

7.1.6.6 Data Model

7.1.6.6.1 General

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

Table 7.1.6.6.1-1 specifies the data types defined for the SS_SLPositioningManagement API.

Table 7.1.6.6.1-1: SS_SLPositioningManagement API specific Data Types

Data type	Section defined	Description	Applicability
SIPositionMgmtSubsc	7.1.6.6.2.2	Represents the SL Positioning Management subscription information.	
SIPositionMgmtSubscPatch	7.1.6.6.2.3	Represents the update in the SL Positioning Management subscription.	
SIPositionMgmtNotif	7.1.6.6.2.4	Represents the SL Positioning Management notification.	
SIPosMgmtParam	7.1.6.6.2.10	Represents the SL Positioning Management parameters.	
SIPosMgmtMetric	7.1.6.6.3.4	Represents the SL Positioning Management metric.	
SrPosInfoReq	7.1.6.6.2.6	Represents the SR Positioning Information Request.	
SrPosFilter	7.1.6.6.3.6	Represents the requested SR based positioning information filters.	
SrPosInfoResp	7.1.6.6.2.7	Represents the SR Positioning Information Response.	
SrUeList	7.1.6.6.2.8	Represents the list of UE identities of SR based positioning.	
SrPosInfo	7.1.6.6.2.9	Represents the SR based positioning information.	
ValUeInfo	7.1.6.6.2.5	Represents the Val UE and its address information.	
ValUeSel	7.1.6.6.3.5	Represents VAL UE(s) selection criteria for SL Positioning management.	

Table 7.1.6.6.1-2 specifies data types re-used by the SS_SLPositioningManagement API service.

Table 7.1.6.6.1-2: SS_SLPositioningManagement API re-used Data Types

Data type	Reference	Comments	Applicability
2DRelativeLocation	3GPP TS 29.572 [31]	Represents 2D local co-ordinates with origin corresponding to another known point.	
3DRelativeLocation	3GPP TS 29.572 [31]	Represents 3D local co-ordinates with origin corresponding to another known point.	
DurationSec	3GPP TS 29.122 [3]	Represents a time duration in units of seconds.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
LocationQoS	3GPP TS 29.572 [31]	Represents the location QoS.	
RangeDirection	3GPP TS 29.572 [31]	Represents the distance and direction between two points.	
RelativeVelocityWithUncertainty	3GPP TS 29.572 [31]	Represents relative velocity with uncertainty.	
ReportingInformation	3GPP TS 29.523 [20]	Used to indicate the reporting requirement.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the applicability of optional features defined in table 7.1.4.6-1.	
Uri	3GPP TS 29.122 [3]	Used to indicate the notification URI.	
ValServiceArea	Clause 7.1.3.4.2.2	Represents the VAL service area.	
ValTargetUe	Clause 7.3.1.4.2.3	Used to indicate either VAL User ID or VAL UE ID, to which location reporting applies.	
ValUeAddrInfo	Clause 7.4.1.4.2.30	Represents VAL UE address information.	

7.1.6.6.2 Structured data types

7.1.6.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

7.1.6.6.2.2

Type: SIPositionMgmtSubsc

Table 7.1.6.6.2.2-1: Definition of type SIPositionMgmtSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcId	string	M	1	Contains the identifier of the target VAL service of the VAL application for which the subscription applies.	
tgtUes	array(ValTargetUe)	C	1..N	Contains the list of the identifier(s) of the VAL User(s) or the list of the identifier(s) of the VAL UE(s) for which the subscription applies. (NOTE)	
valServArea	LocationArea5G	C	0..1	Contains the VAL Service Area for which the subscription applies. (NOTE)	
slPosMgmtParams	SIPosMgmtParam	O	0..1	Contains the requested SL Positioning parameters.	
valUeSel	array(ValUeSel)	O	1..N	Contains the list of the VAL UE(s) selection criteria.	
notifUri	Uri	M	1	Contains the URI via which notifications shall be delivered.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.1.6.8. This attribute shall be present only when feature negotiation is required.	
NOTE: At least one of these attributes shall be present.					

7.1.6.6.2.3

Type: SIPositionMgmtSubscPatch

Table 7.1.6.6.2.3-1: Definition of type SIPositionMgmtSubscPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
tgtUes	array(ValTargetUe)	O	1..N	Contains the either the list of the identifier(s) of the VAL User(s) or the list of the identifier(s) of the VAL UE(s) for which subscription applies.	
valServArea	LocationArea5G	O	0..1	Contains the VAL Service Area for which the subscription applies.	
slPosMgmtParams	SIPosMgmtParam	O	0..1	Contains the requested SL Positioning parameters.	
valUeSel	array(ValUeSel)	O	1..N	Contains the list of the VAL UE(s) selection criteria.	
notifUri	Uri	O	0..1	Contains the URI via which notifications shall be delivered.	

7.1.6.6.2.4

Type: SIPositionMgmtNotif

Table 7.1.6.6.2.4-1: Definition of type SIPositionMgmtNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
subscId	string	M	0..1	Contains the identifier of the subscription to which the notification is related.	
refUes	array(ValUeInfo)	C	1..N	Contains the Val UE(s) that are identified as the Reference UE(s). This attribute shall be present only if reference UE(s) is/are subscribed and discovered by the LMS.	
tgtUes	array(ValUeInfo)	C	1..N	Contains the Val UE(s) that are identified as the Target UE(s). This attribute shall be present only if target UE(s) is/are subscribed and discovered by the LMS.	
SIPosMgmtParamResp	map(map(RangeDirection))	C	1..N(1..M)	Contains one or several set(s) of distance and/or direction information between Reference UE(s) and Target UE(s). The key of the external map is the identifier of the Reference UE for which the provided map value applies. The key of the internal map is the identifier of the Target UE for which the provided map value applies. This attribute shall be present only if SL Positioning parameters are requested in the corresponding subscription.	

7.1.6.6.2.5

Type: ValUeInfo

Table 7.1.6.6.2.5-1: Definition of type ValUeInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
valUeId	string	C	0..1	Contains the unique identifier of the concerned VAL UE. (NOTE)	
valUeAddr	ValUeAddrInfo	C	0..1	Contains the address information of the concerned VAL UE. (NOTE)	

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

7.1.6.6.2.6

Type: SrPosInfoReq

Table 7.1.6.6.2.6-1: Definition of type SrPosInfoReq

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcId	string	O	0..1	Contains the identifier of the VAL service of the VAL application.	
ueList	SrUeList	M	1	Contains the list of the identifier of the target UE(s).	
srPosFltr	array(SrPosFilter)	M	1	Contains the requested SR based positioning information.	
locQoS	LocationQoS	O	0..1	Contains the requested location QoS.	
expTime	DurationSec	O	0..1	Contains the expiration timer for the SR based positioning information request.	

7.1.6.6.2.7 Type: SrPosInfoResp

Table 7.1.6.6.2.7-1: Definition of type SrPosInfoResp

Attribute name	Data type	P	Cardinality	Description	Applicability
srPosInfo	array(SrPosInfo)	M	1..N	Contains the SR based positioning information.	

7.1.6.6.2.8 Type: SrUeList

Table 7.1.6.6.2.8-1: Definition of type SrUeList

Attribute name	Data type	P	Cardinality	Description	Applicability
clientUes	array(string)	O	1..N	Contains the identifier(s) of client UE(s).	
tgtUes	array(string)	M	1..N	Contains the identifier(s) of target UE(s).	
refUes	array(string)	M	1..N	Contains the list of identifier(s) of reference UE(s).	

7.1.6.6.2.9 Type: SrPosInfo

Table 7.1.6.6.2.9-1: Definition of type SrPosInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
refUe	string	M	1	Contains the identity of reference UE.	
tgtUe	string	M	1	Contains the identity of target UE.	
relativeLocation 2D	2DRelativeLocation	C	0..1	Contains the 2D local co-ordinates of the target UE with the origin corresponding to the reference UE. (NOTE)	
relativeLocation 3D	3DRelativeLocation	C	0..1	Contains the 3D local co-ordinates of the target UE with the origin corresponding to the reference UE. (NOTE)	
relativeVelocity	RelativeVelocityWithUncertainty	C	0..1	Contains the 3D relative velocity of the target UE with the origin corresponding to the reference UE. (NOTE)	
distanceDirection	RangeDirection	C	0..1	Contains the the distance and direction of the target UE with the origin corresponding to the reference UE. (NOTE)	
NOTE: At least one of these attributes shall be present.					

7.1.6.6.2.10 Type: SIPosMgmtParam

Table 7.1.6.6.2.10-1: Definition of type SIPosMgmtParam

Attribute name	Data type	P	Cardinality	Description	Applicability
reqMetric	SIPosMgmtMetric	M	1	Contains the requested SL Positioning Management metric.	

7.1.6.6.3 Simple data types and enumerations

7.1.6.6.3.1 Introduction

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

7.1.6.6.3.2 Simple data types

The simple data types defined in table 7.1.6.6.3.2-1 shall be supported.

Table 7.1.6.6.3.2-1: Simple data types

Type name	Description

7.1.6.6.3.4 Enumeration: SIPosMgmtMetric

Table 7.1.6.6.3.4-1: Enumeration SIPosMgmtMetric

Enumeration value	Description	Applicability
DISTANCE	Indicates that the SL Positioning Management metric is distance.	
DIRECTION	Indicates that the SL Positioning Management metric is direction.	
DISTANCE_DIRECTION	Indicates that the SL Positioning Management metric is both distance and direction.	

7.1.6.6.3.5 Enumeration: ValUeSel

Table 7.1.6.6.3.5-1: Enumeration ValUeSel

Enumeration value	Description	Applicability
REF_UE	Indicates that the selection criteria of UE role is Reference UE.	
TARGET_UE	Indicates that the selection criteria of UE role is Target UE.	

7.1.6.6.3.6 Enumeration: SrPosFilter

Table 7.1.6.6.3.6-1: Enumeration SrPosFilter

Enumeration value	Description	Applicability
RANGE	Indicates that the range is requested.	
DIRECTION	Indicates that the direction is requested.	
RELATIVE_POS	Indicates that the relative position is requested.	
RELATIVE_VEL	Indicates that the relative velocity is requested.	

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.1.6.6.5 Binary data

7.1.6.6.5.1 Binary Data Types

Table 7.1.6.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

7.1.6.7 Error Handling

7.1.6.7.1 General

For the SS_SLPositioningManagement API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses are applicable for the SS_SLPositioningManagement API.

7.1.6.7.2 Protocol Errors

No specific protocol errors for the SS_SLPositioningManagement API are specified.

7.1.6.7.3 Application Errors

The application errors defined for SS_SLPositioningManagement API are listed in table 7.1.6.6.3-1.

Table 7.1.6.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability
n/a			

7.1.6.8 Feature negotiation

The optional features in table 7.1.4.8-1 are defined for the SS_SLPositioningManagement API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.1.6.8-1: Supported Features

Feature number	Feature Name	Description

7.1.6.9 Security

The provisions of clause 9 shall apply for the SS_SLPositioningManagement API.

7.2 Group management APIs

7.2.1 SS_GroupManagement API

7.2.1.1 API URI

The SS_GroupManagement service shall use the SS_GroupManagement API.

The request URIs used in HTTP requests from the VAL server towards the Group management server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-gm".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.2.1.2

7.2.1.2Resources

7.2.1.2.1Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.2.1.2.1-1 depicts the resource URIs structure for the SS_GroupManagement API.

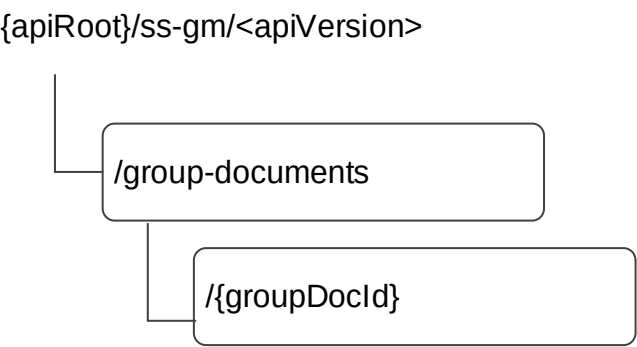


Figure 7.2.1.2.1-1: Resource URI structure of the SS_GroupManagement API

Table 7.2.1.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.2.1.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
VAL Group Documents	/group-documents	POST	Create a new VAL group document.
		GET	Retrieve VAL group documents according to the query parameters. If there are no query parameters, do not fetch any VAL group document.
Individual VAL Group Document	/group-documents/{groupDocId}	GET	Retrieve an individual VAL group's membership and configuration information according to query parameter on the resource identified by {groupDocId}. If there are no query parameter, fetch the whole VAL group document resource identified by {groupDocId}.
		PUT	Update an individual VAL group's membership and configuration information identified by {groupDocId}.
		PATCH	Partially update an individual VAL group's membership and configuration information identified by {groupDocId}
		DELETE	Deletes an individual VAL group's membership and configuration information identified by {groupDocId}.

7.2.1.2.2 Resource: VAL Group Documents

7.2.1.2.2.1 Description

The VAL Group Documents resource represents all the VAL group documents that are created at a given group management server.

7.2.1.2.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-gm/<apiVersion>/group-documents**

This resource shall support the resource URI variables defined in the table 7.2.1.2.2.2-1.

Table 7.2.1.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.2.1.2.2.3 Resource Standard Methods

7.2.1.2.2.3.1 POST

This method shall support the URI query parameters specified in table 7.2.1.2.2.3.1-1.

Table 7.2.1.2.2.3.1-1: 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 7.2.1.2.2.3.1-2 and the response data structures and response codes specified in table 7.2.1.2.2.3.1-3.

Table 7.2.1.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
VALGroupDocument	M	1	Details of the VAL group that needs to be created,

Table 7.2.1.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
VALGroupDocument	M	1	201 Created	VAL group created successfully. The URI of the created resource shall be returned in the "Location" HTTP header.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.2.1.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-gm/<apiVersion>/group-documents/{groupDocId}

7.2.1.2.2.3.2 GET

This operation retrieves VAL group documents satisfying filter criteria. This method shall support the URI query parameters specified in table 7.2.1.2.2.3.2-1.

Table 7.2.1.2.2.3.2-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
val-group-id	string	O	0..1	String identifying the VAL group.
val-service-id	string	O	0..1	String identifying the VAL service.

This method shall support the request data structures specified in table 7.2.1.2.2.3.2-2 and the response data structures and response codes specified in table 7.2.1.2.2.3.2 -3.

Table 7.2.1.2.2.3.2-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.2.1.2.3.2-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(VALGroupDocument)	M	0..N	200 OK	List of VAL group documents. This response shall include VAL group documents matching the query parameters provided in the request.
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative group management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative group management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.2.1.2.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative group management server.

Table 7.2.1.2.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative group management server.

7.2.1.2.2.4 Resource Custom Operations

None.

7.2.1.2.3 Resource: Individual VAL Group Document

7.2.1.2.3.1 Description

The Individual VAL Group Document resource represents an individual group document that is created at a given group management server.

7.2.1.2.3.2 Resource Definition

Resource URI: **{apiRoot}/ss-gm/<apiVersion>/group-documents/{groupDocId}**

This resource shall support the resource URI variables defined in the table 7.2.1.2.3.2-1.

Table 7.2.1.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
groupDocId	string	Represents an individual group document resource.

7.2.1.2.3.3 Resource Standard Methods

7.2.1.2.3.3.1 GET

This operation retrieves VAL group information satisfying filter criteria. This method shall support the URI query parameters specified in table 7.2.1.2.3.3.1-1.

Table 7.2.1.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
group-members	boolean	O	0..1	When set to 'true', it indicates the group management server to send the members list information of the VAL group. Set to false or omitted otherwise.
group-configuration	boolean	O	0..1	When set to 'true', it indicates the group management server to send the configuration information of the VAL group. Set to false or omitted otherwise.

This method shall support the request data structures specified in table 7.2.1.2.3.3.1-2 and the response data structures and response codes specified in table 7.2.1.2.3.3.1-3.

Table 7.2.1.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.2.1.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
VALGroupDocument	M	1	200 OK	The VAL group information based on the request from the VAL server. This response shall include VAL group members list if group-members flag is set to true in the request, VAL group configuration information if the group-configuration flag is set to true in the request, VAL group identifier, whole VAL group document resource if both group-members and group-configuration flags are omitted/set to false in the request.
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative group management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative group management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.2.1.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative group management server.

Table 7.2.1.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative group management server.

7.2.1.2.3.3.2 PUT

This operation updates the VAL group document. This method shall support the URI query parameters specified in table 7.2.1.2.3.3.2-1.

Table 7.2.1.2.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.2.1.2.3.3.2-2 and the response data structures and response codes specified in table 7.2.1.2.3.3.2-3.

Table 7.2.1.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
VALGroupDocument	M	1	Updated details of the VAL group document.

Table 7.2.1.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
VALGroupDocument	M	1	200 OK	The VAL group document updated successfully and the updated VAL group document returned in the response.
n/a			204 No Content	The VAL group document updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative group management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative group management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.2.1.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative group management server.

Table 7.2.1.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative group management server.

7.2.1.2.3.3.3 DELETE

This operation deletes the VAL group document. This method shall support the URI query parameters specified in table 7.2.1.2.3.3.3-1.

Table 7.2.1.2.3.3.3-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.2.1.2.3.3.3-2 and the response data structures and response codes specified in table 7.2.1.2.3.3.3-3.

Table 7.2.1.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.2.1.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual VAL group document matching the groupDocId is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative group management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative group management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.2.1.2.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative group management server.

Table 7.2.1.2.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative group management server.

7.2.1.2.3.3.4 PATCH

This method shall support the URI query parameters specified in table 7.2.1.2.3.3.4-1.

Table 7.2.1.2.3.3.4-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.2.1.2.3.3.4-2 and the response data structures and response codes specified in table 7.2.1.2.3.3.4-3.

Table 7.2.1.2.3.3.4-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
VALGroupDocumentPatch	M	1	Contains the modifications to be applied to the Individual VAL Group Document resource.

Table 7.2.1.2.3.3.4-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
VALGroupDocument	M	1	200 OK	Individual VAL Group Document resource is modified successfully and representation of the modified VAL Group Document resource is returned.
n/a			204 No Content	The Individual VAL Group Document resource is updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.2.1.2.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

Table 7.2.1.2.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

7.2.1.2.3.4 Resource Custom Operations

None.

7.2.1.3 Notifications

None.

7.2.1.4 Data Model

7.2.1.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API

Table 7.2.1.4.1-1 specifies the data types defined specifically for the SS_GroupManagement API service.

Table 7.2.1.4.1-1: SS_GroupManagement API specific Data Types

Data type	Section defined	Description	Applicability
VALGroupDocument	7.2.1.4.2.2	Represents details of the VAL group document information.	
VALGroupDocumentPatch	7.2.1.4.2.3	Represent details of the partial update of VAL group document information.	PatchUpdate

Table 7.2.1.4.1-2 specifies data types re-used by the SS_GroupManagement API service.

Table 7.2.1.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
ExternalGroupId	3GPP TS 29.122 [3]	Used to represent the the external group identifier related to the member UEs of the group.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
LocationInfo	3GPP TS 29.122 [3]	The location information related to VAL group.	
PduSessionType	3GPP TS 29.571 [21]	Identifies PDU Session Type.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the applicability of optional features defined in table 7.2.1.6-1.	
ValSvcAreald	Clause 7.1.3.4.3.2	Used to represent the VAL service area identifier.	ValSrvArea
ValTargetUe	Clause 7.3.1.4.2.3	Used to indicate either VAL User ID or VAL UE ID, to which location reporting applies.	

7.2.1.4.2 Structured data types

7.2.1.4.2.1 Introduction

7.2.1.4.2.2 Type: VALGroupDocument

Table 7.2.1.4.2.2-1: Definition of type VALGroupDocument

Attribute name	Data type	P	Cardinality	Description	Applicability
valGroupld	string	M	1	This is VAL group identity (VAL group ID) as per TS 23.434 [2], which is a unique identifier within the VAL service that represents a VAL group, set of VAL users or VAL UEs according to the VAL service.	
grpDesc	string	O	0..1	Text description of the VAL group.	
members	array(ValTargetUe)	O	1..N	List of VAL User IDs or VAL UE IDs, which are members of the VAL group.	
valGrpConf	string	O	0..1	Configuration data for the VAL group. Shall be present in HTTP POST request message from VAL server to Group Management server.	
valServiceIds	array(string)	O	1..N	List of VAL services whose communications enabled on the group.	
suppFeat	Supported Features	C	0..1	Used to negotiate the supported optional features of the API as described in clause 6.8. This attribute shall be provided only if feature negotiation needs to take place..	
resUri	Uri	O	0..1	The URI for individual VAL group document resource. (NOTE 1)	
locInfo	LocationInfo	O	0..1	The location information related to the VAL group. This information is used to determine the members of the group. (NOTE 3)	
addLocInfo	LocationArea5G	O	0..1	The additional location information related to the VAL group. This information is used to determining the members of the group. (NOTE 3)	
valSvcAreaId	ValSvcAreaId	O	0..1	Identifier of the VAL service area. (NOTE 3)	ValSrvArea
extGrpId	ExternalGroupld	O	0..1	The external group identifier, identifying the member UEs of the VAL group at the 3GPP core network.	
com5GLanType	PduSessionType	O	0..1	Identifies the 5G LAN-Type communication. (NOTE 2)	
valSvcInf	string	O	0..1	VAL service specific information that may be present during group membership update and in the notification of the events "GM_GROUP_INFO_CHANGE" and "GM_GROUP_CREATE".	
NOTE 1: The "resUri" attribute is not modifiable by the VAL server.					
NOTE 2: The enumeration value "UNSTRUCTURED" in data type "PduSessionType" is not applicable.					
NOTE 3: When the "ValSrvArea" feature is supported, the "locInfo" and "valSvcAreaId" attributes are mutually exclusive; and the "addLocInfo" and "valSvcAreaId" attributes are mutually exclusive.					

7.2.1.4.2.3 Type: VALGroupDocumentPatch

Table 7.2.1.4.2.3-1: Definition of type VALGroupDocumentPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
grpDesc	string	O	0..1	Text description of the VAL group.	
members	array(ValTargetUe)	O	1..N	List of VAL User IDs or VAL UE IDs, which are members of the VAL group.	
valGrpConf	string	O	0..1	Configuration data for the VAL group.	
valServiceIds	array(string)	O	1..N	List of VAL services whose communications enabled on the group.	
locInfo	LocationInfo	O	0..1	The location information related to the VAL group. This information is used to determine the members of the group. (NOTE 2)	
addLocInfo	LocationArea5G	O	0..1	The additional location information related to the VAL group. This information is used to determining the members of the group. (NOTE 2)	
valSvcAreaId	ValSvcAreaId	O	0..1	Identifier of the VAL service area. (NOTE 2)	ValSrvArea
extGrpId	ExternalGroupId	O	0..1	The external group identifier, identifying the member UEs of the VAL group at the 3GPP core network.	
com5GLanType	PduSessionType	O	0..1	Identifies the 5G LAN-Type communication. (NOTE 1)	
NOTE 1: The enumeration value "UNSTRUCTURED" in data type "PduSessionType" is not applicable. NOTE 2: When the "ValSrvArea" feature is supported, the "locInfo" attribute and "valSvcAreaId" attribute are mutually exclusive within the resource representation, and the "valSvcAreaId" attribute and the "addLocInfo" attribute are also mutually exclusive in the resource representation. If one of them is provided in this data type for the first time as part of an update request, the other shall be removed from the resource representation, if present.					

7.2.1.4.3 Simple data types and enumerations

None.

7.2.1.5 Error Handling

7.2.1.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.2.1.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_GroupManagement API.

7.2.1.5.3 Application Errors

The application errors defined for SS_GroupManagement API are listed in table 7.2.1.5.3-1.

Table 7.2.1.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.2.1.6 Feature negotiation

General feature negotiation procedures are defined in clause 6.8.

Table 7.2.1.6-1: Supported Features

Feature number	Feature Name	Description
1	PatchUpdate	Indicates the support of the PATCH method for updating an Individual VAL Group Document resource.
2	enNB1	This feature indicates the support of enhancements to this application layer API in Rel-18.
3	ValSrvArea	This feature indicates the support of VAL service area ID functionality as part of the phase-3 of the enhancements to the SEAL framework. The following functionalities are supported: - Support the usage of the VAL service area identifier to identify a VAL service area.

7.3 Configuration management APIs

7.3.1 SS_UserProfileRetrieval API

7.3.1.1 API URI

The SS_UserProfileRetrieval service shall use the SS_UserProfileRetrieval API.

The request URIs used in HTTP requests from the VAL server towards the Configuration management server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-upr".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.3.1.2.

7.3.1.2 Resources

7.3.1.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.3.1.2.1-1 depicts the resource URIs structure for the SS_UserProfileRetrieval API.

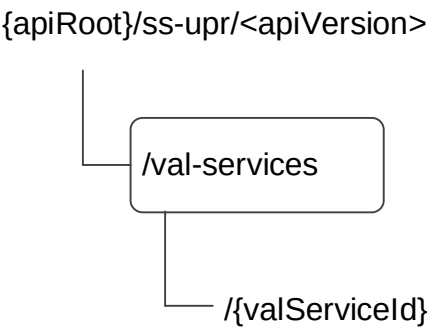


Figure 7.3.1.2.1-1: Resource URI structure of the SS_UserProfileRetrieval API

Table 7.3.1.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.3.1.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
VAL Services	/val-services	GET	Retrieve VAL User or VAL UE's profile information.

7.3.1.2.2 Resource: VAL Services

7.3.1.2.2.1 Description

The VAL Services resource represents all the VAL services that are created at a given configuration management server.

7.3.1.2.2.2 Resource Definition

Resource URI: {apiRoot}/ss-upr/<apiVersion>/val-services

This resource shall support the resource URI variables defined in the table 7.3.1.2.2.2-1.

Table 7.3.1.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.3.1.2.2.3 Resource Standard Methods

7.3.1.2.2.3.1 GET

This operation retrieves VAL User or VAL UE profile information satisfying the filter criteria. This method shall support the URI query parameters specified in table 7.3.1.2.2.3.1-1.

Table 7.3.1.2.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
val-tgt-ue	ValTargetUe	M	1	Identifying a VAL target UE.
val-service-id	string	O	0..1	String identifying a VAL service.

This method shall support the request data structures specified in table 7.3.1.2.2.3.1-2 and the response data structures and response codes specified in table 7.3.1.2.2.3.1 -3.

Table 7.3.1.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.3.1.2.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(ProfileDoc)	M	0..N	200 OK	List of VAL User / VAL UE profile documents. This response shall include user profile information matching the query parameters provided in the request.
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative configuration management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative configuration management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.3.1.2.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative configuration management server.

Table 7.3.1.2.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative configuration management server.

7.3.1.2.2.4 Resource Custom Operations

None.

7.3.1.3 Notifications

None.

7.3.1.4 Data Model

7.3.1.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API

Table 7.3.1.4.1-1 specifies the data types defined specifically for the SS_UserProfileRetrieval API service.

Table 7.3.1.4.1-1: SS_UserProfileRetrieval API specific Data Types

Data type	Section defined	Description	Applicability
ProfileDoc	7.3.1.4.2.2	Represents the profile information associated with VAL user ID or VAL UE ID.	
ValTargetUe	7.3.1.4.2.3	Represents the information identifying a VAL user ID or VAL UE ID.	
ValTargetUeRm	7.3.1.4.2.4	Represents the same as the ValTargetUe data type but with the OpenAPI "nullable" property set to "true".	

Table 7.3.1.4.1-2 specifies data types re-used by the SS_UserProfileRetrieval API service.

Table 7.3.1.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
n/a			

7.3.1.4.2 Structured data types

7.3.1.4.2.1 Introduction

7.3.1.4.2.2 Type: ProfileDoc

Table 7.3.1.4.2.2-1: Definition of type ProfileDoc

Attribute name	Data type	P	Cardinality	Description	Applicability
profileInformation	string	M	1	Profile information associated with valTgtUe.	
valTgtUe	ValTargetUe	M	1	Unique identifier of a VAL user or a VAL UE.	

7.3.1.4.2.3 Type: ValTargetUe

Table 7.3.1.4.2.3-1: Definition of type ValTargetUe

Attribute name	Data type	P	Cardinality	Description	Applicability
valUserId	string	O	0..1	Unique identifier of a VAL user.	
valUeId	string	O	0..1	Unique identifier of a VAL UE.	

NOTE: Either "valUserId" or "valUeId" shall be provided.

7.3.1.4.2.4 Type: ValTargetUeRm

This data type is defined in the same way as the "ValTargetUe" data type, but with the OpenAPI "nullable" property set to "true".

7.3.1.4.3 Simple data types and enumerations

None.

7.3.1.5 Error Handling

7.3.1.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.3.1.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_UserProfileRetrieval API.

7.3.1.5.3 Application Errors

The application errors defined for SS_UserProfileRetrieval API are listed in table 7.3.1.5.3-1.

Table 7.3.1.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.3.1.6 Feature negotiation

General feature negotiation procedures are defined in clause 6.8.

Table 7.3.1.6-1: Supported Features

Feature number	Feature Name	Description

7.3.2 SS_VALServiceData API

7.3.2.1 API URI

The SS_VALServiceData service shall use the SS_VALServiceData API.

The API URI of the SS_VALServiceData API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-bsd".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.3.1.2.

7.3.2.1A Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_VALServiceData API.

7.3.2.2 Resources

7.3.2.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.3.2.2.1-1 depicts the resource URIs structure for the SS_VALServiceData API.

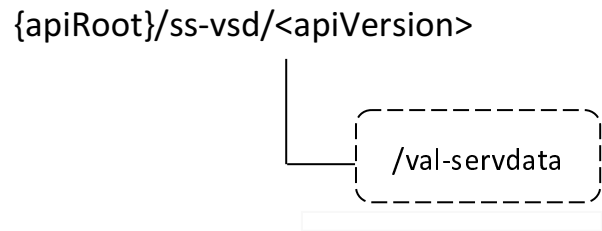


Figure 7.3.2.2.1-1: Resource URI structure of the SS_VALServiceData API

Table 7.3.2.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.3.2.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
VAL Service Data Sets	/val-servdata	GET	Retrieve the VAL service data according to the provided query parameter(s).

7.3.2.2.2 Resource: VAL Service Data Sets

7.3.2.2.2.1 Description

This resource represents the collection of VAL Service Data resources managed by the CM Server.

7.3.2.2.2.2 Resource Definition

Resource URI: {apiRoot}/ss-vsd/<apiVersion>/val-servdata

This resource shall support the resource URI variables defined in the table 7.3.2.2.2-1.

Table 7.3.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.

7.3.2.2.2.3 Resource Standard Methods

7.3.2.2.2.3.1 GET

This operation retrieves the VAL service data satisfying the filter criteria. This method shall support the URI query parameters specified in table 7.3.2.2.2.3.1-1.

Table 7.3.2.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
val-tgt-ues	array(string)	O	1..N	Identifying the list of the target VAL UE(s). (NOTE)
val-tgt-users	array(string)	O	1..N	Identifying the list of the target VAL user(s). (NOTE)
val-service-ids	array(string)	O	1..N	Identifying the list of the target VAL service(s). (NOTE)
supp-feats	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.3.2.7. This query parameter shall be present only when feature negotiation needs to take place.
NOTE: At least one of these query parameters shall be present, unless the request targets to retrieve all the VAL Service Data Sets managed by the CM Server.				

This method shall support the request data structures specified in table 7.3.2.2.3.1-2 and the response data structures and response codes specified in table 7.3.2.2.3.1-3.

Table 7.3.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.3.2.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ValServDataResp	M	1	200 OK	Represents the requested VAL service data.
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative CM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative CM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.3.2.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative CM Server.

Table 7.3.2.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative CM server.

7.3.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.3.2.3 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

7.3.2.4 Notifications

There are no notifications defined for this API in this release of the specification.

7.3.2.5 Data Model

7.3.2.5.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.3.2.5.1-1 specifies the data types defined specifically for the SS_VALServiceData API service.

Table 7.3.2.5.1-1: SS_VALServiceData API specific Data Types

Data type	Section defined	Description	Applicability
ValServDataResp	7.3.2.5.2.2	Represents the response to a VAL service data retrieval request.	
ValServiceData	7.3.2.5.2.3	Represents the VAL service data.	

Table 7.3.2.5.1-2 specifies data types re-used by the SS_VALServiceData API service.

Table 7.3.2.5.1-2: SS_VALServiceData re-used Data Types

Data type	Reference	Comments	Applicability
SupportedFeatures	3GPP TS 29.571 [21]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
ValTargetUe	7.3.1.4.2.3	Used to indicate the VAL user ID or VAL UE ID.	

7.3.2.5.2 Structured data types

7.3.2.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.3.2.5.2.2 Type: ValServDataResp

Table 7.3.2.5.2.2-1: Definition of type ValServDataResp

Attribute name	Data type	P	Cardinality	Description	Applicability
valServData	array(ValServiceData)	M	0..N	Contains the requested VAL service data. If an empty array is provided within this attribute, this means that no VAL service data set satisfies the provided query parameter(s) in the corresponding request.	
suppFeats	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.3.2.7. This attribute shall be present only when feature negotiation needs to take place.	

7.3.2.5.2.3 Type: ValServiceData

Table 7.3.2.5.2.3-1: Definition of type ValServiceData

Attribute name	Data type	P	Cardinality	Description	Applicability
valTgtUe	ValTargetUe	M	1	Contains the unique identifier of a VAL user or a VAL UE.	
valServlds	array(string)	M	1..N	Contains the list of the VAL service(s) associated with the VAL user or VAL UE provided within the "valTgtUe" attribute.	
valServSpecInfo	string	O	0..1	Contains the VAL service specific information.	

7.3.2.5.3 Simple data types and enumerations

7.3.2.5.3.1 Introduction

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

7.3.2.5.3.2 Simple data types

The simple data types defined in table 7.3.2.5.3.2-1 shall be supported.

Table 7.3.2.5.3.2-1: Simple data types

Type name	Description

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.3.2.5.5 Binary data

7.3.2.5.5.1 Binary Data Types

Table 7.3.2.5.5.1-1: Binary Data Types

Name	Clause defined	Content type

7.3.2.6 Error Handling

7.3.2.6.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.3.2.6.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_VALServiceData API.

7.3.2.6.3 Application Errors

The application errors defined for SS_VALServiceData API are listed in table 7.3.2.6.3-1.

Table 7.3.2.6.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.3.2.7 Feature negotiation

The optional features in table 7.3.2.7-1 are defined for the SS_VALServiceData API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.3.2.7-1: Supported Features

Feature number	Feature Name	Description

7.3.3 SS_ASCAIInfoRetrieval API

7.3.3.1 API URI

The SS_ASCAIInfoRetrieval service shall use the SS_ASCAIInfoRetrieval API.

The API URI of the SS_ASCAIInfoRetrieval API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-ascaiinfo".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.3.3.2 and 7.3.3.3.

NOTE: When 3GPP TS 29.122 [3] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 7.3.3, the CM Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.3.3.2 Resources

There are no resources defined in this release of the specification.

7.3.3.3 Custom Operations without associated resources

7.3.3.3.1 Overview

The structure of the custom operation URIs of the SS_ASCAIInfoRetrieval API is shown in Figure 7.3.3.3.1-1.

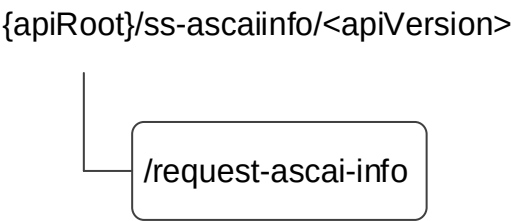


Figure 7.3.3.3.1-1: Custom operation URI structure of the SS_ASCAIInfoRetrieval API

Table 7.3.3.3.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the SS_ASCAIInfoRetrieval API.

Table 7.3.3.3.1-1: Custom operations without associated resources

Custom operation name	Custom operation URI	Mapped HTTP method	Description
RequestASCAIInfo	/request-ascai-info	POST	Enables a service consumer to request Application Satellite Coverage Availability Information.

The custom operations shall support the URI variables defined in table 7.3.3.3.1-2.

Table 7.3.3.3.1-2: URI variables for this custom operation

Name	Data type	Definition
apiRoot	string	See clause 7.3.3.1.

7.3.3.3.2 Operation: RequestASCAIInfo

7.3.3.3.2.1 Description

The custom operation enables a service consumer to request Application Satellite Coverage Availability Information.

7.3.3.3.2.2 Operation Definition

This operation shall support the response data structures and response codes specified in tables 7.3.3.3.2.2-1 and 7.3.3.3.2.2-2.

Table 7.3.3.3.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AscaiInfoReq	M	1	Contains the parameters to request Application Satellite Coverage Availability Information.

Table 7.3.3.3.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AscaInfoResp	M	1	200 OK	Successful case. The requested Application Satellite Coverage Availability Information is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative CM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative CM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.3.3.3.2.2.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative CM Server.

Table 7.3.3.3.2.2.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative CM Server.

7.3.3.4 Notifications

There are no notifications defined for this API in this release of the specification.

7.3.3.5 Data Model

7.3.3.5.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.3.3.5.1-1 specifies the data types defined specifically for the SS_ASCAIInfoRetrieval API service.

Table 7.3.3.5.1-1: SS_ASCAIInfoRetrieval API specific Data Types

Data type	Section defined	Description	Applicability
AscailInfo	7.3.3.5.2.6	Represents the Application Satellite Coverage Availability Information.	
AscailInfoData	7.3.3.5.2.5	Represents the Application Satellite Coverage Availability Information data.	
AscailInfoReq	7.3.3.5.2.2	Represents the Application Satellite Coverage Availability Information request data.	
AscailInfoReqUe	7.3.3.5.2.3	Represents the Application Satellite Coverage Availability Information request data per target VAL UE/user.	
AscailInfoResp	7.3.3.5.2.4	Represents the Application Satellite Coverage Availability Information response data.	

Table 7.3.3.5.1-2 specifies data types re-used by the SS_ASCAIInfoRetrieval API service.

Table 7.3.3.5.1-2: SS_ASCAIInfoRetrieval re-used Data Types

Data type	Reference	Comments	Applicability
GeographicArea	3GPP TS 29.572 [31]	Represents the geographical area.	
LocationInfo	3GPP TS 29.122 [3]	Represents the location information.	
TimeWindow	3GPP TS 29.122 [3]	Represents a time window.	
RatType	3GPP TS 29.571 [21]	Represents the RAT type.	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
ValTargetUe	Clause 7.3.1.4.2.3	Represents the identifier of a VAL UE or VAL user.	

7.3.3.5.2 Structured data types

7.3.3.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.3.3.5.2.2 Type: AscailInfoReq

Table 7.3.3.5.2.2-1: Definition of type AscailInfoReq

Attribute name	Data type	P	Cardinality	Description	Applicability
ascailReqs	array(AscailInfoReqUe)	M	1..N	Contains the ASCAI request related information.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.3.3.7. This attribute shall be present only when feature negotiation is required.	

7.3.3.5.2.3 Type: AscailInfoReqUe

Table 7.3.3.5.2.3-1: Definition of type AscailInfoReqUe

Attribute name	Data type	P	Cardinality	Description	Applicability
valTgtUe	ValTargetUe	M	1	Contains the identifier of the target VAL UE/user.	
valSvcId	string	O	0..1	Contains the identifier of the target VAL service.	
satId	string	O	0..1	Contains the identifier of the dedicated satellite for the requested VAL UE/user.	
locInfo	LocationInfo	O	0..1	Contains the current location information for the requested VAL UE/user.	

7.3.3.5.2.4 Type: AscailInfoResp

Table 7.3.3.5.2.4-1: Definition of type AscailInfoResp

Attribute name	Data type	P	Cardinality	Description	Applicability
ascailInfoData	array(AscailInfoData)	M	0..N	Contains the requested Application Satellite Coverage Availability Information data. If there is no Application Satellite Coverage Availability Information data corresponding to the received parameters in the corresponding request, then an empty array is returned.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.3.3.7. This attribute shall be present only when feature negotiation is required.	

7.3.3.5.2.5 Type: AscailInfoData

Table 7.3.3.5.2.5-1: Definition of type AscailInfoData

Attribute name	Data type	P	Cardinality	Description	Applicability
ascailInfo	array(AscailInfo)	M	1..N	Contains the requested Application Satellite Coverage Availability Information.	
valTgtUe	ValTargetUe	M	1	Contains the identifier of the requesting VAL UE/user.	
valSvcId	string	O	0..1	Contains the identifier of the concerned VAL service.	
satId	string	O	0..1	Contains the identifier of the satellite to which the provided Application Satellite Coverage Availability Information is related.	
locInfo	LocationInfo	O	0..1	Contains the VAL UE/user location information to which the provided Application Satellite Coverage Availability Information is related.	

7.3.3.5.2.6 Type: AscailInfo

Table 7.3.3.5.2.6-1: Definition of type AscailInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
geoArea	GeographicArea	M	1	Contains the geographical area information where the satellite coverage is available.	
availTimeWnds	array(TimeWindow)	M	1..N	Contains the time period(s) during which the satellite coverage is available within the geographical area provided within the "geoArea" attribute.	
availRatTypes	array(RatType)	O	1..N	Contains the satellite RAT type(s) for which the satellite coverage is available. Within the array elements of this attribute, only the satellite related RAT types are applicable.	

7.3.3.5.3 Simple data types and enumerations

7.3.3.5.3.1 Introduction

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

7.3.3.5.3.2 Simple data types

The simple data types defined in table 7.3.3.5.3.2-1 shall be supported.

Table 7.3.3.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.3.3.5.5 Binary data

7.3.3.5.5.1 Binary Data Types

Table 7.3.3.5.5.1-1: Binary Data Types

Name	Clause defined	Content type

7.3.3.6 Error Handling

7.3.3.6.1 General

For the SS_ASCAIInfoRetrieval API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses are applicable for the SS_ASCAIInfoRetrieval.

7.3.3.6.2 Protocol Errors

No specific procedures for the SS_ASCAIInfoRetrieval API are specified.

7.3.3.6.3 Application Errors

The application errors defined for SS_ASCAIInfoRetrieval API are listed in table 7.3.3.6.3-1.

Table 7.3.3.6.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.3.3.7 Feature negotiation

The optional features in table 7.3.3.7-1 are defined for the SS_ASCAIInfoRetrieval API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.3.3.7-1: Supported Features

Feature number	Feature Name	Description

7.4 Network resource management APIs

7.4.1 SS_NetworkResourceAdaptation API

7.4.1.1 API URI

The SS_NetworkResourceAdaptation service shall use the SS_NetworkResourceAdaptation API.

The API URI of the SS_NetworkResourceAdaptation API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-nra".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.4.1.2

7.4.1.1A Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_NetworkResourceAdaptation API.

7.4.1.2 Resources

7.4.1.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.4.1.2.1-1 depicts the resource URIs structure for the SS_NetworkResourceAdaptation API.

{apiRoot}/ss-nra/<apiVersion>

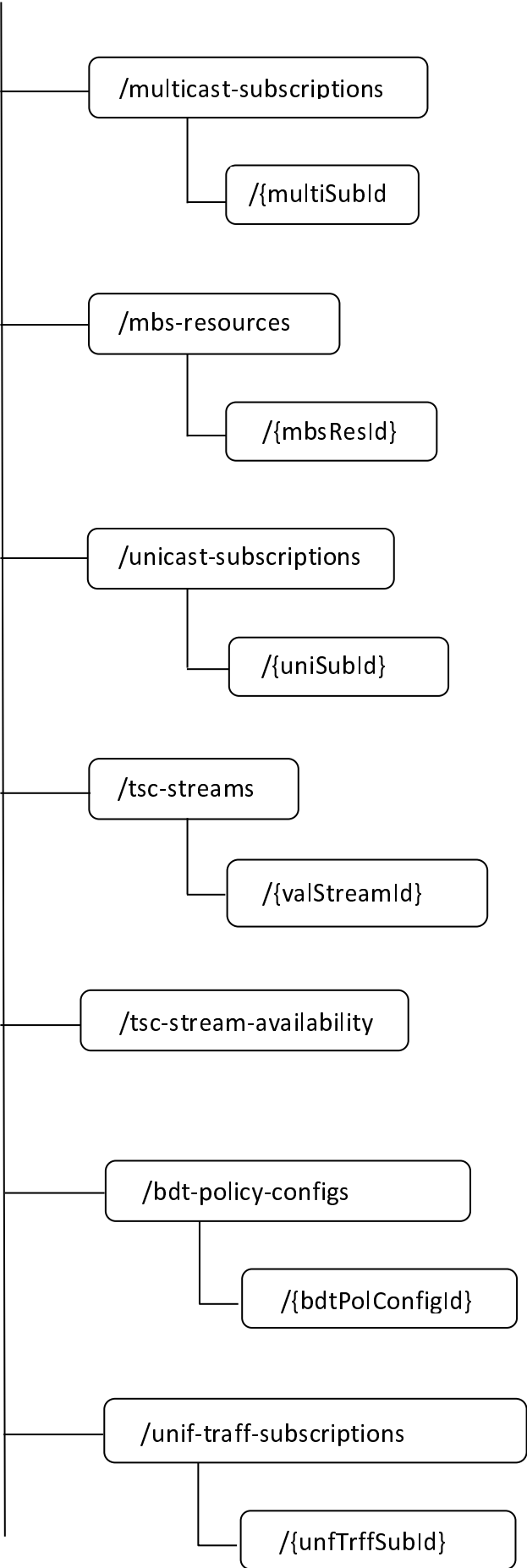


Figure 7.4.1.2.1-1: Resource URI structure of the SS_NetworkResourceAdaptation API

Table 7.4.1.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.4.1.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Multicast Subscriptions	/multicast-subscriptions	POST	Create a new Individual Multicast Subscription resource.
Individual Multicast Subscription	/multicast-subscriptions/{multiSubId}	GET	Read an Individual Multicast Subscription resource.
		DELETE	Remove an Individual Multicast Subscription resource.
MBS Resources	/mbs-resources	POST	Request the creation of an MBS resource.
Individual MBS Resource	/mbs-resources/{mbsResId}	GET	Request the retrieval of an existing "Individual MBS Resource" resource.
		PUT	Request the update of an existing "Individual MBS Resource" resource.
		PATCH	Request the modification of an existing "Individual MBS Resource" resource.
		DELETE	Request the deletion of an existing "Individual MBS Resource" resource.
		Activate	Request the activation of an existing MBS Resource.
		Deactivate	Request the deactivation of an existing MBS Resource.
Unicast Subscriptions	/unicast-subscriptions	POST	Create a new Individual Unicast Subscription resource.
Individual Unicast Subscription	/unicast-subscriptions/{uniSubId}	GET	Read an Individual Unicast Subscription resource.
		PUT	Update an Individual Unicast Subscription resource.
		PATCH	Modify an Individual Unicast Subscription resource.
		DELETE	Remove an Individual Unicast Subscription resource.
TSC Stream Availability	/tsc-stream-availability	GET	Retrieve TSC stream availability information.
TSC Streams	/tsc-streams	GET	Retrieve TSC stream information.
Individual TSC Stream	/tsc-streams/{valStreamId}	GET	Read an Individual TSC stream resource.
		PUT	Create a new Individual TSC stream resource.
		DELETE	Remove an Individual TSC stream resource.
		GET	Read an Individual TSC stream resource.
BDT Policy Configurations	/bdt-policy-configs	POST	Create a new background data transfer policy configuration.
Individual BDT Policy Configuration	/bdt-policy-configs/{bdtPolConfigId}	GET	Request the retrieval of an existing "Individual BDT Policy Configuration" resource.
		PUT	Request the update of an existing "Individual BDT Policy Configuration" resource.
		PATCH	Request the modification of an existing "Individual BDT Policy Configuration" resource.
		DELETE	Request the deletion of an existing "Individual BDT Policy Configuration" resource.
Unified Traffic Pattern Subscriptions	/unif-traff-subscriptions	POST	Create a new Unified Traffic Pattern Subscription.

Individual Unified Traffic Pattern Subscription	/unif-traff-subscriptions/{unfTrffSubId}	GET	Retrieve an existing "Individual Unified Traffic Pattern Subscription" resource.
		PUT	Request to update of an existing "Individual Unified Traffic Pattern Subscription" resource.
		PATCH	Request the modification of an existing "Individual Unified Traffic Pattern Subscription" resource.
		DELETE	Request the deletion of an existing "Individual Unified Traffic Pattern Subscription" resource.

7.4.1.2.2 Resource: Multicast Subscriptions

7.4.1.2.2.1 Description

7.4.1.2.2.2 Resource Definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/multicast-subscriptions

This resource shall support the resource URI variables defined in table 7.4.1.2.2.2-1.

Table 7.4.1.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.4.1.2.2.3 Resource Standard Methods

7.4.1.2.2.3.1 POST

Table 7.4.1.2.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.4.1.2.2.3.1-2 and the response data structures and response codes specified in table 7.4.1.2.2.3.1-3.

Table 7.4.1.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
MulticastSubscription	M	1	

Table 7.4.1.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MulticastSubscription	M	1	201 Created	
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.500 [22] shall also apply.				

Table 7.4.1.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-nra/<apiVersion>/multicast-subscriptions/{multiSubId}

7.4.1.2.2.4 Resource Custom Operations

None.

7.4.1.2.3 Resource: Individual Multicast Subscription

7.4.1.2.3.1 Description

7.4.1.2.3.2 Resource Definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/multicast-subscriptions/{multiSubId}

This resource shall support the resource URI variables defined in table 7.4.1.2.3.2-1.

Table 7.4.1.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	6.5
multiSubId	string	The multicast subscription identifier.

7.4.1.2.3.3 Resource Standard Methods

7.4.1.2.3.3.1 GET

Table 7.4.1.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.3.3.1-2 and the response data structures and response codes specified in table 7.4.1.2.3.3.1-3.

Table 7.4.1.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MulticastSubscription	M	1	200 OK	
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

Table 7.4.1.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

7.4.1.2.3.3.2 DELETE

Table 7.4.1.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.3.3.2-2 and the response data structures and response codes specified in table 7.4.1.2.3.3.2-3.

Table 7.4.1.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The Individual Multicast Subscription resource was deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

Table 7.4.1.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

7.4.1.2.3.4 Resource Custom Operations

None.

7.4.1.2.4 Resource: Unicast Subscriptions

7.4.1.2.4.1 Description

7.4.1.2.4.2 Resource Definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/unicast-subscriptions

This resource shall support the resource URI variables defined in table 7.4.1.2.4.2-1.

Table 7.4.1.2.4.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.4.1.2.4.3 Resource Standard Methods

7.4.1.2.4.3.1 POST

Table 7.4.1.2.4.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.4.1.2.4.3.1-2 and the response data structures and response codes specified in table 7.4.1.2.4.3.1-3.

Table 7.4.1.2.4.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
UnicastSubscription	M	1	

Table 7.4.1.2.4.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UnicastSubscription	M	1	201 Created	
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.4.3.1-4: 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}/ss-nra/<apiVersion>/unicast-subscriptions/{uniSubId}

7.4.1.2.4.4 Resource Custom Operations

None.

7.4.1.2.5 Resource: Individual Unicast Subscription

7.4.1.2.5.1 Description

7.4.1.2.5.2 Resource Definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/unicast-subscriptions/{uniSubId}

This resource shall support the resource URI variables defined in table 7.4.1.2.5.2-1.

Table 7.4.1.2.5.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.
uniSubId	string	The unicast subscription identifier.

7.4.1.2.5.3 Resource Standard Methods

7.4.1.2.5.3.1 GET

Table 7.4.1.2.5.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.5.3.1-2 and the response data structures and response codes specified in table 7.4.1.2.5.3.1-3.

Table 7.4.1.2.5.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.5.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UnicastSubscription	M	1	200 OK	
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.5.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

Table 7.4.1.2.5.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

7.4.1.2.5.3.2 DELETE

Table 7.4.1.2.5.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.5.3.2-2 and the response data structures and response codes specified in table 7.4.1.2.5.3.2-3.

Table 7.4.1.2.5.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.5.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The Individual Unicast Subscription resource was deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.5.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

Table 7.4.1.2.5.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

7.4.1.2.5.3.3 PUT

Table 7.4.1.2.5.3.3-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.5.3.3-2 and the response data structures and response codes specified in table 7.4.1.2.5.3.3-3.

Table 7.4.1.2.5.3.3-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
UnicastSubscription	M	1	Represents the updated representation of the "Individual Unicast Subscription" resource.

Table 7.4.1.2.5.3.3-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UnicastSubscription	M	1	200 OK	Successful case. The "Individual Unicast Subscription" resource is successfully updated and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual Unicast Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.5.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

Table 7.4.1.2.5.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

7.4.1.2.5.3.4 PATCH

Table 7.4.1.2.5.3.4-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.5.3.4-2 and the response data structures and response codes specified in table 7.4.1.2.5.3.4-3.

Table 7.4.1.2.5.3.4-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
UnicastSubscriptionPatch	M	1	Represents the modified parameters for network resource.

Table 7.4.1.2.5.3.4-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UnicastSubscription	M	1	200 OK	Successful case. The "Individual Unicast Subscription" resource is successfully modified and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual Unicast Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.5.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM server.

Table 7.4.1.2.5.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM server.

7.4.1.2.5.4 Resource Custom Operations

None.

7.4.1.2.6 Resource: TSC Stream Availability

7.4.1.2.6.1 Description

The TSC stream availability represent for TSC stream availability discovery with the given stream specification.

7.4.1.2.6.2 Resource Definition

Resource URI: **{apiRoot}/ss-nra/<apiVersion>/tsc-stream-availability**

This resource shall support the resource URI variables defined in table 7.4.1.2.6.2-1.

Table 7.4.1.2.6.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.

7.4.1.2.6.3 Resource Standard Methods

7.4.1.2.6.3.1 GET

This operation retrieves the TSC stream availability information. This method shall support the URI query parameters specified in table 7.4.1.2.6.3.1-1.

Table 7.4.1.2.6.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
stream-specs	array(StreamSpecification)	M	1..N	The MAC address(es) of the source DS-TT port(s) and the destination DS-TT port(s).

This method shall support the request data structures specified in table 7.4.1.2.6.3.1-2 and the response data structure and response codes specified in table 7.4.1.2.6.3.1-3, table 7.4.1.2.6.3.1-4 and table 7.4.1.2.6.3.1-5.

Table 7.4.1.2.6.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.6.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(TscStream Availability)	M	1..N	200 OK	List of TSC stream availability information, each including the stream specification and list of traffic specifications. This response shall include stream specification matching the query parameters provided in the request.
N/A	O	0..1	204 No Content	Indicates no stream specification matching with the query parameters, no TSC stream availability information.
N/A			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
N/A			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.4.1.2.6.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

Table 7.4.1.2.6.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

7.4.1.2.6.4 Resource Custom Operations

None.

7.4.1.2.7 Resource: TSC streams

7.4.1.2.7.1 Description

The TSC streams represent the resources for TSC communication with the given stream specification.

7.4.1.2.7.2 Resource Definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/tsc-streams

This resource shall support the resource URI variables defined in table 7.4.1.2.7.2-1.

Table 7.4.1.2.7.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.

7.4.1.2.7.3 Resource Standard Methods

7.4.1.2.7.3.1 GET

This method shall support the URI query parameters specified in the table 7.4.1.2.7.3.1-1.

Table 7.4.1.2.7.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
val-stream-ids	array(string)	O	1..N	Retrieval of all the TSC stream resources managed by the NRM server or the TSC Stream resource(s) identified by the VAL Stream ID(s).

This method shall support the request data structures specified in table 7.4.1.2.7.3.1-2 and the response data structure and response codes specified in table 7.4.1.2.7.3.1-3, table 7.4.1.2.7.3.1-4 and table 7.4.1.2.7.3.1-5.

Table 7.4.1.2.7.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.7.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(TscStream Data)	M	1..N	200 OK	Retrieval of TSC stream data information.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.7.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

Table 7.4.1.2.7.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

7.4.1.2.7.4 Resource Custom Operations

None.

7.4.1.2.8 Resource: Individual TSC Stream

7.4.1.2.8.1 Description

7.4.1.2.8.2 Resource Definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/tsc-streams/{valStreamId}

This resource shall support the resource URI variables defined in table 7.4.1.2.8.2-1.

Table 7.4.1.2.8.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.
valStreamId	string	The VAL Stream ID identifies the TSC stream.

7.4.1.2.8.3 Resource Standard Methods

7.4.1.2.8.3.1 GET

This operation retrieves an individual TSC stream information. This method shall support the URI query parameters specified in the table 7.4.1.2.8.3.1-1.

Table 7.4.1.2.8.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.8.3.1-2 and the response data structure and response codes specified in table 7.4.1.2.8.3.1-3, table 7.4.1.2.8.3.1-4 and table 7.4.1.2.8.3.1-5.

Table 7.4.1.2.8.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.8.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
TscStreamData	M	1	200 OK	
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.8.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

Table 7.4.1.2.8.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	An alternative URI of the resource located in an alternative network resource management server.

7.4.1.2.8.3.2 PUT

This operation create an individual TSC stream identified by VAL Stream ID. This method shall support the URI query parameters specified in the table 7.4.1.2.8.3.2-1.

Table 7.4.1.2.8.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.8.3.2-2 and the response data structure and response codes specified in table 7.4.1.2.8.3.2-3 and table 7.4.1.2.8.3.2-4.

Table 7.4.1.2.8.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
TscStreamData	M	1	Represents the TSC stream creation request.

Table 7.4.1.2.8.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
TscStreamData	M	1	201 Created	Successful case. The TSC stream is successfully created and a representation of the created "Individual TSC Stream" resource is returned in the response body. The URI of the created resource shall also be returned in an HTTP "Location" header.
NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.8.3.2-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-nra/<apiVersion>/tsc-streams/{valStreamId}

7.4.1.2.8.3.3 DELETE

This operation deletes the individual TSC stream resource. This method shall support the URI query parameters specified in the table 7.4.1.2.8.3.3-1.

Table 7.4.1.2.8.3.3-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.4.1.2.8.3.3-2 and the response data structure and response codes specified in table 7.4.1.2.8.3.3-3, table 7.4.1.2.8.3.3-4 and table 7.4.1.2.8.3.3-5.

Table 7.4.1.2.8.3.3-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description

Table 7.4.1.2.8.3.3-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The Individual TSC Stream resource was deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.8.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

Table 7.4.1.2.8.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative network resource management server.

7.4.1.2.9 Resource: MBS Resources

7.4.1.2.9.1 Description

This resource represents the collection of MBS Resources managed by the NEF.

7.4.1.2.9.2 Resource Definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/mbs-resources

This resource shall support the resource URI variables defined in table 7.4.1.2.9.2-1.

Table 7.4.1.2.9.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.

7.4.1.2.9.3 Resource Standard Methods

7.4.1.2.9.3.1 POST

This method enables to request the creation of a new MBS Resource at the NRM Server.

This method shall support the URI query parameters specified in table 7.4.1.2.9.3.1-1.

Table 7.4.1.2.9.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.4.1.2.9.3.1-2 and the response data structures and response codes specified in table 7.4.1.2.9.3.1-3.

Table 7.4.1.2.9.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
MbsResourceReq	M	1	Represents the parameters to request the creation of a new MBS resource.

Table 7.4.1.2.9.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MbsResourceResp	M	1	201 Created	Successful case. The requested MBS resource is successfully created and a representation of the created "Individual MBS Resource" resource is returned in the response body. The URI of the created resource shall also be returned in an HTTP "Location" header.
ProblemDetails	O	0..1	400 Bad Request	(NOTE 2)
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				
NOTE 2: Failure cases are described in clause 7.4.1.5.				

Table 7.4.1.2.9.3.1-4: 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}/ss-nra/<apiVersion>/mbs-resources/{mbsResId}

7.4.1.2.9.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.4.1.2.10 Resource: Individual MBS Resource

7.4.1.2.10.1 Description

This resource represents an "Individual MBS Resource" resource managed by the NEF.

7.4.1.2.10.2 Resource Definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/mbs-resources/{mbsResId}

This resource shall support the resource URI variables defined in table 7.4.1.2.10.2-1.

Table 7.4.1.2.10.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.
mbsResId	string	Represents the identifier of the "Individual MBS Resource" resource.

7.4.1.2.10.3 Resource Standard Methods

7.4.1.2.10.3.1 GET

This method enables to retrieve an existing "Individual MBS Resource" resource managed by the NRM Server.

This method shall support the URI query parameters specified in table 7.4.1.2.10.3.1-1.

Table 7.4.1.2.10.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.10.3.1-2 and the response data structures and response codes specified in table 7.4.1.2.10.3.1-3.

Table 7.4.1.2.10.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.10.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MBSResource	M	1	200 OK	Successful case. A representation of the requested "Individual MBS Resource" resource is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.10.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

Table 7.4.1.2.10.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

7.4.1.2.10.3.2 PUT

This method enables to request the update of an existing "Individual MBS Resource" resource managed by the NRM Server.

This method shall support the URI query parameters specified in table 7.4.1.2.10.3.2-1.

Table 7.4.1.2.10.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.10.3.2-2 and the response data structures and response codes specified in table 7.4.1.2.10.3.2-3.

Table 7.4.1.2.10.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
MBSResource	M	1	Represents the updated representation of the "Individual MBS Resource" resource.

Table 7.4.1.2.10.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MBSResource	M	1	200 OK	Successful case. The "Individual MBS Resource" resource is successfully updated and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual MBS Resource" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
ProblemDetails	O	0..1	400 Bad Request	(NOTE 2)
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				
NOTE 2: Failure cases are described in clause 7.4.1.5.				

Table 7.4.1.2.10.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

Table 7.4.1.2.10.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

7.4.1.2.10.3.3 PATCH

This method enables to request the modification of an existing "Individual MBS Resource" resource managed by the NRM Server.

This method shall support the URI query parameters specified in table 7.4.1.2.10.3.3-1.

Table 7.4.1.2.10.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.10.3.3-2 and the response data structures and response codes specified in table 7.4.1.2.10.3.3-3.

Table 7.4.1.2.10.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
MBSResourcePatch	M	1	Represents the requested modifications to the "Individual MBS Resource" resource.

Table 7.4.1.2.10.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MBSResource	M	1	200 OK	Successful case. The "Individual MBS Resource" resource is successfully modified and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual MBS Resource" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
ProblemDetails	O	0..1	400 Bad Request	(NOTE 2)
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				
NOTE 2: Failure cases are described in clause 7.4.1.5.				

Table 7.4.1.2.10.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

Table 7.4.1.2.10.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

7.4.1.2.10.3.4 DELETE

This method enables to request the deletion of an existing "Individual MBS Resource" resource managed by the NRM Server.

This method shall support the URI query parameters specified in table 7.4.1.2.10.3.4-1.

Table 7.4.1.2.10.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.10.3.4-2 and the response data structures and response codes specified in table 7.4.1.2.10.3.4-3.

Table 7.4.1.2.10.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.10.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual MBS Resource" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.10.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

Table 7.4.1.2.10.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

7.4.1.2.10.4 Resource Custom Operations

7.4.1.2.10.4.1 Overview

Table 7.4.1.2.10.4.1-1: Custom operations

Operation name	Custom operation URI	Mapped HTTP method	Description
Activate	/mbs-resources/{mbsResId}/activate	POST	Request the activation of an existing MBS Resource.
Deactivate	/mbs-resources/{mbsResId}/deactivate	POST	Request the deactivation of an existing MBS Resource.

7.4.1.2.10.4.2 Operation: Activate

7.4.1.2.10.4.2.1 Description

This resource custom operation enables to request the activation of an existing MBS Resource at the NRM Server.

7.4.1.2.10.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 7.4.1.2.10.4.2.2-1 and the response data structure and response codes specified in table 7.4.1.2.10.4.2.2-2.

Table 7.4.1.2.10.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
MbsResAct	M	1	Contains the parameters to request the activation of the MBS Resource.

Table 7.4.1.2.10.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MbsResAct	M	1	200 OK	Successful case. The activation request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status code for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.4.1.2.10.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

Table 7.4.1.2.10.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

7.4.1.2.10.4.3 Operation: Deactivate

7.4.1.2.10.4.3.1 Description

This resource custom operation enables to request the deactivation of an existing MBS Resource at the NRM Server.

7.4.1.2.10.4.3.2 Operation Definition

This operation shall support the request data structures specified in table 7.4.1.2.10.4.3.2-1 and the response data structure and response codes specified in table 7.4.1.2.10.4.3.2-2.

Table 7.4.1.2.10.4.3.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
MbsResDeact	M	1	Contains the parameters related to the deactivation of the MBS Resource.

Table 7.4.1.2.10.4.3.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MbsResDeact	M	1	200 OK	Successful case. The deactivation request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status code for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.4.1.2.10.4.3.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

Table 7.4.1.2.10.4.3.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

7.4.1.2.11 Resource: BDT Policy Configurations

7.4.1.2.11.1 Description

This resource represents the collection of BDT Policy Configurations managed by the NRM Server.

7.4.1.2.11.2 Resource definition

Resource URI: **{apiRoot}/ss-nra/<apiVersion>/bdt-policy-configs**

This resource shall support the resource URI variables defined in table 7.4.1.2.11.2-1.

Table 7.4.1.2.11.2-1: Resource URI variables for resource "BDT Policy Configurations"

Name	Data type	Definition
apiRoot	string	See clause 6.5.

7.4.1.2.11.3 Resource methods

7.4.1.2.11.3.1 POST

This method enables to request the creation of a new "Individual BDT Policy Configuration" resource at the NRM Server

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 7.4.1.2.11.3.1-1, table 7.4.1.2.11.3.1-2 and table 7.4.1.2.11.3.1-3.

Table 7.4.1.2.11.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	Cardinality	Remarks

Table 7.4.1.2.11.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
BdtPolConfig	M	1	Represents the parameters to request the creation of a new "BDT Policy Configurations" resource.

Table 7.4.1.2.11.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
BdtPolConfig	M	1	201 Created	Successful case. The requested BDT Policy configuration resource is successfully created and a representation of the created "Individual BDT Policy Configuration" resource is returned in the response body. The URI of the created resource shall also be returned in an HTTP "Location" header.
n/a			204 No Content	The request is successfully received.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.11.3.1-4: 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}/ss-nra/<apiVersion>/bdt-policy-configs/{bdtPolConfigId}

7.4.1.2.12 Resource: Individual BDT Policy Configuration

7.4.1.2.12.1 Description

This resource represents an "Individual BDT Policy Configuration" resource managed by the NRM Server.

7.4.1.2.12.2 Resource definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/bdt-policy-configs/{bdtPolConfigId}

This resource shall support the resource URI variables defined in table 7.4.1.2.12.2-1.

Table 7.4.1.2.12.2-1: Resource URI variables for resource "Individual BDT Policy Config"

Name	Data type	Definition
apiRoot	string	See clause 6.5.
bdtPolConfigId	string	Represents the identifier of the "Individual BDT Policy Configuration" resource.

7.4.1.2.12.3 Resource methods

7.4.1.2.12.3.1 GET

The GET method allows to read an "Individual BDT Policy Configuration" resource to obtain details of an active resource BDT policy configuration.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 7.4.1.2.12.3.1-1 and table 7.4.1.2.12.3.1-2.

Table 7.4.1.2.12.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.12.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
BdtPolConfig	M	1	200 OK	Successful case. A representation of the requested "Individual BDT Policy Configuration" resource is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative network resource management server.

Table 7.4.1.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative network resource management server.

7.4.1.2.12.3.2 PUT

This method enables a service consumer to request the update of an existing "Individual BDT Policy Configuration" resource managed by the NRM Server.

This method shall support the URI query parameters specified in table 7.4.1.2.12.3.2-1.

Table 7.4.1.2.12.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.12.3.2-2 and the response data structures and response codes specified in table 7.4.1.2.12.3.2-3.

Table 7.4.1.2.12.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
BdtPolConfig	M	1	Represents the updated representation of the "Individual BDT Policy Configuration" resource.

Table 7.4.1.2.12.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
BdtPolConfig	M	1	200 OK	Successful case. The targeted "Individual BDT Policy Configuration" resource is successfully updated and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The targeted "Individual BDT Policy Configuration" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.12.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

Table 7.4.1.2.13.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

7.4.1.2.12.3.3 PATCH

This method enables a service consumer to request the modification of an existing "Individual BDT Policy Configuration" resource managed by the NRM Server.

This method shall support the URI query parameters specified in table 7.4.1.2.12.3.3-1.

Table 7.4.1.2.12.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.1.2.12.3.3-2 and the response data structures and response codes specified in table 7.4.1.2.12.3.3-3.

Table 7.4.1.2.12.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
BdtPolConfigPatch	M	1	Represents the requested modifications to the "Individual BDT Policy Configuration" resource.

Table 7.4.1.2.12.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
BdtPolConfig	M	1	200 OK	Successful case. The targeted "Individual BDT Policy Configuration" resource is successfully modified and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The targeted "Individual BDT Policy Configuration" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM Server. Redirection handling is defined in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.12.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

Table 7.4.1.2.12.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains an alternative URI of the resource located in an alternative NRM Server.

7.4.1.2.12.3.4 DELETE

The DELETE method deletes the resource related to the BDT policy configuration.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 7.4.1.2.3.4-1 and table 7.4.1.2.12.3.4-2.

Table 7.4.1.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual BDT policy Configuration" resource was deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative network resource management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative network resource management server.

Table 7.4.1.2.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative network resource management server.

7.4.1.2.12.4 Resource Custom Operations

None.

7.4.1.2.13 Resource: Unified Traffic Pattern Subscriptions

7.4.1.2.13.1 Description

This resource represents the collection of Unified Traffic Patterns Subscriptions managed by the NRM Server.

7.4.1.2.13.2 Resource definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/unif-traff-subscriptions

This resource shall support the resource URI variables defined in table 7.4.1.2.13.2-1.

Table 7.4.1.2.13.2-1: Resource URI variables for resource " Unified Traffic Pattern Subscriptions"

Name	Data type	Definition
apiRoot	string	See clause 6.5.

7.4.1.2.13.3 Resource methods

7.4.1.2.13.3.1 POST

This method enables to request the creation of a new "Individual Unified Traffic Pattern Subscription" resource at the NRM Server

This method shall support the URI query parameters specified in the table 7.4.1.2.13.3.1-1.

Table 7.4.1.2.13.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	Cardinality	Remarks

This method shall support the request and response data structures and response codes specified in the table 7.4.1.2.13.3.1-2 and table 7.4.1.2.13.3.1-3.

Table 7.4.1.2.13.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
UnfTrafficSubc	M	1	Represents the parameters to request the creation of a new "Individual Unified Traffic Pattern Subscription" resource.

Table 7.4.1.2.13.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UnfTrafficSubc	M	1	201 Created	Successful case. The requested Unified Traffic Pattern Subscription is successfully created and a representation of the created "Individual Unified Traffic Pattern Subscription" resource is returned in the response body. The URI of the created resource shall also be returned in an HTTP "Location" header.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.13.3.1-4: 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}/ss-nra/<apiVersion>/unif-traff-subscriptions/{unfTrffSubId}

7.4.1.2.14 Resource: Individual Unified Traffic Pattern Subscription

7.4.1.2.14.1 Description

This resource represents an "Individual Unified Traffic Pattern Subscription" resource managed by the NRM Server.

7.4.1.2.14.2 Resource definition

Resource URI: {apiRoot}/ss-nra/<apiVersion>/unif-traff-subscriptions/{unfTrffSubId}

This resource shall support the resource URI variables defined in table 7.4.1.2.14.2-1.

Table 7.4.1.2.14.2-1: Resource URI variables for resource "Individual BDT Policy Config"

Name	Data type	Definition
apiRoot	string	See clause 6.5.
unfTrffSubId	string	Represents the identifier of the "Individual Unified Traffic Pattern Subscription" resource.

7.4.1.2.14.3 Resource methods

7.4.1.2.14.3.1 GET

The GET method allows to retrieve an existing "Individual Unified Traffic Pattern Subscription" resource at the NRM Server.

This method shall support the URI query parameters specified in the table 7.4.1.2.14.3.1-1.

Table 7.4.1.2.14.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	Cardinality	Remarks

This method shall support the request and response data structures and response codes specified in the table 7.4.1.2.14.3.1-2 and table 7.4.1.2.14.3.1-3.

Table 7.4.1.2.14.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.14.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UnfTrafficSubc	M	1	200 OK	Successful case. The requested "Individual Unified Traffic Pattern Subscription" resource is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.14.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM server.

Table 7.4.1.2.14.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM server.

7.4.1.2.14.3.2 PUT

The PUT method allows to update an existing "Individual Unified Traffic Pattern Subscription" resource at the NRM Server.

This method shall support the URI query parameters specified in the table 7.4.1.2.14.3.2-1.

Table 7.4.1.2.14.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	Cardinality	Remarks

This method shall support the request and response data structures and response codes specified in the table 7.4.1.2.14.3.2-2 and table 7.4.1.2.14.3.2-3.

Table 7.4.1.2.14.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
UnfTrafficSubc	M	1	Contains the updated representation of the "Individual Unified Traffic Pattern Subscription" resource.

Table 7.4.1.2.14.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UnfTrafficSubc	M	1	200 OK	Successful case. The "Individual Unified Traffic Pattern Subscription" resource is successfully updated and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual Unified Traffic Pattern Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.14.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM server.

Table 7.4.1.2.14.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM server.

7.4.1.2.14.3.3 PATCH

The PATCH method allows to modify an existing "Individual Unified Traffic Pattern Subscription" resource at the NRM Server.

This method shall support the URI query parameters specified in the table 7.4.1.2.14.3.3-1.

Table 7.4.1.2.14.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	Cardinality	Remarks

This method shall support the request and response data structures and response codes specified in the table 7.4.1.2.14.3.3-2 and table 7.4.1.2.14.3.3-3.

Table 7.4.1.2.14.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
UnfTrafficSubcPat ch	M	1	Contains the requested modifications to the "Individual Unified Traffic Pattern Subscription" resource.

Table 7.4.1.2.14.3.3-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UnfTrafficSubc	M	1	200 OK	Successful case. The "Individual Unified Traffic Pattern Subscription" resource is successfully modified and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual Unified Traffic Pattern Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.14.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM server.

Table 7.4.1.2.14.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM server.

7.4.1.2.14.3.4 DELETE

The DELETE method allows to delete an existing "Individual Unified Traffic Pattern Subscription" resource at the NRM Server.

This method shall support the URI query parameters specified in the table 7.4.1.2.14.3.4-1.

Table 7.4.1.2.14.3.4-1: URI query parameters supported by the POST method on this resource

Name	Data type	Cardinality	Remarks

This method shall support the request and response data structures and response codes specified in the table 7.4.1.2.14.3.4-2 and table 7.4.1.2.14.3.4-3.

Table 7.4.1.2.14.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.1.2.14.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual Unified Traffic Pattern Subscription" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2.14.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM server.

Table 7.4.1.2.14.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative NRM server.

7.4.1.2.14.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.4.1.2A Custom Operations without associated resources

7.4.1.2A.1 Overview

The structure of the custom operation URIs of the SS_NetworkResourceAdaptation API is shown in Figure 7.4.1.2A.1-1.

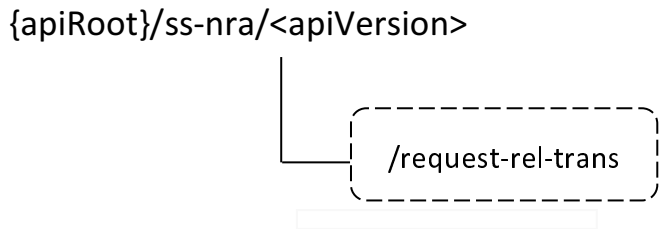


Figure 7.4.1.2A.1-1: Custom operation URI structure of the SDD_Transmission API

Table 7.4.1.2A.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the SS_NetworkResourceAdaptation API.

Table 7.4.1.2A.1-1: Custom operations without associated resources

Custom operation name	Custom operation URI	Mapped HTTP method	Description
RelTransRequest	/request-rel-trans	POST	Enables a service consumer to request reliable transmission service.

The custom operations shall support the URI variables defined in table 7.4.1.2A.1-2.

Table 7.4.1.2A.1-2: URI variables for this custom operation

Name	Data type	Definition
apiRoot	string	See clause 7.4.1.1.

7.4.1.2A.2 Operation: RelTransRequest

7.4.1.2A.2.1 Description

The custom operation enables a service consumer to request reliable transmission service to the NRM Server.

7.4.1.2A.2.2 Operation Definition

This operation shall support the request data structures specified in table 7.4.1.2A.2.2-1 and the response data structures and response codes specified in table 7.4.1.2A.2.2-2.

Table 7.4.1.2A.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
RelTransReq	M	1	Contains the parameters to request reliable transmission service.

Table 7.4.1.2A.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The reliable transmission service request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NRM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative NRM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2]
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.1.2A.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative NRM Server.

Table 7.4.1.2A.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative NRM Server.

7.4.1.3 Notifications

7.4.1.3.1 General

Table 7.4.1.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Notify_UP_Delivery_Mode	{notifUri}	POST	Report User Plane delivery mode.
	(NOTE)		
BDT_Negotiation_Notification	{notifUri}	POST	Report BDT negotiation related event(s).
Unified_Traffic_Pattern_Notification	{notifUri}	POST	Report UE unified traffic pattern monitoring and management event(s).
NOTE: This notification is used for both multicast resource management for EPS and multicast/broadcast resource management for 5GS. The "notifUri" is hence either provided via the Request_Multicast_Resource service operation for the former case, or the CreateMBSResource/UpdateMBSResource service operation for the latter case.			

7.4.1.3.2 Notify_UP_Delivery_Mode

7.4.1.3.2.1 Description

7.4.1.3.2.2 Notification definition

Callback URI: {notifUri}

This method shall support the URI query parameters specified in table 7.4.1.3.2.2-1.

Table 7.4.1.3.2.2-1: 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 7.4.1.3.2.2-2 and the response data structures and response codes specified in table 7.4.1.3.2.2-3.

Table 7.4.1.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
UserPlaneNotification	M	1	Represents the content of the user plane delivery mode notification.

Table 7.4.1.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The receipt of the Notification is acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.4.1.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.4.1.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.4.1.3.3 BDT_Negotiation_Notification

7.4.1.3.3.1 Description

7.4.1.3.3.2 Notification definition

Callback URI: {notifUri}

This method shall support the URI query parameters specified in table 7.4.1.3.3.2-1.

Table 7.4.1.3.3.2-1: 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 7.4.1.3.3.2-2 and the response data structures and response codes specified in table 7.4.1.3.3.2-3.

Table 7.4.1.3.3.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
BdtNotification	M	1	Represents the negotiated BDT policy notification.

Table 7.4.1.3.3.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The receipt of the Notification is acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.4.1.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.4.1.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.4.1.3.4 Unified_Traffic_Pattern_Notification

7.4.1.3.4.1 Description

7.4.1.3.4.2 Notification definition

Callback URI: {notifUri}

This method shall support the URI query parameters specified in table 7.4.1.3.4.2-1.

Table 7.4.1.3.4.2-1: 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 7.4.1.3.4.2-2 and the response data structures and response codes specified in table 7.4.1.3.4.2-3.

Table 7.4.1.3.4.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
UnfTrafficUpdNotif	M	1	Represents the Unified Traffic Pattern Notification

Table 7.4.1.3.4.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The Notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.4.1.3.4.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.4.1.3.4.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.4.1.4 Data Model

7.4.1.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API

Table 7.4.1.4.1-1 specifies the data types defined specifically for the SS_NetworkResourceAdaptation API service.

Table 7.4.1.4.1-1: SS_NetworkResourceAdaptation API specific Data Types

Data type	Section defined	Description	Applicability
AppTraffDesc	7.4.1.4.2.29	Represents the application traffic descriptor.	
BdtPolConfig	7.4.1.4.2.18	Represents the parameters related to the BDT Policy Configuration Resource.	
BdtNotification	7.4.1.4.2.20	Represents the negotiated BDT Policy notification.	
DeliveryMode	7.4.1.4.3.2	Indicates the delivery mode.	
GeoArea	7.4.1.4.2.19	Represents the Geographic Area.	
EpsMbmsInfo	7.4.1.4.3.0A	Represents the EPS MBMS bearer information.	
ManagementSubc	7.4.1.4.2.25	Represents the unified traffic pattern management subscription details.	
MbsResAct	7.4.1.4.2.16	Represents the parameters related to the activation of the MBS Resource.	
MbsResDeact	7.4.1.4.2.17	Represents the parameters related to the deactivation of the MBS Resource.	
MbsResource	7.4.1.4.2.12	Represents an MBS Resource.	
MbsResourcePatch	7.4.1.4.2.15	Represents the parameters to request the modification of an MBS Resource.	
MbsResourceReq	7.4.1.4.2.11	Represents the parameters to request the creation of an MBS Resource.	
MbsResourceRespInfo	7.4.1.4.2.13	Represents NRM Server side information related to the MBS Resource.	
MbsResourceResp	7.4.1.4.2.14	Represents a response to an MBS Resource creation/modification request.	
MulticastSubscription	7.4.1.4.2.2	Represents a multicast subscription.	
NetSysIndicator	7.4.1.4.3.4	Represents the network system indicator, i.e. 5GS, EPS or both.	
NrmEvent	7.4.1.4.3.3	Indicates the NRM event.	
NrmEventNotification	7.4.1.4.2.5	Represents a notification on an individual User Plane event.	
RelTransReq	7.4.1.4.2.28	Represents the parameters to request reliable transmission service.	
ServiceAnnouncementMode	7.4.1.4.3.1	Indicates the service announcement mode.	
StreamSpecification	7.4.1.4.2.9	Represents a stream specification that includes MAC addresses of the source and destination DS-TT ports.	
TrafficPatternIndication	7.4.1.4.3.7	Represents the traffic pattern indication requests.	
TrafficPatternConfig	7.4.1.4.2.26	Represents the traffic pattern configuration of the VAL service.	
TrafficSpecification	7.4.1.4.2.10	Represents the traffic class supported by the DS-TTs and available end-to-end maximum latency value.	
TrafficSpecInformation	7.4.1.4.2.7	Represents the traffic class supported by the DS-TTs and available end-to-end latency value and Priority Code Point (PCP) value.	
TscStreamAvailability	7.4.1.4.2.8	Represents the TSC stream availability information including the stream specification and list of traffic specifications.	
TscStreamData	7.4.1.4.2.6	Represents the TSC stream data information.	
UnfTrafficSubc	7.4.1.4.2.23	Represents the Unified Traffic Pattern Subscription.	
UnfTrafficSubcPatch	7.4.1.4.2.24	Represents the Unified Traffic Pattern Subscription Patch.	
UnfTrafficUpdNotif	7.4.1.4.2.27	Represents the Unified Traffic Pattern Notification.	
UnicastSubscription	7.4.1.4.2.3	Represents a network resource adaptation subscription.	
UnicastSubscriptionPatch	7.4.1.4.2.31	Represents the requested modifications to a network resource adaptation subscription.	
UserPlaneNotification	7.4.1.4.2.4	Represents a notification on User Plane events.	
ValUeAddrInfo	7.4.1.4.2.30	Represents VAL UE address information.	

Table 7.4.1.4.1-2 specifies data types re-used by the SS_NetworkResourceAdaptation API service.

Table 7.4.1.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
ConnInfo	3GPP TS 29.548 [35]	Represents the data transmission connection information.	
DateTime	3GPP TS 29.122 [3]	Used to represent the subscription duration.	
DurationSec	3GPP TS 29.122 [3]	Used to represent the duration in seconds.	
ExternalGroupId	3GPP TS 29.122 [3]	Represents an External Group Identifier.	
ExternalMbsServiceArea	3GPP TS 29.571 [21]	Represents an MBS Service Area.	
GeographicArea	3GPP TS 29.572 [31]	Represents Geographical area.	
CivicAddress	3GPP TS 29.572 [31]	Represents civic address of an area.	
Ipv4Addr	3GPP TS 29.571 [21]	Used to identify the IPv4 address.	
Ipv6Addr	3GPP TS 29.571 [21]	Used to identify the IPv6 address.	
LocalMbmsInfo	3GPP TS 29.486 [27]	Used to represent the local MBMS information.	
MacAddr48	3GPP TS 29.571 [21]	Used to identify a MAC address.	
MbmsLocArea	3GPP TS 29.122 [3]	Used to indicate the requested area of the MBMS bearer.	
MbsServiceInfo	3GPP TS 29.571 [21]	Represents MBS Service Information.	
MbsSession	3GPP TS 29.571 [21]	Represents an MBS Session.	
MbsSessionId	3GPP TS 29.571 [21]	Represents the identifier of an MBS Session.	
Port	3GPP TS 29.122 [3]	Used to identify the port.	
ProblemDetails	3GPP TS 29.571 [21]	Represents error related information.	
ScheduledCommunicationTime	3GPP TS 29.122 [3]	Used to define the schedules for traffic pattern configurations.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the supported optional features of the API.	
TimeWindow	3GPP TS 29.122 [3]	Represents a time interval.	
TransportProtocol	3GPP TS 29.558 [43]	Represents the transport layer protocol.	
UsageThreshold	3GPP TS 29.122 [3]	Represents the data usage threshold.	
Uint32	3GPP TS 29.571 [21]	Represents an unsigned integer.	
UInteger	3GPP TS 29.571 [21]	Represents an unsigned integer.	
Uri	3GPP TS 29.122 [3]	Used to indicate the notification URI.	
ValTargetUe	Clause 7.3.1.4.2.3	Used to identify either a VAL User ID or a VAL UE ID.	
WebsocketNotifConfig	3GPP TS 29.122 [3]	Used to indicate the configuration parameters to set up notification delivery over Websocket protocol.	

7.4.1.4.2 Structured data types

7.4.1.4.2.1 Introduction

7.4.1.4.2.2 Type: MulticastSubscription

Table 7.4.1.4.2.2-1: Definition of type MulticastSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
valGroupId	string	M	1	The identity of the group that the MBMS bearer is requested for.	
annMode	ServiceAnnouncementMode	M	1	Indicates whether the service announcement is sent by NRM Server or by the service consumer.	
multiQosReq	string	M	1	The QoS requirement for the multicast.	
locArea	MbmsLocArea	O	0..1	Indicate the area where the MBMS bearer is requested for.	
duration	DateTime	O	0..1	Identifies the absolute time at which the subscription resource is considered to expire. When omitted in the request, it indicates the resource is requested to be valid forever by the service consumer. When omitted in the response, it indicates the resource is set to valid forever by the service consumer.	
tmgi	Uint32	O	0..1	TMGI. Shall be provided by the NRM server if announcement mode is set to VAL.	
localMbmsInfo	LocalMbmsInfo	O	0..1	Contains the local MBMS information. This attribute may be present only within the trust domain.	LocalMBMS
localMbmsActivated	boolean	O	0..1	Set to true to indicate that the local MBMS is activated. Set to false or omitted otherwise.	LocalMBMS
notifUri	Uri	M	1	Identifies the notification URI where the NRM notification shall be sent to.	
reqTestNotif	boolean	O	0..1	Set to true to request the VAE server to send a test notification as defined in clause 6.6. Set to false or omitted otherwise.	Notification_test_event
wsNotifCfg	WebsocketNotifConfig	O	0..1	Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 6.6.	Notification_websocket
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.4.1.6. This attribute shall be present only when feature negotiation needs to take place	
upIpv4Addr	Ipv4Addr	O	0..1	Ipv4address of the user plane. (NOTE)	
upIpv6Addr	Ipv6Addr	O	0..1	Ipv6address of the user plane. (NOTE)	
upPortNum	Port	O	0..1	UDP port number of the user plane.	
radioFreqs	array(Uint32)	O	1..N	The radio frequencies which may be provided by the NRM server.	
NOTE: At least one of upIpv4Addr or upIpv6Addr shall be provided by the NRM server.					

7.4.1.4.2.3

Type: UnicastSubscription

Table 7.4.1.4.2.3-1: Definition of type UnicastSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
valUes	array(string)	C	1..N	Represents the list of the VAL UE identifier(s). (NOTE)	enNB
valGroupId	string	C	0..1	Represents the VAL group identifier. (NOTE)	enNB
valTgtUe	ValTargetUe	C	0..1	Contains the identity of the VAL user or VAL UE that the bearer is requested for. (NOTE)	
bdtId	string	O	0..1	Represents the BDT identifier.	SEALDD_BDT
uniQosReq	string	O	0..1	Contains the QoS requirement.	
duration	DateTime	O	0..1	Identifies the absolute time at which the subscription resource is considered to expire. When omitted in the request, it indicates the resource is requested to be valid forever by the service consumer. When omitted in the response, it indicates the resource is set to valid forever by the service consumer.	
notifUri	Uri	M	1	Identifies the notification URI where the NRM notification shall be sent to.	
reqTestNotif	Boolean	O	0..1	Set to true to request the VAE server to send a test notification as defined in clause 6.6. Set to false or omitted otherwise.	Notification_test_event
wsNotifCfg	WebsocketNotifConfig	O	0..1	Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 6.6.	Notification_websocket
suppFeat	SupportedFeatures	C	1	Contains the list of supported feature(s) among the ones defined in clause 7.4.1.6. This attribute shall be present only when feature negotiation needs to take place.	
NOTE: When the "enNB" feature is supported, these attributes are mutually exclusive and only one of them shall be present. When the "enNB" feature is not supported, only the "valTgtUe" attribute is applicable and shall be present.					

7.4.1.4.2.4

Type: UserPlaneNotification

Table 7.4.1.4.2.4-1: Definition of type UserPlaneNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
notifId	Uri	M	1	Contains the URI of the resource (e.g., "Individual Multicast Subscription" resource, "Individual MBS Resource" resource) to which the notification is related.	
eventNotifs	array(NrmEventNotification)	M	1..N	Contains the notifications about Individual Events. The only applicable event within the "event" attribute of the NrmEventNotification data structure is the "UP_DELIVERY_MODE" event.	

7.4.1.4.2.5

Type: NrmEventNotification

Table 7.4.1.4.2.5-1: Definition of type NrmEventNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
event	NrmEvent	M	1	Contains the reported event.	
ts	DateTime	M	1	Contains the time at which the event is observed.	
deliveryMode	DeliveryMode	C	0..1	Indicates mode of delivery of the user data to the UE(s), i.e. via unicast mode, EPS MBMS multicast mode, 5GS MBS multicast mode or 5GS MBS broadcast mode. This attribute shall be present only if the "event" attribute is set to "UP_DELIVERY_MODE".	
streamIds	array(string)	O	1..N	Indicates the identifier(s) of the unicast/multicast stream(s) currently being used or the unicast/multicast stream(s) to be used to deliver the media data that is currently delivered over multicast/unicast. This attribute may be present only if the "event" attribute is set to "UP_DELIVERY_MODE" and the NRM Server already has the streams available.	
stopUniStreamIds	array(string)	O	1..N	Contains the unicast streams to be stopped as data delivery is switched to multicast delivery. This attribute may be present only if the "event" attribute is set to "UP_DELIVERY_MODE" and the "deliveryMode" attribute is set to "MULTICAST", "MBS_MULTICAST" or "MBS_BROADCAST".	enNB1
mbsResServiceArea	ExternalMbsServiceArea	O	0..1	Contains the Service Area of the MBS Resource where the reported delivery mode is applied. This attribute may be present only if the "deliveryMode" attribute is present and set to either "MBS_MULTICAST" or "MBS_BROADCAST".	SEAL_3
valUeIds	array(string)	O	1..N	Contains the identifier(s) of the VAL UE(s) for which unicast delivery is applied. This attribute may be present only if the "deliveryMode" attribute is present and set to "UNICAST".	SEAL_3_Ext

7.4.1.4.2.6 Type: TscStreamData

Table 7.4.1.4.2.6-1: Definition of type TscStreamData

Attribute name	Data type	P	Cardinality	Description	Applicability
streamSpec	StreamSpecification	M	1	Stream specification includes MAC addresses of the source and destination DS-TT ports.	
trafficSpecInfo	TrafficSpecInformation	M	1	Traffic Specification Information includes Priority Code Point (PCP), MaxFrameInterval, MaxFrameSize, MaxIntervalFrames, MaxLatency, etc. (e.g. as described in IEEE 802.1Qcc [29] in clause 46.2).	

7.4.1.4.2.7 Type: TrafficSpecInformation

Table 7.4.1.4.2.7-1: Definition of type TrafficSpecInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
pcpValue	Uint32	M	1	The Priority Code Point (PCP) value identify the traffic class, with value between 0 to 7.	
maxFramInt	DurationSec	M	1	Maximum Frame Interval.	
maxFramSize	Uint32	M	1	Maximum frame size will transmit, excluding the overhead.	
maxIntFrames	Uint32	M	1	Maximum interval frames.	
maxLatency	Uint32	M	1	Indicates the end-to-end latency (including the UE-DS-TT residence times, UPF residence time, and propagation delays) in milliseconds.	

7.4.1.4.2.8 Type: TscStreamAvailability

Table 7.4.1.4.2.8-1: Definition of type TscStreamAvailability

Attribute name	Data type	P	Cardinality	Description	Applicability
streamSpec	StreamSpecification	M	1	Stream specification includes MAC addresses of the source and destination DS-TT ports.	
trafficSpecs	array(TrafficSpecification)	M	1..N	The traffic classes supported by the DS-TTs and available end-to-end maximum latency values.	

7.4.1.4.2.9 Type: StreamSpecification

Table 7.4.1.4.2.9-1: Definition of type StreamSpecification

Attribute name	Data type	P	Cardinality	Description	Applicability
srcMacAddr	MacAddr48	M	1	The MAC address of the source DS-TT port.	
dstMacAddr	MacAddr48	M	1	The MAC address of the destination DS-TT port.	

7.4.1.4.2.10 Type: TrafficSpecification

Table 7.4.1.4.2.10-1: Definition of type TrafficSpecification

Attribute name	Data type	P	Cardinality	Description	Applicability
trafficClass	Uint32	M	1	The traffic class supported by the DS-TTs with value between 0 to 7.	
e2eMaxLatency	UInteger	M	1	Indicates the end to end maximum latency (including the UE-DS-TT residence times, UPF residence time, and propagation delays), in the units of milliseconds.	

7.4.1.4.2.11 Type: MBSResourceReq

Table 7.4.1.4.2.11-1: Definition of type MBSResourceReq

Attribute name	Data type	P	Cardinality	Description	Applicability
mbsResource	MBSResource	M	1	Contains the parameters to request the creation of the MBS Resource.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.4.1.6. This attribute shall be present only when feature negotiation needs to take place.	

7.4.1.4.2.12

Type: MBSResource

Table 7.4.1.4.2.12-1: Definition of type MBSResource

Attribute name	Data type	P	Cardinality	Description	Applicability
valGroupId	string	C	0..1	Contains the identity of the VAL group to which the MBS Resource is related. (NOTE 1)	
valUeIdsList	array(ValTargetUe)	C	1..N	Contains the list of the identifier(s) of the VAL UE(s) to which the MBS Resource is related. (NOTE 1)	
servAnmtMode	ServiceAnnoucementMode	M	1	Contain the MBS Service Announcement mode to be used, i.e. whether the MBS Service Announcement is delivered by the NRM Server or the service consumer.	
mbsResServInfo	MbsServiceInfo	M	1	Contains the MBS Service Information for the MBS Resource.	
mbsResServiceArea	ExternalMbsServiceArea	O	0..1	Contains the Service Area of the MBS Resource.	
notifUri	Uri	M	1	Contains the URI towards which the user plane delivery mode notifications shall be sent.	
netSysInd	NetSysIndicator	O	0..1	Indicates whether the MBS Resource requires multicast/broadcast services from 5GS, EPS or both.	
localMbmsInfo	LocalMbmsInfo	O	0..1	Contains the local MBMS information. This attribute may only be provided if the "netSysInd" attribute is set to "EPS" or "5GS_AND_EPS". (NOTE 2)	
localMbmsActivated	boolean	O	0..1	Set to true by the service consumer to indicate that the local MBMS is activated. Set to false or omitted otherwise. (NOTE 2)	
mbsResRespInfo	MBSResourceRespInfo	O	0..1	Represents the NRM Server side information related to the created MBS Resource. This attribute may only be present in the response to the request to create/update/modify/retrieve the MBS Resource.	
NOTE 1: These attributes are mutually exclusive. Either one of them shall be present.					
NOTE 2: These attributes are mutually exclusive. Either one of them may be present.					

7.4.1.4.2.13

Type: MBSResourceRespInfo

Table 7.4.1.4.2.13-1: Definition of type MBSResourceRespInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
mbs5gSessionId	MbsSessionId	O	0..1	Contains the identifier of the MBS session (i.e. TMGI and/or SSM, in addition to the NID in the case an SNPN). This attribute may not be present if the MBS Service Announcement is delivered by the NRM Server (i.e. the "servAnmtMode" attribute in the corresponding request is set to "NRM").	
mbmsBearerId	MbsSessionId	O	0..1	Contains the identifier of the MBMS bearer (i.e. TMGI). This attribute may not be present if the MBS Service Announcement is delivered by the NRM Server (i.e. the "servAnmtMode" attribute in the corresponding request is set to "NRM").	
upIpv4Addr	Ipv4Addr	C	0..1	Contains the user plane IPv4 address of the NRM Server to be used by the service consumer for downlink packets delivery. (NOTE 1)	
upIpv6Addr	Ipv6Addr	C	0..1	Contains the user plane IPv6 address of the NRM Server to be used by the service consumer for downlink packets delivery. (NOTE 1)	
upPortNum	Port	O	0..1	Contains the user plane UDP port number to be used by service consumer for downlink packets delivery.	
mbs5GInfo	MbsSession	O	0..1	Contains MBS related configuration information. This attribute may only be present if the network system used for multicast/broadcast services is 5GS or both 5GS and EPS.	
epsMbmsInfo	EpsMbmsInfo	O	0..1	Contains MBMS related configuration information. This attribute may only be present if the network system used for multicast/broadcast services is EPS or both 5GS and EPS.	

NOTE 1: At least one of these attributes shall be present.

7.4.1.4.2.14

Type: MBSResourceResp

Table 7.4.1.4.2.14-1: Definition of type MBSResourceResp

Attribute name	Data type	P	Cardinality	Description	Applicability
mbsResource	MBSResource	M	1	Contains the the created MBS Resource.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.4.1.6. This attribute shall be present only when feature negotiation is taking place.	

7.4.1.4.2.15 Type: MBSResourcePatch

Table 7.4.1.4.2.15-1: Definition of type MBSResourcePatch

Attribute name	Data type	P	Cardinality	Description	Applicability
mbsResServInfo	MbsServiceInfo	O	0..1	Contains the updated MBS Service Information for the MBS Resource.	
mbsResServiceArea	ExternalMbsServiceArea	O	0..1	Contains the updated Service Area of the MBS Resource.	
notifUri	Uri	O	0..1	Contains the URI towards which the user plane delivery mode notifications shall be sent.	
localMbmsInfo	LocalMbmsInfo	O	0..1	Contains the local MBMS information. This attribute may only be provided if the "netSysInd" attribute is set to "EPS" or "5GS_AND_EPS". (NOTE)	
localMbmsActivated	boolean	O	0..1	Set to true by the service consumer to indicate that the local MBMS is activated. Set to false or omitted otherwise. (NOTE)	
NOTE: These attributes are mutually exclusive. Either one of them may be present.					

7.4.1.4.2.16 Type: MbsResAct

Table 7.4.1.4.2.16-1: Definition of type MbsResAct

Attribute name	Data type	P	Cardinality	Description	Applicability
mbs5gSessionId	MbsSessionId	M	1	Contains the identifier of the MBS session to be activated.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.4.1.6. This attribute shall be present only when feature negotiation needs to take place.	

7.4.1.4.2.17 Type: MbsResDeact

Table 7.4.1.4.2.17-1: Definition of type MbsResDeact

Attribute name	Data type	P	Cardinality	Description	Applicability
mbs5gSessionId	MbsSessionId	M	1	Contains the identifier of the MBS session to be deactivated.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.4.1.6. This attribute shall be present only when feature negotiation needs to take place.	

7.4.1.4.2.18

Type: BdtPolConfig

Table 7.4.1.4.2.18-1: Definition of type BdtPolConfig

Attribute name	Data type	P	Cardinality	Description	Applicability
valServId	string	M	1	Identifies a VAL Service.	
valGroupId	string	C	0..1	Identifies a group of UEs. (NOTE)	
valUeIds	array(string)	C	1..N	Represents a List of VAL UEs whose BDT policy is provided. (NOTE)	
dataVolUe	UsageThreshold	M	1	Represents the Data volume per UE for BDT.	
desiredTimeWindow	TimeWindow	M	1	Represents the desired time window for BDT.	
grantTimeWindow	TimeWindow	C	0..1	Represents the granted time window by the 3GPP network for BDT. This attribute may be present only in the responses.	
desiredGeoArea	GeoArea	M	1	Represents the desired geographical area for BDT.	
expTime	DurationSec	O	0..1	Represents the expiration time for the background data transfer request.	
policyGuidance	array(PolicyGuidance)	O	0..N	Represents a list of policy guidance. If no value is included, NRM server may use local policies.	
bdtPolRefId	string	C	0..1	Identifies a BDT policy reference identifier. This attribute may be present only in the responses.	
notifUri	Uri	M	1	Identifies the destination notification URI where the NRM notification shall be sent to.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features. This attribute shall be present only if feature negotiation needs to take place.	
NOTE: Either one of the "valGroupId" or "valUeIds" attribute shall be present.					

7.4.1.4.2.19

Type: GeoArea

Table 7.4.1.4.2.19-1: Definition of type GeoArea

Attribute name	Data type	P	Cardinality	Description	Applicability
geographicalAreas	array(GeographicArea)	O	1..N	Represents a list of Geographical area.	
civicAddress	array(CivicAddresses)	O	1..N	Represents a list of Civic address of an area.	

7.4.1.4.2.20

Type: BdtNotification

Table 7.4.1.4.2.20-1: Definition of type BdtNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
notifId	Uri	M	1	Contains the URI of the "Individual BDT Policy Configuration" resource to which this notification is related.	
bdtConfigId	string	M	0..1	Identifies the "Individual BDT Policy Configuration" to which the notification is related. This attribute shall be set to the same value as the "bdtPolConfigId" variable (see clause 7.4.1.2.12.2) of the resource URI provided within the "notifId" attribute.	
grantTimeWindow	TimeWindow	C	0..1	Represents the updated time window granted by the 3GPP network for BDT. This attribute shall be present only if the "bdtPolicyRemoveInd" attribute value is not present, or preset and set to "false".	
bdtPolicyRemoveInd	boolean	O	0..1	Indicates whether the BDT policy at the 3GPP network corresponding to the BDT policy reference identifier has been removed. When present, it shall be set as follows: - "true": The BDT policy was removed by the 3GPP network. - "false": the BDT policy was not removed at the 3GPP network. - Default value when omitted is "false".	

7.4.1.4.2.21

Type: BdtPolConfigPatch

Table 7.4.1.4.2.21-1: Definition of type BdtPolConfigPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
dataVolUe	UsageThreshold	O	0..1	Represents the Data volume per UE for BDT.	
desiredTimeWindow	TimeWindow	O	0..1	Represents the desired time window for BDT.	
desiredGeoArea	GeoArea	O	0..1	Represents the desired geographical area for BDT.	
expTime	DurationSec	O	0..1	Represents the expiration time for the background data transfer request.	
policyGuidance	array(PolicyGuidance)	O	0..N	Represents a list of policy guidance.	

7.4.1.4.2.22

Type: PolicyGuidance

Table 7.4.1.4.2.22-1: Definition of type PolicyGuidance

Attribute name	Data type	P	Cardinality	Description	Applicability
policyType	PolicyType	O	0..1	Indicates the policy type.	
cost	UInteger	C	0..1	Represents the cost associated with the policy type and shall be included when the value of the "policyType" attribute is set to "HIGH_THROUGHPUT_WITH_COST"	

7.4.1.4.2.23 Type: UnfTrafficSubc

Table 7.4.1.4.2.21-1: Definition of type UnfTrafficSubc

Attribute name	Data type	P	Cardinality	Description	Applicability
mgmtSubs	map(ManagementSubc)	M	1..N	Represent the list of UE unified traffic pattern management subscriptions. The key of the map shall be any unique string encoded value.	
notifUri	Uri	M	1	Identifies the destination notification URI where the notifications shall be sent to.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features. This attribute shall be present only if feature negotiation needs to take place.	

7.4.1.4.2.24 Type: UnfTrafficSubcPatch

Table 7.4.1.4.2.22-1: Definition of type UnfTrafficSubcPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
mgmtSubs	map(ManagementSubc)	O	1..N	Represent the list of UE unified traffic pattern management subscriptions. The key of the map shall be any unique string encoded value and shall be set to the same value as the one received during creation of the corresponding resource.	
notifUri	Uri	O	1	Identifies the updated destination notification URI where the notifications shall be sent to.	

7.4.1.4.2.25 Type: ManagementSubc

Table 7.4.1.4.2.23-1: Definition of type ManagementSubc

Attribute name	Data type	P	Cardinality	Description	Applicability
valServId	string	M	1	Identifies a VAL Service.	
valUeIds	array(string)	M	1..N	Represents a List of VAL UE(s) for which unified traffic pattern subscription is requested.	
traffPatInd	array(TrafficPatternIndication)	M	1..N	Represents the traffic pattern indications.	
traffPatConfig	TrafficPatternConfig	O	0..1	Contains the traffic pattern configuration of the VAL service for the UE(s) provided within the "valUeIds" attribute.	

7.4.1.4.2.26

Type: TrafficPatternConfig

Table 7.4.1.4.2.24-1: Definition of type TrafficPatternConfig

Attribute name	Data type	P	Cardinality	Description	Applicability
scheds	array(ScheduledCommunicationTime)	O	1..N	Contains the list of schedule(s) applicable to the traffic patterns of the VAL service for the concerned UE(s).	
expTime	DateTime	O	0..1	Identifies the absolute time at which the VAL traffic pattern parameter configuration expires. When omitted, it indicates that the VAL traffic pattern parameter configuration never expires.	
stationaryInd	boolean	O	0..1	Contains the stationary indication. - Set to "true" to indicate that the UE(s) are expected to be stationary while communicating using this traffic pattern configuration. - Set to "false" or omitted, to indicate that the UE(s) are expected to be mobile while communicating using this traffic pattern configuration. - The Default value is "false" when this attribute is omitted.	

7.4.1.4.2.27

Type: UnfTrafficUpdNotif

Table 7.4.1.4.2.25-1: Definition of type UnfTrafficUpdNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
valUelds	array(string)	M	1..N	Represents the list of VAL UEs to which the unified traffic pattern update notification is related.	
sched	ScheduledCommunicationTime	O	0..1	Contains the schedule applicable to the unified traffic patterns of the UE(s) provided within the "valUelds" attribute, and indicates the times or durations of UE availability.	
stationInd	boolean	O	0..1	Contains the stationary indication. - Set to "true" to indicate that the UE(s) are expected to be stationary while communicating using this traffic pattern configuration. - Set to "false" or omitted, to indicate that the UE(s) are expected to be mobile while communicating using this traffic pattern configuration. - The Default value is "false" when this attribute is omitted.	
cause	string	C	0..1	This attribute shall be present when the notification is provided to inform of a parameter configuration applied by the network which is incompatible with the existing Traffic Patterns. The attribute may be present when the notification informs of UE unified traffic pattern updates, providing additional information on the reason for the UE unified traffic pattern update (e.g. monitoring events received).	

7.4.1.4.2.28 Type: RelTransReq

Table 7.4.1.4.2.28-1: Definition of type RelTransReq

Attribute name	Data type	P	Cardinality	Description	Applicability
appDescs	array(AppTraffDesc)	O	1..N	Contains the application traffic descriptors of the service consumer, which are used to establish redundant transmission paths. (NOTE)	
valUeId	string	O	0..1	Contains the unique identifier of the concerned VAL UE.	
valAddrInfo	ValUeAddrInfo	O	0..1	Contains the address information of the concerned VAL UE.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.4.1.6. This attribute shall be present only when feature negotiation needs to take place.	
NOTE: In this release of this specification, this attribute shall not contain more than two array elements.					

7.4.1.4.2.29 Type: AppTraffDesc

Table 7.4.1.4.2.29-1: Definition of type AppTraffDesc

Attribute name	Data type	P	Cardinality	Description	Applicability
connInfo	ConnInfo	M	1	Contains the data transmission connection information, i.e., address/port and/or URI via which application traffic is exchanged.	
transProtoc	TransportProtocol	O	0..1	Represents the transport layer protocol via which application traffic is exchanged.	

7.4.1.4.2.30 Type: ValUeAddrInfo

Table 7.4.1.4.2.30-1: Definition of type ValUeAddrInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
valUelpv4Addr	Ipv4Addr	C	0..1	Contains the IPv4 address of the targeted VAL UE. (NOTE)	
valUelpv6Addr	Ipv6Addr	C	0..1	Contains the IPv6 address of the targeted VAL UE. (NOTE)	
port	Port	O	0..1	Contains the port information of the targeted VAL UE.	
NOTE: These attributes are mutually exclusive. Either one of them shall be present.					

7.4.1.4.2.31 Type: UnicastSubscriptionPatch

Table 7.4.1.4.2.31-1: Definition of type UnicastSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
valUes	array(string)	O	1..N	Represents the list of the VAL UE identifier(s).	
valGroupId	string	O	0..1	Represents the VAL group identifier.	
valTgtUe	ValTargetUeRm	O	0..1	Contains the identity of the VAL user or VAL UE that the bearer is requested for.	
bdtId	string	O	0..1	Represents the BDT identifier.	
uniQosReq	string	O	0..1	Contains the QoS requirement.	
duration	DateTime	O	0..1	Identifies the absolute time at which the subscription resource is considered to expire. When omitted in the request, it indicates the resource is requested to be valid forever by the service consumer. When omitted in the response, it indicates the resource is set to valid forever by the service consumer.	
notifUri	Uri	O	0..1	Identifies the notification URI where the NRM notification shall be sent to.	

7.4.1.4.3 Simple data types and enumerations

7.4.1.4.3.0 Introduction

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

7.4.1.4.3.0A Simple data types

The simple data types defined in table 7.4.1.4.3.0A-1 shall be supported.

Table 7.4.1.4.3.0A-1: Simple data types

Type Name	Type Definition	Description	Applicability
EpsMbmsInfo	Bytes	Represents the EPS MBMS bearer information encoded as specified in clause 6.4.7 of 3GPP TS 29.468 [23].	

7.4.1.4.3.1 Enumeration: ServiceAnnouncementMode

Table 7.4.1.4.3.1-1: Enumeration ServiceAnnouncementMode

Enumeration value	Description	Applicability
NRM	Indicates that the NRM Server performs the service announcement.	
VAL	Indicates that the service consumer performs the service announcement.	

7.4.1.4.3.2 Enumeration: DeliveryMode

Table 7.4.1.4.3.2-1: Enumeration DeliveryMode

Enumeration value	Description	Applicability
UNICAST	Indicates Unicast delivery.	
MULTICAST	Indicates EPS MBMS Multicast delivery.	
MBS_MULTICAST	Indicates 5GS MBS Multicast delivery.	SEAL_3
MBS_BROADCAST	Indicates 5GS MBS Broadcast delivery.	SEAL_3

7.4.1.4.3.4 Enumeration: NetSysIndicator

Table 7.4.1.4.3.4-1: Enumeration NetSysIndicator

Enumeration value	Description	Applicability
5GS	Indicates that the network system is 5GS.	
EPS	Indicates that the network system is EPS.	
5GS_AND_EPS	Indicates that the network system is both 5GS and EPS.	

7.4.1.4.3.5 Enumeration: NrmEvent

Table 7.4.1.4.3.5-1: Enumeration NrmEvent

Enumeration value	Description	Applicability
UP_DELIVERY_MODE	User Plane delivery mode.	

7.4.1.4.3.6 Enumeration: PolicyType

Table 7.4.1.4.3.6-1: Enumeration PolicyType

Enumeration value	Description	Applicability
LOWEST_COST	Indicates that the policy guidance is to consider lowest cost.	
HIGH_THROUGHPUT_WITH_COST	Indicates that the policy guidance is to consider highest throughput.	

7.4.1.4.3.7 Enumeration: TrafficPatternIndication

Table 7.4.1.4.3.6-1: Enumeration TrafficPatternIndication

Enumeration value	Description	Applicability
TRAFFIC_PATTERN_MANAGE	Indicate that the management of the UE unified traffic pattern is requested.	
TRAFFIC_PATTERN_MONITOR	Indicate that UE unified traffic pattern monitoring related notifications is requested.	
NETWORK_PARAM_COORDINATION	Indicate that network parameter coordination by the NRM with 5GC is requested.	

7.4.1.5 Error Handling

7.4.1.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.4.1.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_NetworkResourceAdaptation API.

7.4.1.5.3 Application Errors

The application errors defined for SS_NetworkResourceAdaptation API are listed in table 7.4.1.5.3-1.

Table 7.4.1.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability
INVALID_MBS_SERVICE_INFO	400 Bad Request	The provided MBS Service Information is invalid (e.g. invalid QoS reference), incorrect or insufficient to perform MBS policy authorization.	
FILTER_RESTRICTIONS_NOT_OBSERVED	400 Bad Request	The MBS IP flow(s) description provided within the MBS Service Information cannot be handled due to the restrictions defined in clause 5.3.8 of 3GPP TS 29.214 [44] not being observed.	
MBS_SERVICE_AREA_NOT_SUPPORTED	403 Forbidden	The requested MBS Service Area is not supported by the 3GPP Core Network.	
MBS_SERVICE_INFO_NOT_AUTHORIZED	403 Forbidden	The provided MBS Service Information is rejected.	

7.4.1.6 Feature negotiation

Table 7.4.1.6-1: Supported Features

Feature number	Feature Name	Description
1	Notification_test_event	The testing of notification connection is supported according to clause 6.6.
2	Notification_websocket	The delivery of notifications over Websocket is supported according to clause 6.6. This feature requires that the Notification_test_event feature is also supported.
3	LocalMBMS	Indicate the support of local MBMS transmission.
4	SEAL_3	This feature indicates the support of the third set of enhancements to the SEAL Enabler Layer framework. Within this feature, the following enhancements are covered: - Support MBS resources management.
5	enNB	Indicates the support of enhancements to this application enabler layer API in Rel-19. Within this feature, the following enhancements are covered: - Support to provide the unicast streams to be stopped (i.e., as data delivery is switched to multicast delivery) within the user plane delivery mode notification. - Support of the network resource adaptation service operation consolidation.
6	SEAL_3_Ext	This feature indicates the support of an extension to the third set of enhancements to the SEAL Enabler Layer framework. Within this feature, the following enhancements are covered: - Support to report the list of VAL UE(s) for which unicast delivery is used as part of the user plane delivery mode reporting.
7	SEALDD_BDT	Indicates the support of enhancements to this application enabler layer API to support SEALDD services. Within this feature, the following enhancements are covered: - Support to provide the BDT reference in network resource request.

7.4.2 SS_NetworkResourceMonitoring API

7.4.2.1 API URI

The SS_NetworkResourceMonitoring service shall use the SS_NetworkResourceMonitoring API.

The request URIs used in HTTP requests from the VAL server towards the NRM server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-nrm".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.4.2.2

7.4.2.2 Resources

7.4.2.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.4.2.2.1-1 depicts the resource URIs structure for the SS_NetworkResourceMonitoring API.

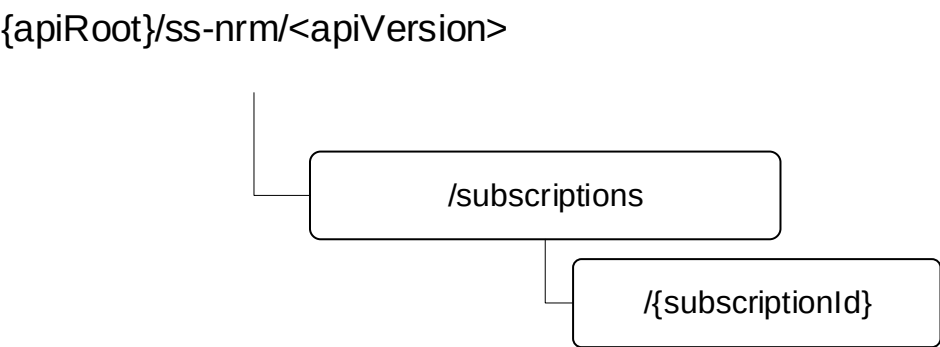


Figure 7.4.2.2.1-1: Resource URI structure of the SS_NetworkResourceMonitoring API

Table 7.4.2.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.4.2.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Unicast Monitoring Subscriptions	/subscriptions	POST	Create individual unicast monitoring subscription resource or obtain unicast QoS monitoring data for VAL UEs, VAL Group, or VAL Streams.
Individual Unicast Monitoring Subscription	/subscriptions/{subscriptionId}	DELETE	Remove an existing individual unicast monitoring subscription resource according to the subscriptionId.
		GET	Read an existing individual unicast monitoring subscription resource according to the subscriptionId.
		PUT	Update an individual unicast monitoring subscription identified by the subscriptionId.
		PATCH	Modify an individual unicast monitoring subscription identified by the subscriptionId.

7.4.2.2.2 Resource: Unicast Monitoring Subscriptions

7.4.2.2.2.1 Description

7.4.2.2.2.2 Resource Definition

Resource URI: {apiRoot}/ss-nrm/<apiVersion>/subscriptions

This resource shall support the resource URI variables defined in table 7.4.2.2.2.2-1.

Table 7.4.2.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.4.2.1.

7.4.2.2.2.3 Resource Standard Methods

7.4.2.2.2.3.1 POST

This method enables a VAL Server to request the creation of a unicast QoS monitoring subscription at the NRM server. This method shall support the URI query parameters specified in table 7.4.2.2.2.3.1-1.

Table 7.4.2.2.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.4.2.2.2.3.1-2 and the response data structures and response codes specified in table 7.4.2.2.2.3.1-3.

Table 7.4.2.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
MonitoringSubscription	M	1	

Table 7.4.2.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MonitoringSubscription	M	1	201 Created	The requested individual monitoring subscription resource is successfully created and a representation of the created resource is returned in the response body.
MonitoringReport	M	1	200 OK	The requested unicast QoS monitoring data is returned.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.2.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-nrm/<apiVersion>/subscriptions{subscriptionId}

7.4.2.2.2.4 Resource Custom Operations

None.

7.4.2.2.3 Resource: Individual Unicast Monitoring Subscription

7.4.2.2.3.1 Description

7.4.2.2.3.2 Resource Definition

Resource URI: {**apiRoot**}/ss-nrm/<**apiVersion**>/subscriptions/{**subscriptionId**}

This resource shall support the resource URI variables defined in table 7.4.2.2.3.2-1.

Table 7.4.2.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.4.2.1.
subscriptionId	string	Represents the identifier of an individual unicast monitoring subscription resource.

7.4.2.2.3.3 Resource Standard Methods

7.4.2.2.3.3.1 DELETE

This operation deletes the Individual Unicast Monitoring Subscription resource. This method shall support the URI query parameters specified in table 7.4.2.2.3.3.1-1.

Table 7.4.2.2.3.3.1-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.2.2.3.3.1-2 and the response data structures and response codes specified in table 7.4.2.2.3.3.1-3.

Table 7.4.2.2.3.3.1-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.2.2.3.3.1-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The Individual Unicast Monitoring Subscription resource matching the subscriptionId is deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.4.2.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative NRM server.

Table 7.4.2.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative NRM server.

7.4.2.2.3.3.2 GET

This operation reads the individual unicast monitoring subscription resource. This method shall support the URI query parameters specified in table 7.4.2.2.3.3.2-1.

Table 7.4.2.2.3.3.2-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.4.2.2.3.3.2-2 and the response data structures and response codes specified in table 7.4.2.2.3.3.2-3.

Table 7.4.2.2.3.3.2-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.4.2.2.3.3.2-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MonitoringSubscription	M	1	200 OK	The requested individual unicast monitoring subscription is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.4.2.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative NRM server.

Table 7.4.2.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative NRM server.

7.4.2.2.3.3.3 PUT

This operation updates the "Individual Unicast Monitoring Subscription". This method shall support the URI query parameters specified in table 7.4.2.2.3.3.3-1.

Table 7.4.2.2.3.3.3-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.2.2.3.3.3-2 and the response data structures and response codes specified in table 7.4.2.2.3.3.3-3.

Table 7.4.2.2.3.3.3-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
MonitoringSubscription	M	1	Updated details of the unicast QoS monitoring subscription. The target identifiers, i.e., the "valUeIds", "valGroupId", and "valStreamIds" attributes shall not be changed in the MonitoringSubscription data structure.

Table 7.4.2.2.3.3.3-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MonitoringSubscription	M	1	200 OK	The subscription is updated successfully, and the updated subscription information returned in the response.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative NRM server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.4.2.2.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative location management server.

Table 7.4.2.2.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative location management server.

7.4.2.2.3.3.4 PATCH

This operation modifies the "Individual Unicast Monitoring Subscription". This method shall support the URI query parameters specified in table 7.4.2.2.3.3.4-1.

Table 7.4.2.2.3.3.4-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.4.2.2.3.3.4-2 and the response data structures and response codes specified in table 7.4.2.2.3.3.4-3.

Table 7.4.2.2.3.3.4-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
MonitoringSubscriptionPatch	M	1	Contains the modifications to be applied to the individual unicast QoS monitoring subscription resource.

Table 7.4.2.2.3.3.4-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MonitoringSubscription	M	1	200 OK	Individual unicast QoS monitoring subscription resource is modified successfully and representation of the modified individual unicast QoS monitoring subscription resource is returned.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.4.2.2.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

Table 7.4.2.2.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

7.4.2.3 Notifications

7.4.2.3.1 General

Table 7.4.2.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Individual Unicast Monitoring Notification	{notifUri}	POST	Notify on updates of the individual monitoring resource according to the requested reporting settings.

7.4.2.3.2 Individual Unicast Monitoring Notification

7.4.2.3.2.1 Description

7.4.2.3.2.2 Notification definition

Callback URI: {**notifUri**}

This method shall support the URI query parameters specified in table 7.4.2.3.2.2-1.

Table 7.4.2.3.2.2-1: 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 7.4.2.3.2.2-2 and the response data structures and response codes specified in table 7.4.2.3.2.2-3.

Table 7.4.2.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
MonitoringReport	M	1	Represents the reported monitoring data.

Table 7.4.2.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The notification is successfully received.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative VAL server where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative VAL server where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.4.2.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative VAL server towards which the notification should be redirected.

Table 7.4.2.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative VAL server towards which the notification should be redirected.

7.4.2.4 Data Model

7.4.2.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API

Table 7.4.2.4.1-1 specifies the data types defined specifically for the SS_NetworkResourceMonitoring API service.

Table 7.4.2.4.1-1: SS_NetworkResourceMonitoring API specific Data Types

Data type	Section defined	Description	Applicability
FailureReport	7.4.2.4.2.9	Represents the failure report indicating the VAL UE(s) or VAL Stream ID(s) for which the NRM server failed to obtain the requested data.	
FailureReason	7.4.2.4.3.3	Represents the failure reason.	
MeasurementData	7.4.2.4.2.3	Presents the aggregated measurement data.	
MeasurementDataType	7.4.2.4.3.1	Indicates the requested measurement data type.	
MeasurementPeriod	7.4.2.4.2.4	Indicates the measurement time period.	
MeasurementRequirements	7.4.2.4.2.6	Indicates the measurement requirements.	
MonitoringReport	7.4.2.4.2.2	Indicates the monitoring report for VAL UEs list, VAL Group, or VAL Stream.	
MonitoringSubscription	7.4.2.4.2.7	The monitoring subscription request.	
MonitoringSubscriptionPatch	7.4.2.4.2.11	Represents the monitoring subscription modification request.	UpdateSupport
ReportingRequirements	7.4.2.4.2.5	Indicates the requested requirements of reporting.	
ReportingThreshold	7.4.2.4.2.10	Indicates a requested reporting threshold.	
TerminationMode	7.4.2.4.3.2	Indicates the termination mode.	
ThresholdHandlingMode	7.4.2.4.3.4	Indicates the multi-parameter threshold handling mode.	

Table 7.4.2.4.1-2 specifies data types re-used by the SS_NetworkResourceMonitoring API service.

Table 7.4.2.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AverWindow	3GPP TS 29.571 [21]	Used to represent an aggregation window.	
BitRate	3GPP TS 29.571 [21]	Used to represent a bit rate measurement value.	
DateTime	3GPP TS 29.122 [3]	Used to represent a date and time.	
DurationSec	3GPP TS 29.571 [21]	Used to represent a measurement timestamp and measurement start time.	
MatchingDirection	3GPP TS 29.520 [33]	Used to indicate a threshold matching direction.	
NotificationMethod	3GPP TS 29.508 [32]	Used to indicate the reporting mode.	
PacketLossRate	3GPP TS 29.571 [21]	Used to represent a packet loss rate measurement value.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the supported optional features of the API.	
UInteger	3GPP TS 29.571 [21]	Used to represent integer attributes within MeasurementData and ReportingRequirements data structures.	
Uri	3GPP TS 29.122 [3]	Used to indicate the notification URI.	
ValTargetUe	clause 7.3.1.4.2.3	Used to identify either a VAL User ID or a VAL UE ID.	
WebsocketNotifConfig	3GPP TS 29.122 [3]	Used to indicate the configuration parameters to set up notification delivery over Websocket protocol.	

7.4.2.4.2 Structured data types

7.4.2.4.2.1 Introduction

7.4.2.4.2.2 Type: MonitoringReport

Table 7.4.2.4.2.2-1: Definition of type MonitoringReport

Attribute name	Data type	P	Cardinality	Description	Applicability
valUeIds	array(ValTargetUe)	C	1..N	List of VAL UEs whose measurement data is provided (NOTE).	
valGroupId	string	C	0..1	The group ID used for the VAL group for which measurement data is provided (NOTE).	
valStreamIds	array(string)	C	1..N	List of VAL stream IDs whose measurement data (NOTE).	
measData	MeasurementData	M	1	The aggregated measurement data.	
termCause	TerminationMode	O	0..1	Contains the subscription termination cause. The presence of this attribute indicates that the subscription is terminated following this notification.	SEAL_Ext
timestamp	DateTime	M	1	The timestamp of the measurement.	
failureRep	array(FailureReport)	C	1..N	The failure report from the NRM server indicating the VAL UE(s) or VAL Stream ID(s) whose measurement data is not obtained successfully and is not provided in the monitoring report. This attribute shall be provided by the NRM server when the requested measurement data is not obtained successfully for all the requested VAL UE(s) or VAL Stream ID(s).	
monProfileId	MonProfileId	O	0..1	Contains the identifier of the monitoring profile to which the notification is related.	SEAL_Ext

NOTE: Only one of these attributes shall be provided.

7.4.2.4.2.3 Type: MeasurementData

Table 7.4.2.4.2.3-1: Definition of type MeasurementData

Attribute name	Data type	P	Cardinality	Description	Applicability
dlDelay	UInteger	O	0..1	The downlink packet delay in milliseconds (NOTE).	
ulDelay	UInteger	O	0..1	The uplink packet delay in milliseconds (NOTE).	
rtDelay	UInteger	O	0..1	The round trip packet delay in milliseconds (NOTE).	
avgPlr	PacketLossRate	O	0..1	The average packet loss rate (NOTE).	
avgDataRate	BitRate	O	0..1	The average data rate (NOTE).	
maxDataRate	BitRate	O	0..1	The maximum data rate (NOTE).	
avrDITrafficVol	UInteger	O	0..1	The average traffic volume for downlink in bytes (NOTE).	
avrUITrafficVol	UInteger	O	0..1	The average traffic volume for uplink in bytes (NOTE).	

NOTE: At least one of the measurement indexes shall be provided.

7.4.2.4.2.4 Type: MeasurementPeriod

Table 7.4.2.4.2.4-1: Definition of type MeasurementPeriod

Attribute name	Data type	P	Cardinality	Description	Applicability
measStartTime	DateTime	M	1	Indicate the starting time for the measurement.	
measDuration	DurationSec	M	1	Indicate the duration for the measurement starting from the measStartTime.	

7.4.2.4.2.5

Type: ReportingRequirements

Table 7.4.2.4.2.5-1: Definition of type ReportingRequirements

Attribute name	Data type	P	Cardinality	Description	Applicability
reportingMode	NotificationMethod	M	1	The indication of the requested reporting option: one-time, periodic or event-triggered (i.e. "ON_EVENT_DETECTION") This attribute may be set to the value "ONE_TIME" only if the "immRep" attribute is provided and set to "true"..	
reportingPeriod	DurationSec	C	0..1	Identifies the reporting time interval for the periodic reporting. (NOTE 1).	
reportingThrs	array(ReportingThreshold)	C	1..N	Identifies reporting threshold corresponding to the measurement index(es). (NOTE 2).	
immRep	boolean	O	0..1	It indicates immediate reporting. When included and set to true, it indicates that immediate reporting of the subscribed event(s) is requested.	
repTerminMode	TerminationMode	O	0..1	The indication of the requested reporting termination mode: time-triggered, event-triggered (number of reports reached), event-triggered (threshold reached) or user-triggered. If absent, user-triggered reporting is used as the default termination mode.	
expirationTimer	DurationSec	C	0..1	Identifies the reporting time interval for the time triggered termination mode. (NOTE 3).	
maxNumRep	UInteger	C	0..1	Indicates the maximum number of reports (number of reports reached). (NOTE 4).	
termThr	MeasurementData	C	0..1	Indicates the reporting termination threshold(s) corresponding to the measurement index(ex). (NOTE 5, NOTE 6, NOTE 7).	
termThrMode	ThresholdHandlingMode	C	0..1	Indicates the multi-parameter threshold handling for the event-triggered threshold reached reporting termination. (NOTE 8).	
NOTE 1: The "reportingPeriod" attribute shall be present only when the "reportingMode" attribute is set to "PERIODIC".					
NOTE 2: The "reportingThrs" attribute shall be present only when the "reportingMode" attribute is set to "ON_EVENT_DETECTION".					
NOTE 3: The "expirationTimer" attribute shall be present only if the "repTerminMode" attribute is present and set to "TIME_TRIGGERED".					
NOTE 4: The "maxNumRep" attribute shall be present only if the "repTerminMode" attribute is present and set to "EVENT_TRIGGERED_NUM_REPORTS_REACHED".					
NOTE 5: The "termThr" attributes shall be present only when the "repTerminMode" attribute is present and set to "EVENT_TRIGGERED_MEAS_THR_REACHED".					
NOTE 6: The event-triggered reporting termination condition for the "dlDelay", "ulDelay", "rtDelay" and "avgPIr" attributes within the MeasurementData data structure is met when the measured value is greater than or equal to the given threshold.					
NOTE 7: The event-triggered reporting termination condition for the "avgDataRate", "maxDataRate", "avrDITrafficVol" and "avrUITrafficVol" attributes within the MeasurementData data structure is met when the measured value is less than or equal to the given threshold.					
NOTE 8: The "termThrMode" attribute shall be present only when the "repTerminMode" attribute is present and set to "EVENT_TRIGGERED_MEAS_THR_REACHED" and the "termThr" contains more than one threshold.					

7.4.2.4.2.6

Type: MeasurementRequirements

Table 7.4.2.4.2.6-1: Definition of type MeasurementRequirements

Name	Data type	P	Cardinality	Description	Applicability
measDataTypes	array(MeasurementDataType)	M	1..N	Indicates the required types of measurement data. At least one measurement data type shall be present in the array structure.	
measAggrGranWnd	AverWindow	O	0..1	It indicates the aggregation granularity window for the measured data (NOTE 1). The aggregation granularity window shall not exceed the duration of the measurement time period defined in the "measPeriod" attribute.	
measPeriod	MeasurementPeriod	O	0..1	It indicates the required measurement time period (NOTE 2).	

NOTE 1: If absent, 1 minute shall be used as default setting.

NOTE 2: If absent, current time and 5 minutes duration shall be used as default setting.

7.4.2.4.2.7

Type: MonitoringSubscription

Table 7.4.2.4.2.7-1: Definition of type MonitoringSubscription

Name	Data type	P	Cardinality	Description	Applicability
valUeIds	array(ValTargetUe)	C	1..N	List of VAL UEs which measurement data reporting is requested (NOTE 1).	
valGroupId	string	C	0..1	The group ID used for the VAL group for which measurement data reporting is requested (NOTE 1).	
valStreamIds	array(string)	C	1..N	List of VAL streams for which measurement data reporting is requested (NOTE 1)	
valSvcId	string	O	0..1	Contains the VAL service identifier. (NOTE 2, NOTE 3)	SEAL_Ext
monProfId	MonProfId	O	0..1	Contains the monitoring profile identifier. (NOTE 2, NOTE 3, NOTE 4)	SEAL_Ext
measReqs	MeasurementRequirements	O	0..1	Contains the measurement requirements (NOTE 2, NOTE 4).	
reportReqs	ReportingRequirements	O	0..1	Contains the reporting requirements. (NOTE 3, NOTE 4)	
notifUri	Uri	C	0..1	Contains the URI where the notification should be delivered to. This attribute shall be present only for subscriptions without immediate reporting.	
monRep	MonitoringReport	C	0..1	Contains the unicast QoS monitoring data reporting. The NRM server shall provide this attribute when immediate reporting is requested and the requested data is available.	
reqTestNotif	boolean	O	0..1	Set to true to request the VAL server to send a test notification as defined in clause 6.6. Set to false or omitted otherwise.	Notification_test_event
wsNotifCfg	WebsocketNotificationConfig	O	0..1	Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 6.6.	Notification_websocket
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.4.2.6. This attribute shall be present only when feature negotiation needs to take place.	
NOTE 1: Only one of these attributes shall be provided.					
NOTE 2: If the "measReqs" attribute, and if the "SEAL_Ext" feature is supported, the "monProfId" attribute is/are all absent, then the default monitoring requirements values shall be used or the monitoring requirements values shall be derived based on the VAL Service ID provided within the "valSvcId" attribute, if received.					
NOTE 3: If the "reportReqs" attribute, and if the "SEAL_Ext" feature is supported, the "monProfId" attribute is/are all absent, the default event triggered reporting requirements shall be used or the event triggered reporting requirements values shall be derived based on the VAL Service ID provided within the "valSvcId" attribute, if received.					
NOTE 4: When the "SEAL_Ext" feature is supported and the "monProfId" attribute is present in the resource creation/update request, then both the "measReqs" and "reportReqs" attributes shall not be present neither in the resource creation/update request nor in the corresponding response.					

7.4.2.4.2.8 Void

7.4.2.4.2.9 Type: FailureReport

Table 7.4.2.4.2.9-1: Definition of type FailureReport

Attribute name	Data type	P	Cardinality	Description	Applicability
valUeIds	array(ValTargetUe)	C	1..N	List of VAL UE(s) whose measurement data is not obtained successfully and is not provided (NOTE). The VAL UE(s) may be member(s) of the VAL group identified by the "valGroupId" attribute in the MonitoringReport data structure.	
valStreamIds	array(string)	C	1..N	List of VAL stream ID(s) whose measurement data is not obtained successfully and is not provided (NOTE).	
failureReason	FailureReason	M	1	Identifies the failure reason.	
measDataType	MeasurementDataType	C	0..1	The indication of the measurement data type that is not obtained successfully and is not provided in the monitoring report. This attribute shall be provided if the failure reason does not apply to all the requested measurement data types.	
NOTE: Only one of these attributes shall be provided.					

7.4.2.4.2.10 Type: ReportingThreshold

Table 7.4.2.4.2.10-1: Definition of type ReportingThreshold

Name	Data type	P	Cardinality	Description	Applicability
measThrValues	MeasurementData	M	1	Indicates the value(s) for the measurement threshold index(es).	
thrDirection	MatchingDirection	M	1	Indicates the threshold matching direction for the measurement threshold index(es) provided in the "measThrValues" attribute.	

7.4.2.4.2.11 Type: MonitoringSubscriptionPatch

Table 7.4.2.4.2.11-1: Definition of type MonitoringSubscriptionPatch

Name	Data type	P	Cardinality	Description	Applicability
measReqs	MeasurementRequirements	O	0..1	Indicates the measurement requirements.	
reportReqs	ReportingRequirements	O	0..1	Indicates the reporting requirements.	
notifUri	Uri	O	0..1	Indicates the URI where the notification should be delivered to.	
monProfId	MonProfId	O	0..1	Contains the monitoring profile identifier.	SEAL_Ext

7.4.2.4.3 Simple data types and enumerations

7.4.2.4.3.0A Introduction

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

7.4.2.4.3.0B Simple data types

The simple data types defined in table 7.4.2.4.3.0B-1 shall be supported.

Table 7.4.2.4.3.0B-1: Simple data types

Type Name	Type Definition	Description	Applicability
MonProfileId	string	Represents the monitoring profile identifier.	

7.4.2.4.3.1 Enumeration: MeasurementDataType

Table 7.4.2.4.3.1-1: Enumeration MeasurementDataType

Enumeration value	Description	Applicability
DL_DELAY	The indication for requesting the downlink packet delay data type.	
UL_DELAY	The indication for requesting the uplink packet delay data type.	
RT_DELAY	The indication for requesting the round trip packet delay data type.	
AVG_PLR	The indication for requesting the average packet loss rate data type.	
AVG_DATA_RATE	The indication for requesting the average data rate data type.	
MAX_DATA_RATE	The indication for requesting the maximum data rate data type.	
AVG_DL_TRAFFIC_VOLUME	The indication for requesting the average traffic volume for downlink data type.	
AVG_UL_TRAFFIC_VOLUME	The indication for requesting the average traffic volume for uplink data type.	

7.4.2.4.3.2 Enumeration: TerminationMode

Table 7.4.2.4.3.2-1: Enumeration TerminationMode

Enumeration value	Description	Applicability
TIME_TRIGGERED	The time-triggered termination mode.	
EVENT_TRIGGERED_NUM_REPORTS_REACHED	The event-triggered termination number of reports reached mode.	
EVENT_TRIGGERED_MEAS_THR_REACHED	The event-triggered termination measurement index threshold reached mode.	
USER_TRIGGERED	The user-triggered termination mode.	

7.4.2.4.3.3 Enumeration: FailureReason

Table 7.4.2.4.3.3-1: Enumeration FailureReason

Enumeration value	Description	Applicability
USER_NOT_FOUND	The user is not found.	
STREAM_NOT_FOUND	The stream is not found.	
DATA_NOT_AVAILABLE	The requested data is not available.	
OTHER_REASON	Other reason (unspecified).	

7.4.2.4.3.4 Enumeration: ThresholdHandlingMode

Table 7.4.2.4.3.4-1: Enumeration ThresholdHandlingMode

Enumeration value	Description	Applicability
ALL_REACHED	The decision criterion is met when all the provided thresholds are reached.	
ANY_REACHED	The decision criterion is met when any of the provided threshold(s) is reached.	

7.4.2.5 Error Handling

7.4.2.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.4.2.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_NetworkResourceMonitoring API.

7.4.2.5.3 Application Errors

The application errors defined for SS_NetworkResourceMonitoring API are listed in table 7.4.2.5.3-1.

Table 7.4.2.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.4.2.6 Feature negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.4.2.6-1 lists the supported features for SS_NetworkResourceMonitoring API.

Table 7.4.2.6-1: Supported Features

Feature number	Feature Name	Description
1	Notification_test_event	The testing of notification connection is supported according to clause 6.6.
2	Notification_websocket	The delivery of notifications over Websocket is supported according to clause 6.6. This feature requires that the Notification_test_event feature is also supported.
3	UpdateSupport	Indicates the support of the Update_Unicast_QoS_Monitoring_Subscription service operation. This feature enables the support of both HTTP PUT and HTTP PATCH methods for the SS_NetworkResourceMonitoring API.
4	SEAL_Ext	Indicates the support of the SEAL enhancements in Release-19. Within this feature, the following enhancements are covered: - Support of the monitoring profiles. - Support of the subscription termination indication.

7.5 Event APIs

7.5.1 SS_Events API

7.5.1.1 API URI

The SS_Events service shall use the SS_Events API.

The request URIs use in HTTP requests from the VAL server towards the SEAL server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-events".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.5.1.2.

7.5.1.2 Resources

7.5.1.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.5.1.2.1-1 depicts the resource URIs structure for the SS_Events API.

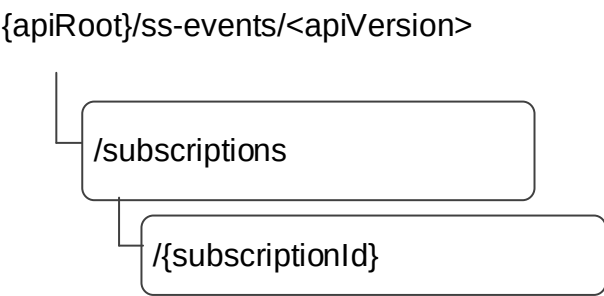


Figure 7.5.1.2.1-1: Resource URI structure of the SS_Events API

Table 7.5.1.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.5.1.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
SEAL Events Subscriptions	/subscriptions	POST	Creates a new individual SEAL Event Subscription.
Individual SEAL Events Subscription	/subscriptions/{subscriptionId}	DELETE	Deletes an individual SEAL Event Subscription identified by the subscriptionId.
		PATCH	Modifies an individual SEAL Event subscription identified by the subscriptionId.
		PUT	Updates an individual SEAL Event subscription identified by the subscriptionId.

7.5.1.2.2 Resource: SEAL Events Subscriptions

7.5.1.2.2.1 Description

The SEAL Events Subscriptions represents all event subscriptions on the SEAL server.

7.5.1.2.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-events/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in the table 7.5.1.2.2.2-1.

Table 7.5.1.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.5.1.2.2.3 Resource Standard Methods

7.5.1.2.2.3.1 POST

This method shall support the URI query parameters specified in the table 7.5.1.2.2.3.1-1.

Table 7.5.1.2.2.3.1-1: 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 7.5.1.2.2.3.1-2 and the response data structures and response codes specified in table 7.5.1.2.2.3.1-3.

Table 7.5.1.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SEALEventSubscription	M	1	Create a new individual SEAL Events Subscription resource.

Table 7.5.1.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SEALEventSubscription	M	1	201 Created	SEAL Events Subscription resource created successfully. The URI of the created resource shall be returned in the "Location" HTTP header
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.5.1.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-events/<apiVersion>/subscriptions/{subscriptionId}

7.5.1.2.2.4 Resource Custom Operations

None.

7.5.1.2.3 Resource: Individual SEAL Events Subscription

7.5.1.2.3.1 Description

The Individual SEAL Events Subscription resource represents an individual event subscription of a VAL server.

7.5.1.2.3.2 Resource Definition

Resource URI: **{apiRoot}/ss-events/<apiVersion>/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in the table 7.5.1.2.3.2-1.

Table 7.5.1.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
subscriptionId	string	Identifies an Individual Events Subscription

7.5.1.2.3.3 Resource Standard Methods

7.5.1.2.3.3.1 DELETE

This method shall support the URI query parameters specified in table 7.5.1.2.3.3.1-1.

Table 7.5.1.2.3.3.1-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.5.1.2.3.3.1-2 and the response data structures and response codes specified in table 7.5.1.2.3.3.1-3.

Table 7.5.1.2.3.3.1-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.5.1.2.3.3.1-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual SEAL Events Subscription matching the subscriptionId is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.5.1.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

Table 7.5.1.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

7.5.1.2.3.3.2 PATCH

This method shall support the URI query parameters specified in table 7.5.1.2.3.3.2-1.

Table 7.5.1.2.3.3.2-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.5.1.2.3.3.2-2 and the response data structures and response codes specified in table 7.5.1.2.3.3.2-3.

Table 7.5.1.2.3.3.2-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
SEALEventSubscriptionPatch	M	1	Contains the modifications to be applied to the SEAL Event subscription resource.

Table 7.5.1.2.3.3.2-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SEALEventSubscription	M	1	200 OK	SEAL Events Subscription resource is modified successfully and representation of the modified SEAL Event subscription is returned.
n/a			204 No Content	The SEAL Events Subscription is updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].

NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.

Table 7.5.1.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

Table 7.5.1.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

7.5.1.2.3.3.3 PUT

This method requests fully replacement of an existing Individual SEAL Events Subscription at the SEAL server. The request shall not update the values of the "subscriberId", "requestTestNotification" (if previously provisioned), "websocketNotifConfig" (if previously provisioned) and/or "suppFeat" attributes within the SEALEventSubscription data type. This method shall support the URI query parameters specified in table 7.5.1.2.3.3.3-1.

Table 7.5.1.2.3.3.3-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.5.1.2.3.3.3-2 and the response data structures and response codes specified in table 7.5.1.2.3.3.3-3.

Table 7.5.1.2.3.3.3-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
SEALEventSubscription	M	1	Contains the SEAL Event subscription to be updated.

Table 7.5.1.2.3.3.3-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SEALEventSubscription	M	1	200 OK	SEAL Event Subscription resource is updated successfully and representation of the modified SEAL Event subscription is returned.
n/a			204 No Content	The SEAL Events Subscription is updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.5.1.2.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

Table 7.5.1.2.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative SEAL server.

7.5.1.2.3.4 Resource Custom Operations

None.

7.5.1.3 Notifications

7.5.1.3.1 General

The delivery of notifications shall conform to clause 6.6.

Table 7.5.1.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
SEAL Event Notification	{notificationDestination}	POST	Notifies subscriber of a SEAL Event

7.5.1.3.2 SEAL Event Notification

7.5.1.3.2.1 Description

SEAL Event Notification is used by the SEAL server notify a VAL server of an Event. The VAL server shall be subscribed to such SEAL Event Notifications via the Individual SEAL Events Subscription Resource.

7.5.1.3.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the VAL server during the subscription to the event.

Callback URI: **{notificationDestination}**

This method shall support the URI query parameters specified in table 7.5.1.3.2.2-1.

Table 7.5.1.3.2.2-1: 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 7.5.1.3.2.2-2 and the response data structures and response codes specified in table 7.5.1.3.2.2-3.

Table 7.5.1.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SEALEventNotification	M	1	Notification information of a SEAL Event

Table 7.5.1.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The receipt of the Notification is acknowledged.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.5.1.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.5.1.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.5.1.4 Data Model

7.5.1.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.5.1.4.1-1 specifies the data types defined specifically for the SS_Events API service.

Table 7.5.1.4.1-1: SS_Events API specific Data Types

Data type	Section defined	Description	Applicability
EventSubscription	7.5.1.4.2.4	Represents the subscription to a single SEAL event.	
GeofencingConditions	7.5.1.4.2.26	Represents the geofencing conditions.	LM_LocationDeviation_Ext1
PartialEventSubscFailRep	7.5.1.4.2.23	Represents the partial failure report during the subscription creation.	PartialFailureSupport
IdentityFilter	7.5.1.4.2.7	Represents a filter of VAL User / UE identities belonging to a VAL service.	
LMInformation	7.5.1.4.2.8	The location information for a VAL User ID or a VAL UE ID.	
LocationAreaMonReport	7.5.1.4.2.20	Represents the event report to notify the VAL UEs moving in or moving out from a given location.	
LocationDevMonReport	7.5.1.4.2.15	Represents the event report to notify the VAL UE/User's location deviation from a given location.	
LocationInfoCriteria	7.5.1.4.2.18	Represents the location information to be monitored. It includes the geographic location information or a reference UE along with the application defined proximity range from the reference UE.	
LocDevNotification	7.5.1.4.3.4	Enumeration of location deviation notification reports.	
MessageFilter	7.5.1.4.2.9	The message filter information applicable to member VAL UEs or Users of the VAL group in the group change notification.	
MonitorEvents	7.5.1.4.2.11	Represents the details of the monitoring and analytics events.	NRM_EventMonitor
MonitorEventsReport	7.5.1.4.2.12	Represents the monitoring and analytics events information related to VAL UE or User.	NRM_EventMonitor
MonitorFilter	7.5.1.4.2.10	Represents the filter information VAL User or UEs and the related events to be monitored.	NRM_EventMonitor
MonitorLocationInterestFilter	7.5.1.4.2.14	Filter information to subscribe for monitoring the VAL UE/User location in a given area of interest.	
MonLocAreaInterestFltr	7.5.1.4.2.17	Filter information to subscribe for location area monitoring information for a given area of interest.	
MonLocTriggerEvent	7.5.1.4.3.5	Identifies the triggering event in the location area monitor filtering.	
MoveInOutUEDetails	7.5.1.4.2.21	Represents the list of UEs either moved into the location area or moved out of the location area.	
MovTimingInfo	7.5.1.4.2.27	Represents the timing information of a VAL UE's movements.	LM_LocationAreaMonitor_Ext1
ReferenceUEDetail	7.5.1.4.2.19	Represents the reference UE details	
RefUeCap	7.5.1.4.2.29	Represents the capabilities of the reference UE.	
DataStatisticsReq	7.5.1.4.2.24	Represents the required information to calculate the target UE's location.	
SatSfInfo	7.5.1.4.2.28	Represents the event reporting of satellite SF information.	NRM_SatSfInfo
SEALEvent	7.5.1.4.3.3	Represents the type of SEAL events that can be subscribed.	
SEALEventDetail	7.5.1.4.2.5	Represents the SEAL event detail.	
SEALEventNotification	7.5.1.4.2.3	Represents an individual SEAL Event Subscription Notification.	
SEALEventSubscription	7.5.1.4.2.2	Represents an individual SEAL Event Subscription resource.	

SEALEventSubscriptionPatch	7.5.1.4.2.22	Represents the parameters to request the modification of a SEAL Event subscription resource.	SubscUpdate
SatSfTrigger	7.5.1.4.3.6	Represents the store and forward triggering conditions.	NRM_SatSfInfo
TempGroupInfo	7.5.1.4.2.16	Represents the created temporary VAL group information.	GM_TempGroup
TimeReqs	7.5.1.4.2.25	Represents the required time information to calculate the target UE's location.	
VALGroupFilter	7.5.1.4.2.6	Represents a filter of VAL group identifiers belonging to a VAL service.	
ValidityConditions	7.5.1.4.2.13	Represents the temporal and/or spatial conditions applied for the events to be monitored.	NRM_EventMonitor

Table 7.5.1.4.1-2 specifies data types re-used by the SS_Events API service:

Table 7.5.1.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AccessType	3GPP TS 29.522 [28]	Used to represent the access type.	LM_LocationDeviation_Ext1
AnalyticsEvent	3GPP TS 29.522 [28]	Analytics event in NWDAF.	NRM_EventMonitor
DateTime	3GPP TS 29.122 [3]	Used to indicate a timestamp.	
DurationSec	3GPP TS 29.122 [3]	Used to indicate the notification interval in the location monitoring filter.	
Float	3GPP TS 29.571 [21]	Used to represent the fractional part of the proximity range in the reference UE details.	
GeoArea	Clause 7.4.1.4.2.19	Represents the geographical area.	
GeographicArea	3GPP TS 29.572 [31]	Identifies the geographical information of the user(s).	
LocationArea5G	3GPP TS 29.122 [3]	User location area when the UE is attached to 5G.	NRM_EventMonitor
LocationInfo	3GPP TS 29.122 [3]	Location information	
LocationQoS	3GPP TS 29.572 [31]	Identifies QoS requested by VAL server.	LM_LocationInfoChange_Extension1
MonitoringType	3GPP TS 29.122 [3]	Monitoring event type in 3GPP system core network.	NRM_EventMonitor
PlmnIdNid	3GPP TS 29.571 [21]	Used to represent the identifier of the PLMN.	LM_LocationDeviation_Ext1
ProfileDoc	Clause 7.3.1.4.2.2	Used to send VAL User or VAL UE profile information as part of event detail in the event notification.	
ReportingInformation	3GPP TS 29.523 [20]	Used to indicate the reporting requirement, only the following information are applicable for SEAL: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
ScheduledCommunicationTime	3GPP TS 29.122 [3]	Used to define the time frame for message filters.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the applicability of optional features defined in table 7.5.1.6-1.	
TestNotification	3GPP TS 29.122 [3]	Following differences apply: - The SCEF is the SEAL server; and - The SCS/AS is the subscribing VAL server.	
TimeWindow	3GPP TS 29.122 [3]	Time window identified by a start time and a stop time.	NRM_EventMonitor

UeStrAndFwdStatus	3GPP TS 29.122 [3]	Identifies the UE status in Store and Forward mode.	
UInteger	3GPP TS 29.571 [21]	Used to represent maximum number of messages in MessageFilter data type.	
Uri	3GPP TS 29.122 [3]	Used to indicate a notification URL.	
VALGroupDocument	Clause 7.2.1.4.2.2	Used to send VAL group document as part of event detail in the event notification.	
ValSvcAreald	Clause 7.1.3.4.3.2	Used to represent the VAL service area identifier.	ValSrvArea
ValTargetUe	7.3.1.4.2.3	Used to identify a VAL user ID or a VAL UE ID.	
WebsockNotifConfig	3GPP TS 29.122 [3]	Following differences apply: - The SCEF is the CAPIF core function; and - The SCS/AS is the Subscribing functional entity.	

7.5.1.4.2 Structured data types

7.5.1.4.2.1 Introduction

7.5.1.4.2.2 SEALEventSubscription

Table 7.5.1.4.2.2-1: Definition of type SEALEventSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriberId	string	M	1	String identifying the subscriber of the event.	
eventSubs	array(EventSubscription)	M	1..N	Subscribed events.	
eventReq	ReportingInformation	M	1	Represents the reporting requirements of the event subscription.	
notificationDestination	Uri	M	1	URI where the notification should be delivered to.	
requestTestNotification	boolean	O	0..1	Set to true by Subscriber to request the SEAL server to send a test notification as defined in clause 6.6. Set to false or omitted otherwise.	Notification_test_event
websocketNotificationConfig	WebsocketNotificationConfig	O	0..1	Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 6.6.	Notification_websocket
eventDetails	array(SEALEventDetail)	C	1..N	Detailed information of individual Events. Shall only be present in the response from the server if the immediate reporting indication in the "immRep" attribute within the "eventReq" attribute is set to true, and the reports are available.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.5.1.6. This attribute shall be present only when feature negotiation needs to take place.	

7.5.1.4.2.3 SEALEventNotification

Table 7.5.1.4.2.3-1: Definition of type SEALEventNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriptionId	string	M	1	Identifier of the subscription resource to which the notification is related – SEAL resource identifier	
eventDetails	array(SEALEventDetail)	M	1..N	Detailed notifications of individual Events.	

7.5.1.4.2.4

EventSubscription

Table 7.5.1.4.2.4-1: Definition of type EventSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
eventId	SEALEvent	M	1	Subscribed event	
valGroups	array(VAL GroupFilter)	C	1..N	Each element of the array represents the VAL group identifier(s) of a VAL service that the subscriber wants to know in the interested event. This parameter shall be present only if the event subscribed is "GM_GROUP_INFO_CHANGE".	GM_GroupInfoChange
identities	array(IdentityFilter)	C	1..N	Each element of the array represents the VAL User / UE IDs of a VAL service that the event subscriber wants to know in the interested event. This parameter shall be present only if the event subscribed is "CM_USER_PROFILE_CHANGE", "LM_LOCATION_INFO_CHANGE", or if the "NRM_SatSfInfo" feature is supported, "NRM_SAT_SF_INFO". (NOTE)	CM_UserProfileChange, LM_LocationInfoChange, NRM_SatSfInfo
monFiltr	array(MonitorFilter)	C	1..N	Each element of the array represents the event monitoring request details that the subscriber wishes to monitor the events related to a set of VAL UEs, VAL group and/or VAL service. This parameter shall be present only if the event subscribed is "NRM_MONITOR_UE_USER_EVENTS"	NRM_EventMonitor
areaInt	array(MonitorLocationInterestFilter)	C	1..N	Each element represent the list of VAL User / UE IDs and the area of interest information for which the subscriber wishes to monitor the location deviation of the VAL User / UEs. This parameter shall be present only if the subscribed event is "LM_LOCATION_DEVIATION_MONITOR".	LM_LocationDeviation
locAreaMon	array(MonLocAreaInterestFilter)	C	1..N	Each element represent the location area monitoring details that the subscriber wishes to monitor for the VAL UEs moving in or moving out of the provided location area. This parameter shall be present only if the subscribed event is "LM_LOCATION_AREA_MONITOR".	LM_LocationAreaMonitor
partialFailRep	PartialEventSubscFailRep	C	0..1	The partial failure report from the SEAL server indicating the target identifier(s) whose event subscription is not created/updated successfully. This attribute shall be provided only if the PartialFailureSupport feature is supported and the event subscription is not created/updated successfully for all requested target identifier(s).	PartialFailureSupport
satSfTrigger	array(SatSfTrigger)	C	1..N	Contains the satellite S&F related event(s) triggering conditions. This attribute shall be present only if the subscribed event within the "eventId" attribute is "NRM_SAT_SF_INFO".	NRM_SatSfInfo
NOTE: The "valSvcId" attribute within IdentityFilter is not applicable for the event "LM_LOCATION_INFO_CHANGE".					

7.5.1.4.2.5

SEALEventDetail

Table 7.5.1.4.2.5-1: Definition of type SEALEventDetail

Attribute name	Data type	P	Cardinality	Description	Applicability
eventId	SEALEvent	M	1	Event that is notified	
lmInfos	array(LMInformation)	C	1..N	The location information for the interested VAL User IDs or VAL UE IDs. This parameter shall be present only if the event in event notification is "LM_LOCATION_INFO_CHANGE".	LM_LocationInfoChange
valGroupDocuments	array(VALGroupDocument)	C	1..N	Newly created VAL group documents or the VAL groups documents with modified membership and configuration information. This parameter shall be present only if the event in event notification is "GM_GROUP_INFO_CHANGE" or "GM_GROUP_CREATE".	GM_GroupInfoChange, GM_GroupCreate
profileDocs	array(ProfileDoc)	C	1..N	Updated profile information associated with VAL Users or VAL UEs. This parameter shall be present only if the event in event notification is "CM_USER_PROFILE_CHANGE".	CM_UserProfileChange
msgFtrs	array(MessageFilter)	C	1..N	The message filters applicable to various member VAL User or UEs of the VAL group. This parameter may be present only if the event in the even notification is "GM_GROUP_INFO_CHANGE"	GM_MessageFilter
monRep	array(MonitorEventsReport)	C	1..N	The events report with details of the events related to VAL UE(s). This parameter shall be present only if the event in the event notification is "NRM_MONITOR_UE_USER_EVENTS"	NRM_EventMonitor
locAdhr	array(LocationDevMonReport)	C	1..N	The location deviation information for the interested VAL User IDs or VAL UE IDs in a given location. This parameter shall be present only if the event in event notification is "LM_LOCATION_DEVIATION_MONITOR".	LM_LocationDeviation
tempGroupInfo	TempGroupInfo	C	0..1	Contains the created temporary VAL group information. This attribute shall be present only if the "eventId" attribute is set to the value "GM_TEMP_GROUP_FORMATION".	GM_TempGroup
locAreaMonRep	array(LocationAreaMonReport)	C	1..N	The location area monitoring information of the given area of interest. This parameter shall be present only if the event in event notification is "LM_LOCATION_AREA_MONITOR".	LM_LocationAreaMonitor
valGroupIds	array(string)	C	1..N	Contains the identifier(s) of the delated VAL Group(s). This attribute shall be present only if the reported event within the "eventId" attribute is "GM_GROUP_DELETION".	GM_GroupDeletion
satSfInfo	array(SatSfInfo)	C	1..N	Contains the satellite SF information for the target VAL User ID(s) or VAL UE ID(s). This attribute shall be present only if the reported event within the "eventId" attribute is "NRM_SAT_SF_INFO".	NRM_SatSfInfo

7.5.1.4.2.6 VALGroupFilter

Table 7.5.1.4.2.6-1: Definition of type VALGroupFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcId	string	O	0..1	Identity of the VAL Service that the subscriber is interested in.	
valGrpIds	array(string)	M	1..N	VAL Group identifiers that the event subscriber wants to know in the interested event.	

7.5.1.4.2.7

IdentityFilter

Table 7.5.1.4.2.7-1: Definition of type IdentityFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcId	string	O	0..1	Identity of the VAL Service that the subscriber is interested in.	
valTgtUes	array(ValTargetUe)	C	1..N	VAL User IDs or VAL UE IDs that the event subscriber wants to know in the interested event. This parameter shall be present if the event subscribed is "CM_USER_PROFILE_CHANGE", "LM_LOCATION_INFO_CHANGE", or if the "NRM_SatSfInfo" feature is supported, "NRM_SAT_SF_INFO".	
suppLoc	boolean	O	0..1	Indication to request for supplementary location information of the VAL UE IDs. Set to true by Subscriber to request the SEAL server to send supplementary location information from the 3GPP core network. Set to false or omitted otherwise. This parameter may be present if the event subscribed is "LM_LOCATION_INFO_CHANGE".	LM_SuppLoc
locQos	LocationQoS	O	0..1	Indicates the expected location QoS requirement for which the location information is requested. This parameter may be present if the event subscribed is "LM_LOCATION_INFO_CHANGE".	LM_LocationInfoChange_Extension1
velocityReq	boolean	C	0..1	Indicates whether velocity of the location information is requested. - "true" indicates that the velocity information is requested. - "false" indicates that the velocity information is not requested. - or omitted (default), to indicate that the velocity information is not requested. This attribute may be present only if the subscribed event is "LM_LOCATION_INFO_CHANGE".	LM_LocationInfoChange_Ext2
locDataStatsReq	boolean	C	0..1	Indicates whether the location data statistics of the location information is requested. - "true" indicates that the location data statistics of the location information is requested. - "false" indicates that the location data statistics of the location information is not requested. - or omitted (default), to indicate that the velocity information is not requested. This attribute may be present only if the subscribed event is "LM_LOCATION_INFO_CHANGE".	LM_LocationInfoChange_Ext2

dataStatisticsReq	DataStatisticsReq	O	0..1	Contains the required information to support location data statistics of the location information. This attribute may be present only when the "locDataStatsReq" is present and set to "true".	LM_LocationInfoChange_Ext2

7.5.1.4.2.8

LMInformation

Table 7.5.1.4.2.8-1: Definition of type LMInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
valTgtUe	ValTargetUe	M	1	VAL User ID or UE ID that the event subscriber wants to know in the interested event.	
locInfo	LocationInfo	M	1	The location information associated with the valTgtUe.	
timeStamp	DateTime	O	0..1	Timestamp of the location report	
valSvcId	string	O	0..1	The VAL service ID of the VAL application for which the location information is subscribed.	

7.5.1.4.2.9

MessageFilter

Table 7.5.1.4.2.9-1: Definition of type MessageFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
reqUe	ValTargetUe	M	1	Identity of the VAL User ID or UE ID that the message filter information is related to.	
tgtUe	array(ValTargetUe)	O	1..N	List of VAL USER or UE IDs whose messages will be sent to the VAL User or UE in reqUe attribute.	
maxMsgs	UInteger	O	0..1	Total number of messages allowed to be sent to the VAL User or UE in the given time frame in the filter.	
scheds	array(ScheduledCommunicationTime)	O	1..N	Time frame associated to the total number of messages in mxMsgs attribute.	
msgTypes	array(string)	O	1..N	List of message types be sent to VAL UE.	

7.5.1.4.2.10

MonitorFilter

Table 7.5.1.4.2.10-1: Definition of type MonitorFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
idnts	array(ValTargetUe)	C	1..N	Identities of the VAL Users or UEs whose events monitoring is requested. (NOTE 1)	
valSvcId	string	O	0..1	Identity of the VAL service.	
valGrpId	string	C	0..1	Identity of the VAL group of the target UEs whose events monitoring is requested. (NOTE 1)	
profilId	string	C	0..1	The monitoring profile ID identifying a list of monitoring and/or analytics events. (NOTE 2)	
valCnds	array(ValidityConditions)	O	1..N	The temporal and/or spatial conditions applied for the events to be considered as valid.	
evntDets	array(MonitorEvents)	C	1..N	List of monitoring and/or analytics events that the VAL server is interested in. (NOTE 2)	

NOTE 1: Either VAL users/UEs or a VAL group identifying VAL UEs shall be present.

NOTE 2: Either event details or monitoring profile ID shall be present in the subscription request. The monitoring profile ID shall present in the subscription response when event details are provided in the subscription request.

7.5.1.4.2.11

MonitorEvents

Table 7.5.1.4.2.11-1: Definition of type MonitorEvents

Attribute name	Data type	P	Cardinality	Description	Applicability
cnEvnts	array(MonitoringType)	O	1..N	List of monitoring events related to VAL UE.	
anlEvnts	array(AnalyticsEvent)	O	1..N	List of analytics events related to VAL UE.	

7.5.1.4.2.12

MonitorEventsReport

Table 7.5.1.4.2.12-1: Definition of type MonitorEventsReport

Attribute name	Data type	P	Cardinality	Description	Applicability
tgtUe	ValTargetUe	M	1	VAL UE for which the events are related.	
evnts	array(MonitorEvents)	M	1..N	List of monitoring and analytics events related to VAL UE.	

7.5.1.4.2.13

ValidityConditions

Table 7.5.1.4.2.13-1: Definition of type ValidityConditions

Attribute name	Data type	P	Cardinality	Description	Applicability
locArea	LocationArea5G	O	0..1	Spatial validity conditions.	
tmWdws	array(TimeWindow)	O	1..N	Time window validity conditions	

7.5.1.4.2.14 MonitorLocationInterestFilter

Table 7.5.1.4.2.14-1: Definition of type MonitorLocationInterestFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
tgtUes	array(ValTargetUe)	M	1..N	List of VAL User(s) or UE ID(s) for which location monitoring is requested for the given location information.	
locInt	LocationInfo	C	0..1	Location information where the VAL server wishes to monitor the target VAL UE(s) location deviation. (NOTE)	
valSvcId	ValSvcAreaId	C	0..1	Identifier of the VAL service area where the VAL server wishes to monitor the target VAL UE(s) location deviation. (NOTE)	ValSrvArea, LM_LocationDeviation_Ext1
notInt	DurationSec	M	1	Periodic time interval in which the LM server needs to notify the VAL UE's location information.	
dynamicLoc	ReferenceUEDetail	C	0..1	Contains the dynamic location area information. (NOTE)	LM_LocationDeviation_Ext1
events	array(LocDevNotification)	O	1..N	Contains the required location monitoring events.	LM_LocationDeviation_Ext1
geofCond	GeofencingConditions	O	0..1	Contains the geofencing conditions,	LM_LocationDeviation_Ext1
NOTE: If the "ValSrvArea" feature is supported, then one of "locInt" or "valSvcId" attributes shall be present; otherwise the "locInt" attribute shall be present. If the "LM_LocationDeviation_Ext1" feature is supported, then only one of the "locInt", "valSvcId" or "dynamicLoc" attributes shall be present; otherwise the "locInt" attribute shall be present.					

7.5.1.4.2.15 LocationDevMonReport

Table 7.5.1.4.2.15-1: Definition of type LocationDevMonReport

Attribute name	Data type	P	Cardinality	Description	Applicability
tgtUes	array(ValTargetUe)	M	1..N	VAL User ID(s) or UE ID(s) to which the report is related.	
locInfo	LocationInfo	M	1	The location information associated with the valTgtUe.	
notifType	LocDevNotification	M	1	Notification about the deviation of the VAL UE(s) in "valTgtUe" attribute to the location in "locInfo" attribute.	

7.5.1.4.2.16 TempGroupInfo

Table 7.5.1.4.2.16-1: Definition of type TempGroupInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
valGrpIds	array(string)	M	1..N	Contains a list of the identifiers of the VAL groups constituting the created temporary VAL group.	
tempValGrpId	string	M	1	Contains the identifier of the created temporary VAL group.	
valServIds	array(string)	O	1..N	Contains a list of the identifiers of the VAL services for which communications are to be enabled on the created temporary VAL group.	

7.5.1.4.2.17

MonLocAreaInterestFiltr

Table 7.5.1.4.2.17-1: Definition of type MonLocAreaInterestFiltr

Attribute name	Data type	P	Cardinality	Description	Applicability
locInfoCri	LocationInfoCriteria	M	1	Contains the location area information where the VAL server wishes to monitor the VAL UE(s) moving in or moving out. This attribute applies also for geofencing services when the "LM_LocationAreaMonitor_Ext1" feature is supported. In such case, it contains the geofencing area.	
trigEvnts	array(MonLocTriggerEvent)	O	1..N	Contains the triggering events when to send the notifications. This attribute applies also for geofencing services when the "LM_LocationAreaMonitor_Ext1" feature is supported. In such case, it shall be present and contain the subscribed geofencing monitoring event(s).	
valServiceId	string	O	0..1	Contains the identifier of the VAL service for which location area monitoring is requested.	LM_LocationAreaMonitor_Ext1

7.5.1.4.2.18

LocationInfoCriteria

Table 7.5.1.4.2.18-1: Definition of type LocationInfoCriteria

Attribute name	Data type	P	Cardinality	Description	Applicability
geoArea	GeographicArea	C	0..1	Geographic location information where the VAL server wishes to monitor the VAL UE(s) moving in or moving out.	
valSvcAreaId	ValSvcAreaId	C	0..1	Identifier of the VAL service area.	ValSrvArea
refUe	ReferenceUEDetail	C	0..1	Reference UE details with proximity range where the VAL server wishes to monitor the VAL UE(s) moving in or moving out.	

NOTE: Either "geoArea" or "refUe" shall be provided.

7.5.1.4.2.19

ReferenceUEDetail

Table 7.5.1.4.2.19-1: Definition of type ReferenceUEDetail

Attribute name	Data type	P	Cardinality	Description	Applicability
valTgtUe	ValTargetUe	M	1	VAL User ID or UE ID that the event subscriber wants to know in the interested event.	
proxRange	UInteger	M	1	Proximity range of the area around the VAL target UE in meters. This attribute represents the integer part of the proximity range value.	
proxRangeFrac	Float	O	0..1	The fractional part of the proximity range value in meters. The minimum value of this attribute is 0. The maximum value of this attribute is 1.	

7.5.1.4.2.20

LocationAreaMonReport

Table 7.5.1.4.2.20-1: Definition of type LocationAreaMonReport

Attribute name	Data type	P	Cardinality	Description	Applicability
curPreUEs	array(ValTargetUe)	O	1..N	Contains the list of the identifier(s) of all VAL UE(s) who are currently present in the given location area. (NOTE)	
moveInOutUEs	MoveInOutUEDetails	C	0..1	Contains the list of the UE(s) that either moved in to the location area or moved out of the location area. This attribute applies also for geofencing services when the "LM_LocationAreaMonitor_Ext1" feature is supported. In such case, it may also contain the statistics (e.g., number of UEs, timing information) of the UE(s) moving in/out of the geofencing area. (NOTE)	
trigEvnt	MonLocTriggerEvent	C	0..1	Contains the event that triggered the sending of the notification. This attribute applies also for geofencing services when the "LM_LocationAreaMonitor_Ext1" feature is supported. In such case, it shall be present and contain the reported geofencing monitoring event. (NOTE)	
NOTE: When the "LM_LocationAreaMonitor_Ext1" feature is not supported, for the first notification report the "curPreUEs" attribute shall be provided, and for the next notification report, either the "curPreUEs" or the "moveInOutUEs" attribute shall be present. When the "LM_LocationAreaMonitor_Ext1" feature is supported, the "curPreUEs" attribute may not be present, and the "moveInOutUEs" and "trigEvnt" attributes shall be present.					

7.5.1.4.2.21

MoveInOutUEDetails

Table 7.5.1.4.2.21-1: Definition of type MoveInOutUEDetails

Attribute name	Data type	P	Cardinality	Description	Applicability
moveInUEs	array(ValTargetUe)	O	1..N	Contains the list of the identifier(s) of the VAL UE(s) that moved into the given location area since the previous reporting. This attribute applies also for geofencing services when the "LM_LocationAreaMonitor_Ext1" feature is supported. In such case, it contains the VAL UE(s) that moved into the geofencing area.	
numUEsMovedIn	UInteger	O	0..1	Contains the number of UE(s) that moved into the geofencing area since the previous notification.	LM_LocationAreaMonitor_Ext1
timingUEsMovedIn	map(MovTimingInfo)	O	1..N	Contains the timing information of the VAL UE(s) that moved into the geofencing area since the previous notification. The key of the map shall be set to the value of the identifier of the VAL UE (among the ones provided within the "moveInUEs" attribute) to which the timing information provided within the map value is related.	LM_LocationAreaMonitor_Ext1
moveOutUEs	array(ValTargetUe)	O	1..N	Contains the list of the identifier(s) of the VAL UE(s) that moved out of the given location area since the previous reporting. This attribute applies also for geofencing services when the "LM_LocationAreaMonitor_Ext1" feature is supported. In such case, it contains the VAL UE(s) that moved out of the geofencing area.	
numUEsMovedOut	UInteger	O	0..1	Contains the number of UE(s) that moved out of the geofencing area.	LM_LocationAreaMonitor_Ext1
timingUEsMovedOut	map(MovTimingInfo)	O	1..N	Contains the timing information of the VAL UE(s) that moved out of the geofencing area since the previous notification. The key of the map shall be set to the value of the identifier of the VAL UE (among the ones provided within the "moveOutUEs" attribute) to which the timing information provided within the map value is related.	LM_LocationAreaMonitor_Ext1

7.5.1.4.2.22

SEALEventSubscriptionPatch

Table 7.5.1.4.2.22-1: Definition of type SEALEventSubscriptionPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
eventSubs	array(EventSubscription)	O	1..N	Subscribed events.	
eventReq	ReportingInformation	O	0..1	Represents the reporting requirements of the event subscription.	
notificationDestination	Uri	O	0..1	URI where the notification should be delivered to.	

7.5.1.4.2.23 PartialEventSubscFailRep

Table 7.5.1.4.2.23-1: Definition of type PartialEventSubscFailRep

Attribute name	Data type	P	Cardinality	Description	Applicability
valTgtUes	array(ValTargetUe)	O	1..N	List of VAL user(s) / VAL UE(s) whose identifier(s) is not found. This attribute may be present only if the subscribed event is "CM_USER_PROFILE_CHANGE", "LM_LOCATION_INFO_CHANGE", "NRM_MONITOR_UE_USER_EVENTS", or "LM_LOCATION_DEVIATION_MONITOR".	
valGrpIds	array(string)	O	1..N	List of VAL group(s) whose identifier(s) is not found. This attribute may be present only if the subscribed event is "GM_GROUP_INFO_CHANGE".	
NOTE: Either the "valTgtUes" attribute or the "valGrpIds" attribute shall be present.					

7.5.1.4.2.24 DataStatisticsReq

Table 7.5.1.4.2.24-1: Definition of type DataStatisticsReq

Attribute name	Data type	P	Cardinality	Description	Applicability
timeReqs	TimeReqs	O	0..1	Contains the time requirements applicable for location data statistics.	
locReqs	array(GeoArea)	O	1..N	Contains the location area requirements applicable for location data statistics.	
NOTE: At least one of these attributes shall be present.					

7.5.1.4.2.25 TimeReqs

Table 7.5.1.4.2.25-1: Definition of type TimeReqs

Attribute name	Data type	P	Cardinality	Description	Applicability
timeWindows	array(TimeWindow)	C	1..N	Contains the applicable time window(s). (NOTE)	
timeSchedule	array(ScheduledCommunicationTime)	C	1..N	Contains the applicable time schedule. (NOTE)	
NOTE: These attributes are mutually exclusive and either one of them shall be present.					

7.5.1.4.2.26

GeofencingConditions

Table 7.5.1.4.2.26-1: Definition of type GeofencingConditions

Attribute name	Data type	P	Cardinality	Description	Applicability
plmn	PlmnIdNid	O	0..1	Represents the identifier to be used for geofencing.	
roamingInd	boolean	O	0..1	Represents the roaming status to be used for geofencing. - "true" indicates that the roaming status is roaming. - "false" indicates that the roaming status is non- roaming. The default value is "false" when this attribute is omitted.	
accessType	AccessType	O	0..1	Represents the access type to be used for geofencing.	
locInfo	LocationInfo	O	0..1	Represents the spatial conditions to be used for geofencing.	
schedules	array(ScheduledCommunicationTime)	O	1..N	Represents the requested monitoring schedule.	
refUECap	RefUeCap	C	0..1	Contains the capabilities of the reference UE/user. This attribute may be present only when the "dynamicLoc" attribute is present within the MonitorLocationInterestFilter data structure.	

7.5.1.4.2.27

MovTimingInfo

Table 7.5.1.4.2.27-1: Definition of type MovTimingInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
timestamp	DateTime	C	0..1	Contains the time at which the VAL UE moved in/out. (NOTE)	
duration	DurationSec	C	0..1	Contains the time duration for the VAL UE to move in/out. For the case of the UE moving in, this attribute contains the time duration that the UE spends out of the area (i.e., since the last time the UE moved out of the area) before moving inside the area. For the case of the UE moving out, this attribute contains the time duration that the UE spends inside the area before moving outside of the area. (NOTE)	
NOTE: At least one of these attributes shall be present.					

7.5.1.4.2.28

SatSfInfo

Table 7.5.1.4.2.28-1: Definition of type SatSfInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
satSfTrigger	SatSfTrigger	M	1	Contains the reported satellite S&F triggering event.	
tgtUe	ValTargetUe	M	1	Contains the identifier of the VAL User or VAL UE to which the report is related.	
ueSfMode	UeStrAndFwdStatus	C	0..1	Contains the UE status in S&F mode information. This attribute shall be present only if the triggering event within the "satSfTrigger" attribute is "UE_SF_MODE".	
estTime	DurationSec	C	0..1	Contains the estimated S&F DL delivery time. This attribute shall be present only if the triggering event within the "satSfTrigger" attribute is "EST_DELIVERY_TIME".	
fLinkAvail	TimeWindow	C	0..1	Contains the feeder link availability period. This attribute shall be present only if the triggering event within the "satSfTrigger" attribute is "FEEDER_LINK_AVAIL_PERIOD".	
timeStamp	DateTime	O	0..1	Contains the timestamp of the report.	

7.5.1.4.2.29

RefUeCap

Table 7.5.1.4.2.29-1: Definition of type RefUeCap

Attribute name	Data type	P	Cardinality	Description	Applicability
refUECap	Float	M	1	Contains the battery power threshold (expressed as a percentage) for the reference UE/user, indicating that the UE can serve as reference UE only if its available battery power is above this threshold. Minimum: 0, maximum: 100	

7.5.1.4.3 Simple data types and enumerations

7.5.1.4.3.1

Introduction

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

7.5.1.4.3.2

Simple data types

None.

7.5.1.4.3.3

Enumeration: SEALEvent

Table 7.5.1.4.3.3-1: Enumeration SEALEvent

Enumeration value	Description	Applicability
LM_LOCATION_INFO_CHANGE	Events related to the location information of VAL Users or VAL UEs from the Location Management Server.	LM_LocationInfoChange
GM_GROUP_INFO_CHANGE	Events related to the modification of VAL group membership and configuration information from the Group Management Server.	GM_GroupInfoChange
CM_USER_PROFILE_CHANGE	Events related to update of user profile information from the Configuration Management Server.	CM_UserProfileChange
GM_GROUP_CREATE	Events related to creation of new VAL groups from the Group Management Server.	GM_GroupCreate
NRM_MONITOR_UE_USER_EVENTS	Monitoring and analytic events related to VAL UEs, users or VAL group from the Network Resource Management Server.	NRM_EventMonitor
LM_LOCATION_DEVIATION_MONITOR	Events from Location Management Server, related to the deviation of the VAL User(s) / UE(s) location from an area of interest.	LM_LocationDeviation
GM_TEMP_GROUP_FORMATION	Events related to the formation of new temporary VAL groups from the Group Management Server.	GM_TempGroup
LM_LOCATION_AREA_MONITOR	Events from Location Management Server, related to the list of UEs moving in or moving out of the specific location.	LM_LocationAreaMonitor
GM_GROUP_DELETION	Events related to deletion of existing VAL Group(s) from the GM Server.	GM_GroupDeletion
NRM_SAT_SF_INFO	Events related to satellite S&F information.	NRM_SatSfInfo

7.5.1.4.3.4

Enumeration: LocDevNotification

Table 7.5.1.4.3.4-1: Enumeration LocDevNotification

Enumeration value	Description	Applicability
NOTIFY_MISMATCH_LOCATION	This value indicates that the location information of the VAL UE(s) from the SEAL LM client and the core network are not matching.	
NOTIFY_ABSENCE	This value indicates that the current location information of the VAL UE(s) is deviating from the VAL server's area of interest.	
NOTIFY_PRESENCE	This value indicates that the current location information of the VAL UE(s) is within the VAL server's area of interest.	
NOTIFY_UNKNOWN	This value indicates that the LM Server cannot determine whether or not the targeted VAL UE is within the area of interest.	LM_LocationDeviation_Ext1

7.5.1.4.3.5 Enumeration: MonLocTriggerEvent

Table 7.5.1.4.3.5-1: Enumeration MonLocTriggerEvent

Enumeration value	Description	Applicability
DISTANCE_TRAVELLED	Trigger event for the location area monitoring based on the distance travelled by the reference UE.	
MOVING_IN	Indicates that the event is the UE(s) moving in. This event applies only to geofencing services.	LM_LocationAreaMonitor_Ext1
MOVING_OUT	Indicates that the event is the UE(s) moving out. This event applies only to geofencing services.	LM_LocationAreaMonitor_Ext1
NUMBER_UE_MOVING_IN	Indicates that the event is the number of UE(s) moving in. This event applies only to geofencing services.	LM_LocationAreaMonitor_Ext1
NUMBER_UE_MOVING_OUT	Indicates that the event is the number of UE(s) moving out. This event applies only to geofencing services.	LM_LocationAreaMonitor_Ext1
TIME_UE_MOVING_IN	Indicates that the event is the timing information for the UE(s) moving in. This event applies only to geofencing services.	LM_LocationAreaMonitor_Ext1
TIME_UE_MOVING_OUT	Indicates that the event is the timing information for the UE(s) moving out. This event applies only to geofencing services.	LM_LocationAreaMonitor_Ext1

7.5.1.4.3.6 Enumeration: SatSfTrigger

Table 7.5.1.4.3.6-1: Enumeration SatSfTrigger

Enumeration value	Description	Applicability
UE_SF_MODE	Indicates that the triggering condition is the UE status in S&F mode.	
EST_DELIVERY_TIME	Indicates that the triggering condition is the DL S&F estimated delivery time.	
FLINK_AVAIL_PERIOD	Indicates that the triggering condition is the feeder link availability period.	

7.5.1.5 Error Handling

7.5.1.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.5.1.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_Events API.

7.5.1.5.3 Application Errors

The application errors defined for SS_Events API are listed in table 7.5.1.5.3-1.

Table 7.5.1.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.5.1.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.5.1.6-1 lists the supported features for SS_Events API.

Table 7.5.1.6-1: Supported Features

Feature number	Feature Name	Description
1	Notification_test_event	Testing of notification connection is supported according to clause 6.6.
2	Notification_websocket	The delivery of notifications over Websocket is supported according to clause 6.6. This feature requires that the Notification_test_event feature is also supported.
3	LM_LocationInfoChange	This feature supports the location information change event.
4	GM_GroupInfoChange	This feature supports the group information change event.
5	CM_UserProfileChange	This feature supports the user profile change event.
6	GM_GroupCreate	This feature supports the group creation event.
7	GM_MessageFilter	This feature supports the message filter information in group information change event.
8	NRM_EventMonitor	This feature supports the monitoring of events related to VAL UEs or Users.
9	LM_LocationDeviation	This feature supports the monitoring of VAL UE / User's deviation from a given area of interest.
10	GM_TempGroup	This feature supports the functionality of temporary VAL group formation within a VAL system.
11	LM_LocationAreaMonitor	This feature supports the monitoring of VAL UEs which are moving in or moving out from a given area of interest.
12	SubscUpdate	Indicates the support for updating an SEAL event subscription resource.
13	LM_SuppLoc	This feature indicates the support of supplementary location information. This feature requires the support of the LM_LocationInfoChange feature.
14	enNB1	This feature indicates the support of enhancements to this application layer API in Rel-18.
15	PartialFailureSupport	Indicates the support of the partial failure cases during a SEAL event subscription creation/update.
16	ValSrvArea	This feature indicates the support of VAL service area ID functionality as part of the phase-3 of the enhancements to the SEAL framework. The following functionalities are supported: - Support the usage of the VAL service area identifier to identify a VAL service area.
17	LM_LocationInfoChange_Extension1	This feature indicates the support of the enhancement to location information change event as part of the 5G-enabled fused location service capability exposure. The following functionalities are supported: - Support location information requests with expected location QoS requirements. This feature requires the support of the LM_LocationInfoChange feature.
18	GM_GroupDeletion	This feature indicates the support of group deletion event notifications as part of the enhancements to this application layer API.
19	LM_LocationInfoChange_Ext2	This feature indicates the support of the enhancements to enable application layer support for location services (eLSAPP). The following functionalities are supported: - Support velocity and location data statistic requirements. This feature requires the support of the "LM_LocationInfoChange" feature.

20	LM_LocationDeviation_Ext1	This feature indicates the support of the enhancement to enable application layer support for location services. The following functionalities are supported: - Support of geofencing conditions provisioning and management. - Support the new "NOTIFY_UNKNOWN" event. This feature requires the support of the LM_LocationDeviation feature.
21	LM_LocationAreaMonitor_Ext1	This feature indicates the support of the enhancement to the location area monitoring functionality to enable enhanced application layer support for location services (eLSAPP). The following functionalities are supported: - Support geofencing services. This feature requires the support of the "LM_LocationAreaMonitor" feature.
22	NRM_SatSfInfo	This feature indicates the support of the subscription and event notification of satellite S&F related event(s) to enable enhanced application layer support for 5G Satellite services. The following functionalities are supported: - Support satellite to subscribe to S&F related event(s) reporting.

7.6 Key management APIs

7.6.1 SS_KeyInfoRetrieval API

7.6.1.1 API URI

The request URI used in each HTTP request from the VAL server towards the Key management server shall have the structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-kir".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.6.1.2.

7.6.1.2 Resources

7.6.1.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.6.1.2.1-1 depicts the resource URIs structure for the SS_KeyInfoRetrieval API.

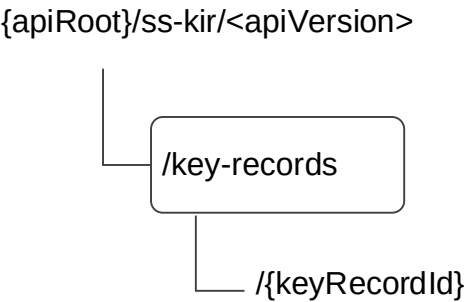


Figure 7.6.1.2.1-1: Resource URI structure of the SS_KeyInfoRetrieval API

Table 7.6.1.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.6.1.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Key records	/key-records	GET	Retrieve key management information uniquely applicable to VAL service, VAL user or VAL UE.

7.6.1.2.2 Resource: Key Records

7.6.1.2.2.1 Description

The Key Records resource represents the key management information of all VAL services that are created at a given key management server.

7.6.1.2.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-kir/<apiVersion>/key-records**

This resource shall support the resource URI variables defined in the table 7.6.1.2.2.2-1.

Table 7.6.1.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.6.1.2.2.3 Resource Standard Methods

7.6.1.2.2.3.1 GET

This operation retrieves VAL service key management information satisfying the filter criteria. This method shall support the URI query parameters specified in table 7.6.1.2.2.3.1-1.

Table 7.6.1.2.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
val-tgt-ue	ValTargetUe	O	0..1	Identifying a VAL user or a VAL UE.
val-service-id	string	M	1	String identifying a VAL service.

This method shall support the request data structures specified in table 7.6.1.2.2.3.1-2 and the response data structures and response codes specified in table 7.6.1.2.2.3.1 -3.

Table 7.6.1.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.6.1.2.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ValKeyInfo	M	1	200 OK	Key management information specific to VAL service, VAL user or VAL UE. This response shall include key management information matching the query parameters provided in the request.
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative key management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative key management server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.6.1.2.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative key management server.

Table 7.6.1.2.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative key management server.

7.6.1.2.2.4 Resource Custom Operations

None.

7.6.1.3 Notifications

None.

7.6.1.4 Data Model

7.6.1.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.6.1.4.1-1 specifies the data types defined specifically for the SS_KeyInfoRetrieval API service.

Table 7.6.1.4.1-1: SS_KeyInfoRetrieval API specific Data Types

Data type	Section defined	Description	Applicability
ValKeyInfo	7.6.1.4.2.3	Key management information associated with VAL server, VAL user or VAL UE.	

Table 7.6.1.4.1-2 specifies data types re-used by the SS_KeyInfoRetrieval API service.

Table 7.6.1.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
ValTargetUe	Clause 7.3.1.4.2.3	Used to identify a VAL User ID or VAL UE ID applicable to key management information.	

7.6.1.4.2 Structured Data Types

7.6.1.4.2.1 Introduction

7.6.1.4.2.2 ValKeyInfo

Table 7.6.1.4.2.3-1: Definition of type ValKeyInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
userUri	Uri	M	1	URI of the user for which the response is intended.	
skmsId	string	O	0..1	String identifying the SEAL key management server, sending the response.	
valService	string	M	1	String identifying the VAL service. This attribute shall be same as in the HTTP GET request.	
valTgtUe	ValTargetUe	O	0..1	String identifying a VAL user or VAL UE. This value depends on the value that was in the HTTP GET request.	
keyInfo	string	M	1	Key management information uniquely applicable to the requested VAL service, VAL user or VAL UE or VAL client.	

7.6.1.4.3 Simple data types and enumerations

None.

7.6.1.5 Error Handling

7.6.1.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.6.1.5.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_KeyInfoRetrieval API.

7.6.1.5.3
Application Errors

The application errors defined for SS_KeyInfoRetrieval API are listed in table 7.6.1.5.3-1.

Table 7.6.1.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.6.1.6
Feature Negotiation

General feature negotiation procedures are defined in clause 6.8.

Table 7.6.1.6-1: Supported Features

Feature number	Feature Name	Description

7.6.2
SS_KMParametersProvisioning API

7.6.2.1
Introduction

The SS_KMParametersProvisioning service shall use the SS_KMParametersProvisioning API.

The API URI of the SS_KMParametersProvisioning API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-kpp".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.6.2.2.

7.6.2.3
Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_KMParametersProvisioning API.

7.6.2.3
Resources

There are no resources defined for this resource in this release of the sepcifciation.

7.6.2.4
Custom operations without associated resources

7.6.2.4.1
Overview

The structure of the custom operation URIs of the SS_KMParametersProvisioning API is shown in Figure 7.6.2.4.1-1.

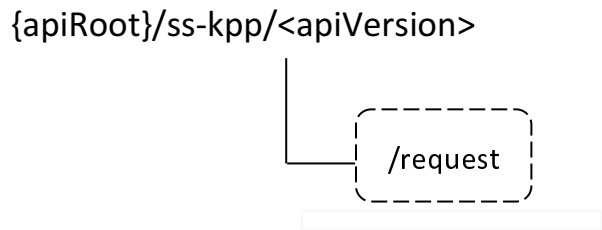


Figure 7.6.2.4.1-1: Custom operation URI structure of the SS_KMParametersProvisioning API

Table 7.6.2.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the SS_KMParametersProvisioning API.

Table 7.6.2.4.1-1: Custom operations without associated resources

Custom operation name	Custom operation URI	Mapped HTTP method	Description
Request	/request	POST	Enables a service consumer to request key parameters provisioning to the SEAL KM Server.

The custom operations shall support the URI variables defined in table 7.6.2.4.1-2.

Table 7.6.2.4.1-2: URI variables for this custom operation

Name	Data type	Definition
apiRoot	string	See clause 7.6.2.1.

7.6.2.4.2 Operation: Request

7.6.2.4.2.1 Description

The custom operation enables a service consumer to request key parameters provisioning to the SEAL KM Server.

7.6.2.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 7.6.2.4.2.2-1 and the response data structures and response codes specified in table 7.6.2.4.2.2-2.

Table 7.6.2.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
VALKeyPpReq	M	1	Contains the key management parameters to provisioned.

Table 7.6.2.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
VALKeyPpResp			200 OK	Successful case. The requested key management parameters are successfully received, processed and provisioned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative SEAL KM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative SEAL KM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status code for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.6.2.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative SEAL KM Server.

Table 7.6.2.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative SEAL KM Server.

7.6.2.5 Notifications

There are no notifications defined for this API in this release of the specification.

7.6.2.6 Data Model

7.6.2.6.1 General

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

Table 7.6.2.6.1-1 specifies the data types defined specifically for the SS_KMParametersProvisioning API service.

Table 7.6.2.6.1-1: SS_KMParametersProvisioning API specific Data Types

Data type	Section defined	Description	Applicability
VALKeyPpReq	7.6.2.5.2.2	Represents the VAL key management parameters to be provisioned.	
VALKeyPpResp	7.6.2.5.2.2	Represents the response to a key management parameters provisioning request.	

Table 7.6.2.6.1-2 specifies data types re-used by the SS_KMParametersProvisioning API service.

Table 7.6.2.6.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
Bytes	3GPP TS 29.571 [21]	Represents a string formatted as a sequence of bytes.	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
Uri	3GPP TS 29.571 [21]	Represents a URI.	
ValTargetUe	Clause 7.3.1.4.2.3	Represents the identifier of the targeted VAL UE or VAL User.	

7.6.2.6.2 Structured data types

7.6.2.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

7.6.2.6.2.2 Type: VALKeyPpReq

Table 7.6.2.6.2.2-1: Definition of type VALKeyPpReq

Attribute name	Data type	P	Cardinality	Description	Applicability
skmcUri	Uri	M	1	Contains the URI of the SEAL KM Client (residing in the VAL Server) that is initiating the request.	
valServiceId	string	M	1	Contains the identifier of the VAL service to which the provisioned key management parameters are related.	
valTgtUe	ValTargetUe	O	0..1	Contains the identifier of the VAL User or VAL UE for which the provisioned key management parameters are related.	
payloadId	string	O	0..1	Contains the identifier of the provisioned key management parameters.	
payload	Bytes	C	0..1	Contains the provisioned key management parameters information.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.6.2.8. This attribute shall be present only when feature negotiation needs to take place.	

7.6.2.6.2.2 Type: VALKeyPpResp

Table 7.6.2.6.2.2-1: Definition of type VALKeyPpResp

Attribute name	Data type	P	Cardinality	Description	Applicability
skmcUri	Uri	M	1	Contains the URI of the SEAL Key Management Client (residing in the VAL Server) that initiated the corresponding request.	
valServiceId	string	M	1	Contains the identifier of the VAL service to which the provisioned key management parameters are related.	
skmsId	string	O	0..1	Contains the identifier of the SEAL KM Server that is sending the response.	
valTgtUe	ValTargetUe	O	0..1	Contains the identifier of the VAL User or VAL UE for which the provisioned key management parameters are related.	
payloadId	string	O	0..1	Contains the identifier of the provisioned key management parameters.	
suppFeat	Supported Features	O	0..1	Contains the list of supported features among the ones defined in clause 7.6.2.8. This attribute shall be present only when feature negotiation needs to take place.	

7.6.2.6.3 Simple data types and enumerations

7.6.2.6.3.1 Introduction

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

7.6.2.6.3.2 Simple data types

The simple data types defined in table 6.3.6.3.2-1 shall be supported.

Table 7.6.2.6.3.2-1: Simple data types

Type name	Description

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.6.2.6.5 Binary data

7.6.2.6.5.1 Binary Data Types

Table 7.6.2.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

7.6.2.7 Error Handling

7.6.2.7.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.6.2.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_KMParametersProvisioning API.

7.6.2.7.3 Application Errors

The application errors defined for SS_KMParametersProvisioning API are listed in table 7.6.2.7.3-1.

Table 7.6.2.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.6.2.8 Feature negotiation

The optional features listed in table 7.6.2.8-1 are defined for the SS_KMParametersProvisioning API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.6.2.8-1: Supported Features

Feature number	Feature Name	Description

7.7 Network Slice Capability Enablement APIs

NSCE APIs are defined in 3GPP TS 29.435 [42].

7.8 Identity management APIs

7.8.1 SS_IdmParameterProvisioning API

7.8.1.1 API URI

The SS_IdmParameterProvisioning service shall use the SS_IdmParameterProvisioning API.

The API URI of the SS_IdmParameterProvisioning API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-ipp".

- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.8.1.2.

7.8.1.2 Resources

7.8.1.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.8.1.2.1-1 depicts the resource URIs structure for the SS_IdmParameterProvisioning API.

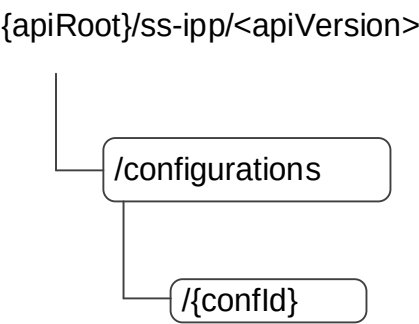


Figure 7.8.1.2.1-1: Resource URI structure of the SS_IdmParameterProvisioning API

Table 7.8.1.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.8.1.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
VAL Services Configurations	/configurations	POST	Request the creation of a VAL Services Configuration.
		GET	Retrieve one or several VAL services configuration(s).
Individual VAL Services Configuration	/configurations/{confId}	GET	Retrieve an existing "Individual VAL Services Configuration" resource.
		PUT	Update an "Individual VAL Services Configuration" resource.
		PATCH	Modify an existing "Individual VAL Services Configuration" resource.
		DELETE	Delete an existing "Individual VAL Services Configuration" resource.

7.8.1.2.2 Resource: VAL Services Configurations

7.8.1.2.2.1 Description

This resource represents the collection of VAL Services Configurations managed by the IM Server.

7.8.1.2.2.2 Resource Definition

Resource URI: {apiRoot}/ss-ipp/<apiVersion>/configurations

This resource shall support the resource URI variables defined in the table 7.8.1.2.2.2-1.

Table 7.8.1.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.

7.8.1.2.2.3 Resource Standard Methods

7.8.1.2.2.3.1 POST

The HTTP POST method enables to request the creation of a VAL Services Configuration to the IM Server.

This method shall support the URI query parameters specified in table 7.8.1.2.2.3.1-1.

Table 7.8.1.2.2.3.1-1: 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 7.8.1.2.2.3.1-2 and the response data structures and response codes specified in table 7.8.1.2.2.3.1-3.

Table 7.8.1.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
VALServicesConfig	M	1	Represents the VAL services configurations that needs to be created.

Table 7.8.1.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
VALServicesConfig	M	1	201 Created	Successful case. The requested VAL services configuration is successfully created. The URI of the created "Individual VAL Services Configuration" resource shall be returned in the "Location" HTTP header.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.8.1.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-ipp/<apiVersion>/configurations/{confId}

7.8.1.2.2.3.2 GET

The HTTP GET method enables to retrieve one or several VAL services configuration(s) satisfying filtering criteria at the IM Server.

This method shall support the URI query parameters specified in table 7.8.1.2.2.3.2-1.

Table 7.8.1.2.3.2-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
val-server-id	string	O	0..1	Contains the identifier of the VAL Server.
config-ids	array(string)	O	1..N	Contains the list of the identifier(s) of the targeted "Individual VAL Services Configuration" resource(s).
supp-feats	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.8.1.7. This query parameter shall be present only when feature negotiation needs to take place.

This method shall support the request data structures specified in table 7.8.1.2.3.2-2 and the response data structures and response codes specified in table 7.8.1.2.3.2-3.

Table 7.8.1.2.3.2-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.8.1.2.3.2-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(VALServiceSConfig)	M	0..N	200 OK	Successful case. The requested VAL services configuration(s) matching the received query parameter(s) shall be returned. If there are no active VAL services configuration(s) matching the received query parameter(s), an empty array is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative IM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative IM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.8.1.2.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative IM Server.

Table 7.8.1.2.2.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative IM Server.

7.8.1.2.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.8.1.2.3 Resource: Individual VAL Services Configuration

7.8.1.2.3.1 Description

This resource represents an "Individual VAL Services Configuration" resource managed by the IM Server.

7.8.1.2.3.2 Resource Definition

Resource URI: **{apiRoot}/ss-ipp/<apiVersion>/configurations/{confId}**

This resource shall support the resource URI variables defined in the table 7.8.1.2.3.2-1.

Table 7.8.1.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.
confId	string	Represents an "Individual VAL Services Configuration" resource.

7.8.1.2.3.3 Resource Standard Methods

7.8.1.2.3.3.1 GET

The HTTP GET method enables to retrieve an "Individual VAL Services Configuration" resource at the IM Server.

This method shall support the URI query parameters specified in table 7.8.1.2.3.3.1-1.

Table 7.8.1.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.8.1.2.3.3.1-2 and the response data structures and response codes specified in table 7.8.1.2.3.3.1-3.

Table 7.8.1.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.8.1.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
VALServicesConfig	M	1	200 OK	Successful case. The requested "Individual VAL Services Configuration" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative IM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative IM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.8.1.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative IM Server.

Table 7.8.1.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative IM Server.

7.8.1.2.3.3.2 PUT

The HTTP PUT method enables to update an existing "Individual VAL Services Configuration" resource at the IM Server.

This method shall support the URI query parameters specified in table 7.8.1.2.3.3.2-1.

Table 7.8.1.2.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.8.1.2.3.3.2-2 and the response data structures and response codes specified in table 7.8.1.2.3.3.2-3.

Table 7.8.1.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
VALServicesConfig	M	1	Represents the updated representation of the "Individual VAL Services Configuration" resource.

Table 7.8.1.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
VALServicesConfig	M	1	200 OK	Successful case. The VAL services configuration is successfully updated and a representation of the updated "Individual VAL Services Configuration" resource is returned in the response body.
n/a			204 No Content	Successful case. The VAL services configuration is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative IM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative IM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.8.1.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative IM Server.

Table 7.8.1.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative IM Server.

7.8.1.2.3.3.3 PATCH

The HTTP PATCH method enables to modify an existing "Individual VAL Services Configuration" resource at the IM Server.

This method shall support the URI query parameters specified in table 7.8.1.2.3.3.3-1.

Table 7.8.1.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.8.1.2.3.3.3-2 and the response data structures and response codes specified in table 7.8.1.2.3.3.3-3.

Table 7.8.1.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
VALServicesConfigPatch	M	1	Represents the requested modifications to be applied to the "Individual VAL Services Configuration" resource.

Table 7.8.1.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
VALServicesConfig	M	1	200 OK	Successful case. The VAL services configuration is successfully modified and a representation of the updated "Individual VAL Services Configuration" resource is returned in the response body.
n/a			204 No Content	Successful case. The VAL services configuration is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative IM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative IM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.8.1.2.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative IM Server.

Table 7.8.1.2.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative IM Server.

7.8.1.2.3.3.4 DELETE

The HTTP DELETE method enables to delete an existing "Individual VAL Services Configuration" resource at the IM Server.

This method shall support the URI query parameters specified in table 7.8.1.2.3.3.4-1.

Table 7.2.1.2.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.8.1.2.3.3.4-2 and the response data structures and response codes specified in table 7.8.1.2.3.3.4-3.

Table 7.8.1.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.8.1.2.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual VAL Services Configuration" is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative IM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative IM Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.8.1.2.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative IM Server.

Table 7.8.1.2.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative IM Server.

7.8.1.2.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.8.1.3 Custom operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

7.8.1.4 Notifications

There are no notifications defined for this API in this release of the specification.

7.8.1.5 Data Model

7.8.1.5.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API

Table 7.8.1.5.1-1 specifies the data types defined specifically for the SS_IdmParameterProvisioning API service.

Table 7.8.1.5.1-1: SS_IdmParameterProvisioning API specific Data Types

Data type	Section defined	Description	Applicability
VALServicesConfig	7.8.1.5.2.2	Represents a VAL services configuration.	
VALServicesParams	7.8.1.5.2.3	Represents VAL services configuration information.	
VALServicesConfigPatch	7.8.1.5.2.4	Represents of the requested modifications to a VAL services configuration.	

Table 7.8.1.5.1-2 specifies data types re-used by the SS_IdmParameterProvisioning API service.

Table 7.8.1.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
SupportedFeatures	3GPP TS 29.571 [21]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
ValTargetUe	Clause 7.3.1.4.2.3	Represents the identifier of a VAL User or a VAL UE.	

7.8.1.5.2 Structured data types

7.8.1.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.8.1.5.2.2 Type: VALServicesConfig

Table 7.8.1.5.2.2-1: Definition of type VALServicesConfig

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcConf	array(VALServiceParams)	M	1..N	Contains the list of VAL services configuration information.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.8.1.7. This attribute shall be present only when feature negotiation needs to take place.	

7.8.1.5.2.3 Type: VALServiceParams

Table 7.8.1.5.2.3-1: Definition of type VALServiceParams

Attribute name	Data type	P	Cardinality	Description	Applicability
valServiceId	string	M	1	Contains the identifier of the VAL service to which the provisioned VAL service configuration, information is provisioned.	
idList	array(ValTargetUe)	M	1..N	Contains the list of VAL User ID(s) or VAL UE ID(s) that are provisioned for the VAL service identified by the "valServiceId" attribute.	

7.8.1.5.2.4 Type: VALServicesConfigPatch

Table 7.8.1.5.2.4-1: Definition of type VALServicesConfigPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
valSvcConf	array(VALServiceParams)	O	1..N	Contains the updated list of VAL services configuration information.	

7.8.1.5.3 Simple data types and enumerations

7.8.1.5.3.1 Introduction

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

7.8.1.5.3.2 Simple data types

The simple data types defined in table 7.8.1.5.3.2-1 shall be supported.

Table 7.8.1.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.8.1.5.5 Binary data

7.8.1.5.5.1 Binary Data Types

Table 7.8.1.5.5.1-1: Binary Data Types

Name	Clause defined	Content type

7.8.1.6 Error Handling

7.8.1.6.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.8.1.6.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_IdmParameterProvisioning API.

7.8.1.6.3 Application Errors

The application errors defined for SS_IdmParameterProvisioning API are listed in table 7.8.1.6.3-1.

Table 7.8.1.6.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.8.1.7 Feature negotiation

The optional features in table 7.8.1.7-1 are defined for the SS_IdmParameterProvisioning API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.8.1.7-1: Supported Features

Feature number	Feature Name	Description

7.9 Data Delivery APIs

SEALDD APIs are defined in 3GPP TS 29.548 [35].

7.10 Application data analytics enablement service configuration APIs

7.10.1 SS_ADAE_VALPerformanceAnalytics API

7.10.1.1 API URI

The SS_ADAE_VALPerformanceAnalytics service shall use the SS_ADAE_VALPerformanceAnalytics API.

The request URIs used in HTTP requests from the VAL server towards the ADAE server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-adae-pa".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.10.1.2.

7.10.1.2 Resources

7.10.1.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.1.2.1-1 depicts the resource URIs structure for the SS_ADAE_VALPerformanceAnalytics API.

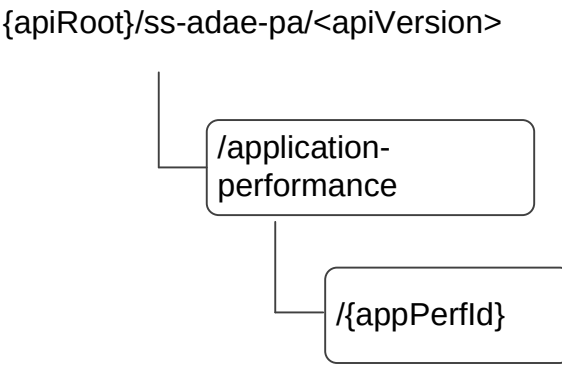


Figure 7.10.1.2.1-1: Resource URI structure of the SS_ADAE_VALPerformanceAnalytics API

Table 7.10.1.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.1.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Application performance event subscription	/application-performance	POST	Subscription to VAL performance analytics.
Individual application performance event subscription	/application-performance/{appPerfId}	GET	Request the retrieval of an existing "Individual application performance event subscription" resource identified by "appPerfId".
		DELETE	Removal of VAL performance analytics subscription identified by "appPerfId".

7.10.1.2.2 Resource: Application performance event subscription

7.10.1.2.2.1 Description

The subscription to the event of the VAL (application) performance analytics.

7.10.1.2.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-adae-pa/<apiVersion>/application-performance**

This resource shall support the resource URI variables defined in the table 7.10.1.2.2.2-1.

Table 7.10.1.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.1.2.2.3 Resource Standard Methods

7.10.1.2.2.3.1 POST

This method to subscribe to the event of the VAL performance analytics and shall support the URI query parameters specified in table 7.10.1.2.2.3.1-1.

Table 7.10.1.2.2.3.1-1: 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 7.10.1.2.2.3.1-2 and the response data structures and response codes specified in table 7.10.1.2.2.3.1-3.

Table 7.10.1.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AppPerfSub	M	1	Subscription to the event of VAL performance analytics.

Table 7.10.1.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AppPerfSub	M	1	201 Created	The subscription to the VAL performance analytics is created.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.1.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-adae-pa/<apiVersion>/application-performance/{appPerfId}

7.10.1.2.2.4 Resource Custom Operations

None.

7.10.1.2.3 Resource: Individual application performance event subscription

7.10.1.2.3.1 Description

The Individual application performance event subscription resource represents an individual event subscription of a service consumer to the application performance analytics of the ADAE server.

7.10.1.2.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-pa/<apiVersion>/application-performance/{appPerfId}

This resource shall support the resource URI variables defined in the table 7.10.1.2.3.2-1.

Table 7.10.1.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
appPerfId	string	Identifies an Individual Events Subscription

7.10.1.2.3.3 Resource Standard Methods

7.10.1.2.3.3.1 GET

This operation retrieves an individual application performance event subscription resource. This method shall support the URI query parameters specified in table 7.10.1.2.3.3.1-1.

Table 7.10.1.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.1.2.3.3.1-2 and the response data structures and response codes specified in table 7.10.1.2.3.3.1-3.

Table 7.10.1.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.1.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AppPerfSub	M	1	200 OK	The requested individual application performance event subscription is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.1.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.1.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.1.2.3.3.2 DELETE

This method shall support the URI query parameters specified in table 7.10.1.2.3.3.2-1.

Table 7.10.1.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.1.2.3.3.2-2 and the response data structures and response codes specified in table 7.10.1.2.3.3.2-3.

Table 7.10.1.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.1.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual subscription is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.1.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.1.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.1.2.3.4 Resource Custom Operations

None.

7.10.1.3 Notifications

7.10.1.3.1 General

Table 7.10.1.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Application performance event notification	{notifUri}	POST	Notification on VAL performance analytics.

7.10.1.3.2 Application performance event notification

7.10.1.3.2.1 Description

Application performance event notification is to notify on the event of the VAL performance analytics.

7.10.1.3.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the service consumer during the subscription to the event.

Callback URI: {notifUri}

This method shall support the URI query parameters specified in table 7.10.1.3.2.2-1.

Table 7.10.1.3.2.2-1: 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 7.10.1.3.2.2-2 and the response data structures and response codes specified in table 7.10.1.3.2.2-3.

Table 7.10.1.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AppPerfNotif	M	1	Notification on VAL performance analytics.

Table 7.10.1.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The notification for the VAL performance analytics event is accepted.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.1.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.1.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.1.4 Data Model

7.10.1.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.1.4.1-1 specifies the data types defined specifically for the SS_ADAE_VALPerformanceAnalytics API service.

Table 7.10.1.4.1-1: SS_ADAE_VALPerformanceAnalytics API specific Data Types

Data type	Section defined	Description	Applicability
AnalyticsIdVpa	7.10.1.4.3.8	Represents the analytics identifier for VAL performance analytics.	ADAE_Ext1
AnalyticsOutput	7.10.1.4.2.10	Represents the VAL performance analytics output.	ADAE_Ext1
AnalyticsCategory	7.10.1.4.3.3	Represents the category of analytics.	
AnalyticsType	7.10.1.4.2.6	Represents the type of analytics.	
AppPerfNotif	7.10.1.4.2.3	Notification information of the application performance analytics.	
AppPerfSub	7.10.1.4.2.2	Subscription to the VAL application performance analytics	
ClientApplicationData	7.10.1.4.2.9	Represents the ADAE client application data.	ADAE_Ext1
PerfData	7.10.1.4.2.7	Represents the performance data.	ADAE_Ext1
PerfThreshold	7.10.1.4.2.8	Represents the performance threshold.	ADAE_Ext1
ProdProfileInfo	7.10.1.4.2.4	Information about the data producer's support data collection and its access to the produced data	
ProducerCap	7.10.1.4.2.5	Indicates data producer capabilities for this data type.	
ProducerData	7.10.1.4.3.5	Type of the data produced by the data producer.	
ProducerRole	7.10.1.4.3.6	The role of the data producer.	
ProducerType	7.10.1.4.3.4	Type of the data producer.	

Table 7.10.1.4.1-2 specifies data types re-used by the SS_ADAE_VALPerformanceAnalytics API service:

Table 7.10.1.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
BitRate	3GPP TS 29.571 [21]	Represents a bit rate measurement value.	
DurationSec	3GPP TS 29.122 [3]	Represents a period of time in units of seconds.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
ReportingInformation	3GPP TS 29.523 [20]	Used to indicate the reporting requirement, only the following information are applicable for SEAL: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
ScheduledCommunicationTime	3GPP TS 29.122 [3]	Used to define the time frame for message filters.	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the supported features.	
TimeWindow	3GPP TS 29.122 [3]	Represents a time window.	
UInteger	3GPP TS 29.571 [21]	Represents an unsigned integer.	
Uri	3GPP TS 29.122 [3]	Represents a URI.	
ValTargetUe	Clause 7.3.1.4.2.3	Used to indicate either VAL User ID or VAL UE ID.	

7.10.1.4.2 Structured data types

7.10.1.4.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.1.4.2.2 Type: AppPerfSub

Table 7.10.1.4.2.2-1: Definition of type AppPerfSub

Attribute name	Data type	P	Cardinality	Description	Applicability
notifUri	Uri	M	1	Represents the notification URI.	
analyticsType	AnalyticsType	M	1	Identifies the type of the VAL application performance analytics.	
analyticsId	AnalyticsIdVpa	C	0..1	Represents the requested analytics identifier. This attribute shall be present when "ADAE_Ext1" feature is supported.	ADAE_Ext1
valServiceId	string	M	1	The identifier of the VAL service, to which the performance analytics subscription is applied.	
valUeIds	array(ValTargetUe)	O	1..N	A list of identities of one or more VAL UEs, whose performance analytics are subscribed to.	
valServerId	string	O	0..1	If the consumer is different from the VAL server, this identifier represents the VAL server to which the VAL performance analytics subscription is applied.	
dataProdProfile	ProdProfileInfo	O	0..1	Characteristics of the data producer to be used.	
clientAppData	ClientApplicationData	O	0..1	Represents the ADAE client application data.	ADAE_Ext1
confLevel	UInteger	O	0..1	Indicates the preferred confidence level of the prediction. Minimum = 0. Maximum = 100.	
area	LocationArea5G	O	0..1	The geographical or service area to which the VAL performance analytics subscription is applied.	
timeValidity	TimeWindow	O	0..1	The time validity of the subscription.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirement of the VAL performance analytics subscription.	
repThrs	array(PerfThreshold)	C	0..1	Represents the reporting thresholds. This attribute shall be present when the "notifMethod" attribute within ReportingInformation data structure in the "repReq" attribute is set to "ON_EVENT_DETECTION".	ADAE_Ext1
expReq	ReportingInformation	O	0..1	Represents the ADAE client exposure requirements requirement of the VAL performance analytics subscription.	ADAE_Ext1
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.10.1.6. This attribute shall be present only when feature negotiation needs to take place.	

7.10.1.4.2.3

Type: AppPerfNotif

Table 7.10.1.4.2.3-1: Definition of type AppPerfNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsOutput	AnalyticsOutput	C	0..1	Represents the analytics output. (NOTE 2)	ADAE_Ext1
output	string	C	0..1	Predicted (or computed, for statistics) change or sustainability of the VAL performance for a VAL server or a VAL session. (NOTE 2)	
valServerId	string	M	1	Identity of the VAL server, the data collection is related to, in the case of the notification is on the VAL performance data collection.	
valUeIds	array(ValTarget Ue)	O	1..N	A list of identities of one or more VAL UEs, the data collection is related to, in the case of the notification is on the VAL performance data collection.	
area	LocationArea5G	C	0..1	Represents the applicable area. This attribute shall be present when "ADAE_Ext1" feature is supported.	ADAE_Ext1
confLevel	UInteger	C	0..1	Indicates the achieved confidence level in the case of prediction. Minimum = 0. Maximum = 100. (NOTE 1)	
timeHorizon	TimeWindow	C	0..1	The time window to which the predictive analytics apply. (NOTE 1)	
NOTE 1: This attribute shall be provided if the "analyticsType" attribute in the subscription was set to "PREDICTIVE" and it may not be provided otherwise.					
NOTE 2: When the "ADAE_Ext1" feature is supported, these attributes are mutually exclusive and only one of them shall be present.					

7.10.1.4.2.4 Type: ProdProfileInfo

Table 7.10.1.4.2.4-1: Definition of type ProdProfileInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
prodId	string	M	1	Identity of the data producer	
prodType	ProducerType	M	1	Type of the data producer.	
dataType	ProducerData	M	1	Type of information that can be provided by the data producer.	
prodRole	ProducerRole	O	0..1	Role of the data producer.	
origProdIds	array(string)	O	1..N	Identifies the identity of the original data producer if the prod-role is not set to the value "ORIGINAL_PRODUCER" or "GENERATING_ENTITY". If the type of the data producer is that value of "A_DCCF", this attribute is a list of identities of data producers.	
dataFresh	integer	O	0..1	It is set to the duration of the time (in seconds) elapsed time after the data generated if the producer-role does not have the value "ORIGINAL_PRODUCER" or "GENERATING_ENTITY".	
producerCap	ProducerCap	O	0..1	Represents data producer capability.	

7.10.1.4.2.5 Type: ProducerCap

Table 7.10.1.4.2.5-1: Definition of type ProducerCap

Attribute name	Data type	P	Cardinality	Description	Applicability
durationTime	DurationSec	O	0..1	Duration time that the data can be stored	
anonymization	boolean	O	0..1	The value "true" means that anonymization is supported, while the value "false" means that anonymization is not supported. The default value is "false" if omitted.	
dataRate	BitRate	O	0..1	Rate of data generation.	
schedule	ScheduledCommunicationTime	O	0..1	Represents scheduling.	

7.10.1.4.2.6 Type: AnalyticsType

Table 7.10.1.4.2.6-1: Definition of type AnalyticsType

Attribute name	Data type	P	Cardinality	Description	Applicability
category	AnalyticsCategory	M	1	Represents the analytics category.	

7.10.1.4.2.7 Type: PerfData

Table 7.10.1.4.2.7-1: Definition of type PerfData

Attribute name	Data type	P	Cardinality	Description	Applicability
rtt	UInteger	O	0..1	Contains the RTT in milliseconds.	
avgDataRate	BitRate	O	0..1	Contains the average data rate.	
maxDataRate	BitRate	O	0..1	Contains the maximum data rate.	
jitter	Uint32	O	0..1	Contains the jitter in nanoseconds.	
qoeMos	Float	O	0..1	Contains the MOS. Minimum = 1. Maximum = 5.	
qoeStalEvent	UInteger	O	0..1	Contains the number of stalling events.	
qoeStalRatio	Float	O	0..1	Contains the stalling ratio. Minimum = 0. Maximum = 1.	
qosProfileLoad	integer	O	0..1	Contains the load level in percentage of the QoS profile. Minimum = 0. Maximum = 100.	
valTrafLoad	integer	O	0..1	Contains the load level in percentage of the VAL application traffic. Minimum = 0. Maximum = 100.	
valSesPerfChange	integer	O	0..1	Contains the VAL server load and VAL server predicted or expected performance change in percentage. Minimum = -100. Maximum = 100.	
NOTE: At least one of the attributes shall be present.					

7.10.1.4.2.8 Type: PerfThreshold

Table 7.10.1.4.2.8-1: Definition of type PerfThreshold

Attribute name	Data type	P	Cardinality	Description	Applicability
value	PerfData	M	1	Represents the value.	
thrDirect	MatchingDirection	M	1	Indicates the threshold matching direction for the analytics threshold provided in the "value" attribute.	

7.10.1.4.2.9 Type: ClientApplicationData

Table 7.10.1.4.2.9-1: Definition of type ClientApplicationData

Attribute name	Data type	P	Cardinality	Description	Applicability
ueRoute	UasRoute	C	0..1	Represents the expected route of the client.	
sesSched	array(Scheduled CommunicationTime)	C	1..N	Represents the VAL application traffic schedule.	
NOTE: At least one of the attributes shall be provided.					

7.10.1.4.2.10 Type: AnalyticsOutput

Table 7.10.1.4.2.10-1: Definition of type AnalyticsOutput

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsId	AnalyticsIdVpa	M	1	Represents the requested analytics identifier.	
valServ	PerfData	C	0..1	Represents the VAL server performance analytics output. This attribute shall be present only if the "analyticsId" is set to "VAL_SERVER_PERF".	
valSess	PerfData	C	0..1	Represents the VAL session performance analytics output. This attribute shall be present only if the "analyticsId" is set to "VAL_SESSION_PERF".	

7.10.1.4.3 Simple data types and enumerations

7.10.1.4.3.1 Introduction

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

7.10.1.4.3.2 Simple data types

None.

7.10.1.4.3.3 Enumeration: AnalyticsCategory

Table 7.10.1.4.3.3-1: Enumeration AnalyticsCategory

Enumeration value	Description	Applicability
PREDICTIVE	The event for the VAL application performance analytics is for predictive analytics.	
STATISTICS	The event for the VAL application performance analytics is for statistics analytics.	

7.10.1.4.3.4 Enumeration: ProducerType

Table 7.10.1.4.3.4-1: Enumeration ProducerType

Enumeration value	Description	Applicability
ADAE_CLIENT	The data producer is ADAE client.	
A_DCCF	The data producer is A-DDCF.	
VAL_SERVER	The data producer is VAL server.	
SEAL_SERVER	The data producer is SEAL server.	
SEAL_CLIENT	The data producer is SEAL client.	
EES	The data producer is EES.	
EAS	The data producer is EAS.	

7.10.1.4.3.5 Enumeration: ProducerData

Table 7.10.1.4.3.5-1: Enumeration ProducerData

Enumeration value	Description	Applicability
PERFORMANCE_INDICATOR	The data type of the data producer is performance indicator.	
REPRODUCER_USAGE_DATA	The data type of the data producer is reproducer usage data.	
SERVER_LOAD_DATA	The data type of the data producer is server load data.	
APPLICATION_PERFORMANCE	The data type of the data producer is application performance.	
EDGE_LOAD	The data type of the data producer is edge load.	

7.10.1.4.3.6 Enumeration: ProducerRole

Table 7.10.1.4.3.6-1: Enumeration ProducerRole

Enumeration value	Description	Applicability
GENERATING_ENTITY	The role of the data producer is generating entity.	
ORIGINAL_PRODUCER	The role of the data producer is original producer.	
RESPOSITORY	The role of the data producer is repository.	

7.10.1.4.3.7 Void

7.10.1.4.3.8 Enumeration: AnalyticsIdVpa

Table 7.10.1.4.3.8-1: Enumeration AnalyticsIdVpa

Enumeration value	Description	Applicability
VAL_SERVER_PERF	Indicates that requested analytics is VAL server performance analytics.	
VAL_SESSION_PERF	Indicates that requested analytics is VAL session performance analytics.	

7.10.1.5 Error Handling

7.10.1.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.10.1.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the SS_ADAE_VALPerformanceAnalytics API.

7.10.1.5.3 Application Errors

The application errors defined for SS_ADAE_VALPerformanceAnalytics API are listed in table 7.10.1.5.3-1.

Table 7.10.1.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.1.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.10.1.6-1 lists the supported features for SS_ADAE_VALPerformanceAnalytics API.

Table 7.10.1.6-1: Supported Features

Feature number	Feature Name	Description
1	ADAE_Ext1	Indicates the support of the ADAE enhancements in Release-19. Within this feature, the following enhancements are covered: - Support of the detailed analytics output.

7.10.2 SS_ADAE_SlicePerformanceAnalytics API

7.10.2.1 API URI

The SS_ADAE_SlicePerformanceAnalytics service shall use the SS_ADAE_SlicePerformanceAnalytics API.

The request URIs used in HTTP requests from the VAL server towards the ADAE server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-adae-sspa".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.10.2.2.

7.10.2.2 Resources

7.10.2.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.2.2.1-1 depicts the resource URIs structure for the SS_ADAE_SlicePerformanceAnalytics API.

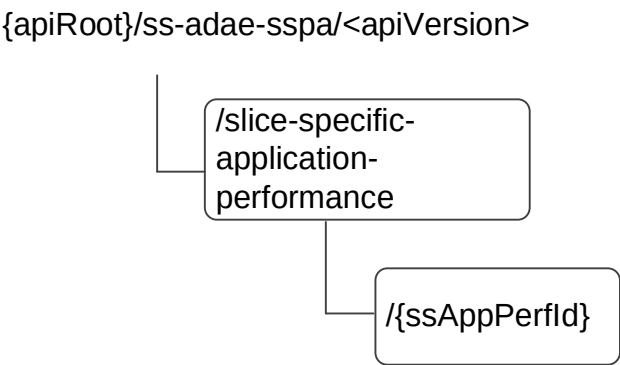


Figure 7.10.2.2.1-1: Resource URI structure of the SS_ADAE_SlicePerformanceAnalytics API

Table 7.10.2.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.2.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Slice specific application performance event subscription	/slice-specific-application-performance	POST	Subscription to the event of the slice-specific application performance analytics.
Individual slice specific application performance event subscription	/slice-specific-application-performance/{ssAppPerfId}	GET	Request the retrieval of an existing "Individual slice specific application performance event subscription" resource identified by {ssAppPerfId}.
		DELETE	Request the deletion of an existing subscription to slice-specific application performance analytics identified by {ssAppPerfId}.

7.10.2.2.2 Resource: Slice-specific application performance event subscription

7.10.2.2.2.1 Description

The subscription to the event of the slice-specific application performance analytics.

7.10.2.2.2.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-sspa/<apiVersion>/slice-specific-application-performance

This resource shall support the resource URI variables defined in the table 7.10.2.2.2.2-1.

Table 7.10.2.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.2.2.2.3 Resource Standard Methods

7.10.2.2.2.3.1 POST

This method to subscribe to the event of the slice-specific application performance analytics and shall support the URI query parameters specified in table 7.10.2.2.2.3.1-1.

Table 7.10.2.2.2.3.1-1: 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 7.10.2.2.2.3.1-2 and the response data structures and response codes specified in table 7.10.2.2.2.3.1-3.

Table 7.10.2.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SliceAppPerfSub	M	1	Subscription to the slice-specific application performance analytics event.

Table 7.10.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SliceAppPerfSub	M	1	201 Created	Subscription to the slice-specific application performance analytics is created.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-adae-sspa/<apiVersion>/slice-specific-application-performance/{ssAppPerfId}

7.10.2.2.2.4 Resource Custom Operations

None.

7.10.2.2.3 Resource: Individual slice-specific application performance event subscription

7.10.2.2.3.1 Description

The Individual slice-specific application performance event subscription resource represents an individual event subscription of a service consumer to the slice-specific application performance analytics of the ADAE server.

7.10.2.2.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-pa/<apiVersion>/slice-specific-application-performance/{ssAppPerfId}

This resource shall support the resource URI variables defined in the table 7.10.2.2.3.2-1.

Table 7.10.2.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
ssAppPerfId	string	Identifies an Individual Events Subscription

7.10.2.2.3.3 Resource Standard Methods

7.10.2.2.3.3.1 GET

This operation retrieves an individual slice-specific application performance event subscription resource. This method shall support the URI query parameters specified in table 7.10.2.2.3.3.1-1.

Table 7.10.2.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.2.2.3.3.1-2 and the response data structures and response codes specified in table 7.10.2.2.3.3.1-3.

Table 7.10.2.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.2.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SliceAppPerfSub	M	1	200 OK	The requested individual slice-specific application performance event subscription is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.2.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.2.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.2.2.3.3.2 DELETE

This method shall support the URI query parameters specified in table 7.10.2.2.3.3.2-1.

Table 7.10.2.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.2.2.3.3.2-2 and the response data structures and response codes specified in table 7.10.2.2.3.3.2-3.

Table 7.10.2.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.2.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual subscription is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.2.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.2.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.2.2.3.4 Resource Custom Operations

None.

7.10.2.3 Notifications

7.10.2.3.1 General

Table 7.10.2.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Slice-specific application performance event notification	{notifUri}	POST	Notification on the slice-specific application performance analytics

7.10.2.3.2 Slice-specific application performance event notification

7.10.2.3.2.1 Description

Slice-specific application performance event notification is to notify on the event of the slice-specific application performance analytics.

7.10.2.3.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the consumer during the subscription to the event.

Callback URI: {notifUri}

This method shall support the URI query parameters specified in table 7.10.2.3.2.2-1.

Table 7.10.2.3.2.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

If the notification is on the slice-specific application performance analytics, this method shall support the request data structures specified in table 7.10.2.3.2.2-2 and the response data structures and response codes specified in table 7.10.2.3.2.2-3.

Table 7.10.2.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SliceAppPerfNotif	M	1	Notification information of the slice-specific application performance analytics.

Table 7.10.2.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Notification for the slice-specific application performance analytics event is accepted.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.2.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.2.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.2.4 Data Model

7.10.2.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.2.4.1-1 specifies the data types defined specifically for the SS_ADAE_SlicePerformanceAnalytics API service.

Table 7.10.2.4.1-1: SS_ADAE_SlicePerformanceAnalytics API specific Data Types

Data type	Section defined	Description	Applicability
SliceAppPerfNotif	7.10.2.4.2.3	Notification information of the slice specific application performance analytics.	
SliceAppPerfSub	7.10.2.4.2.2	Subscription to the slice-specific application performance analytics	
SliceAppPerfAnalytics	7.10.2.4.2.4	Represents the analytics output for slice performance analytics.	ADAE_Ext1

Table 7.10.2.4.1-2 specifies data types re-used by the SS_ADAE_SlicePerformanceAnalytics API service:

Table 7.10.2.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Represents the type of analytics.	
Dnn	3GPP TS 29.571 [21]	Used to Identify a DNN.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
ReportingInformation	3GPP TS 29.523 [20]	Used to indicate the reporting requirement, only the following information are applicable for SEAL: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
Snssai	3GPP TS 29.571 [21]	Used to Identify the S-NSSAI.	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the supported features.	
TimeWindow	3GPP TS 29.122 [3]	Represents a time window.	
UInteger	3GPP TS 29.571 [21]	Represents an unsigned integer.	
Uri	3GPP TS 29.122 [3]	Represents a URI.	
ValTargetUe	Clause 7.3.1.4.2.3	Used to indicate either VAL User ID or VAL UE ID.	

7.10.2.4.2 Structured data types

7.10.2.4.2.1 Introduction

This clause defines the data structures to be used in resource representations of this service.

7.10.2.4.2.2

Type: SliceAppPerfSub

Table 7.10.2.4.2.2-1: Definition of type SliceAppPerfSub

Attribute name	Data type	P	Cardinality	Description	Applicability
notifUri	Uri	M	1	Represents the notification URI.	
analyticsType	AnalyticsType	M	1	Identifies the type of the slice-specific application performance analytics.	
slicelId	Snsai	M	1	The identifier of the slice or slice instance to which the performance analytics subscription is applied.	
dnn	Dnn	O	0..1	Associated DNN.	
valUelds	array(ValTargetUe)	O	1..N	A list of identities of one or more VAL UEs whose slice-specific performance analytics are subscribed to.	
valServerId	string	O	0..1	If the consumer is different from the VAL server, this identifier represents the VAL server to which the slice-specific performance analytics subscription is applied.	
valServiceId	string	O	0..1	Represents the target VAL service identifier.	ADAE_Ext1
confLevel	UInteger	O	0..1	Indicates the preferred confidence level of the prediction. Minimum = 0. Maximum = 100.	
area	LocationArea5G	O	0..1	The geographical or service area to which the slice specific application performance analytics subscription is applied.	
timeValidity	TimeWindow	O	0..1	The time validity of the subscription in seconds.	
timeHorizon	TimeWindow	O	0..1	The time horizon for predictive analytics.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirement of the slice-specific performance analytics subscription.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.10.2.6. This attribute shall be present only when feature negotiation needs to take place.	

7.10.2.4.2.3

Type: SliceAppPerfNotif

Table 7.10.2.4.2.3-1: Definition of type SliceAppPerfNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsOutput	array(SliceAppPerfAnalytics)	C	0..1	Represents the analytics output. (NOTE 2)	ADAE_Ext1
output	string	C	0..1	Predicted or expected performance change or sustainability of the slice-specific performance for a VAL server or a VAL session. (NOTE 2)	
confLevel	UInteger	C	0..1	Indicates the achieved confidence level in the case of prediction. Minimum = 0. Maximum = 100.(NOTE 1)	
timeHorizon	TimeWindow	C	0..1	The time window to which the predictive analytics apply. (NOTE 1)	
NOTE 1: This attribute shall be provided if the "analyticsType" attribute in the subscription was set to "PREDICTIVE" and it may not be provided otherwise.					
NOTE 2: When the "ADAE_Ext1" feature is supported, these attributes are mutually exclusive and only one of them shall be present.					

7.10.2.4.2.4 Type: SliceAppPerfAnalytics

Table 7.10.2.4.2.4-1: Definition of type SliceAppPerfAnalytics

Attribute name	Data type	P	Cardinality	Description	Applicability
valServerId	string	C	0..1	Represents the VAL server identity. (NOTE 1)	
valServiceId	string	C	0..1	Represents the VAL service identity. (NOTE 1)	
sliceId	Snsai	C	1..N	Represents the network slice. (NOTE 1)	
area	LocationArea5G	O	0..1	Represents the area of interest.	
minRtt	UInteger	O	0..1	Represents the minimum RTT in milliseconds. (NOTE 2)	
avgRtt	UInteger	O	0..1	Represents the average RTT in milliseconds. (NOTE 2)	
maxRtt	UInteger	O	0..1	Represents the minimum RTT in milliseconds. (NOTE 2)	
minLat	UInteger	O	0..1	Represents the minimum end-to-end latency in milliseconds. (NOTE 2)	
avgLat	UInteger	O	0..1	Represents the average end-to-end latency in milliseconds. (NOTE 2)	
maxLat	UInteger	O	0..1	Represents the maximum end-to-end latency in milliseconds. (NOTE 2)	
NOTE 1: At least one of these attributes shall be present.					
NOTE 2: At least one of these attributes shall be present.					

7.10.2.5 Error Handling

7.10.2.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.10.2.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the SS_ADAE_SlicePerformanceAnalytics API.

7.10.2.5.3 Application Errors

The application errors defined for SS_ADAE_SlicePerformanceAnalytics API are listed in table 7.10.2.5.3-1.

Table 7.10.2.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.2.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.10.2.6-1 lists the supported features for SS_ADAE_SlicePerformanceAnalytics API.

Table 7.10.2.6-1: Supported Features

Feature number	Feature Name	Description
1	ADAE_Ext1	Indicates the support of the ADAE enhancements in Release-19. Within this feature, the following enhancements are covered: - Support of the detailed analytics output.

7.10.3 SS_ADAE_Ue2UePerformanceAnalytics API

7.10.3.1 API URI

The SS_ADAE_Ue2UePerformanceAnalytics service shall use the SS_ADAE_Ue2UePerformanceAnalytics API.

The request URIs used in HTTP requests from the VAL server towards the ADAE server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-adae-uupa".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.10.3.2.

7.10.3.2 Resources

7.10.3.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.3.2.1-1 depicts the resource URIs structure for the SS_ADAE_Ue2UePerformanceAnalytics API.

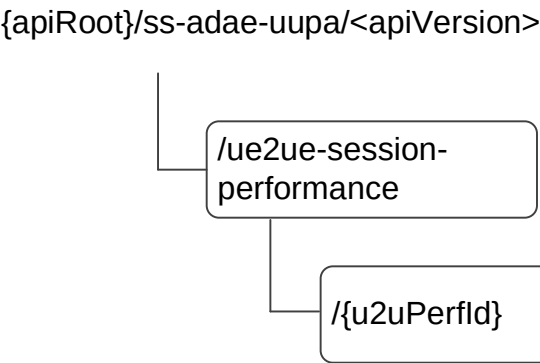


Figure 7.10.3.2.1-1: Resource URI structure of the SS_ADAE_Ue2UePerformanceAnalytics API

Table 7.10.3.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.3.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
UE-to-UE Session Performance Event Subscription	/ue2ue-session-performance	POST	Create an individual UE-to-UE session performance analytics event subscription.
Individual UE-to-UE Session Performance Event Subscription	/ue2ue-session-performance/{u2uPerfId}	GET	Read the individual UE-to-UE session performance analytics event subscription.
		DELETE	Remove the individual UE-to-UE session performance analytics event subscription.

7.10.3.2.2 Resource: UE-to-UE session performance event subscription

7.10.3.2.2.1 Description

The UE-to-UE session performance event subscription to the event of the UE-to-UE session performance analytics.

7.10.3.2.2.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-uupa/<apiVersion>/ue2ue-session-performance

This resource shall support the resource URI variables defined in the table 7.10.3.2.2.2-1.

Table 7.10.3.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.3.2.2.3 Resource Standard Methods

7.10.3.2.2.3.1 POST

This method to subscribe to the event of the UE-to-UE session performance analytics and shall support the URI query parameters specified in table 7.10.3.2.2.3.1-1.

Table 7.10.3.2.2.3.1-1: 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 7.10.3.2.2.3.1-2 and the response data structures and response codes specified in table 7.10.3.2.2.3.1-3.

Table 7.10.3.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
U2UPerfSub	M	1	Subscription to the UE-to-UE session performance analytics event.

Table 7.10.3.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
U2UPerfSub	M	1	201 Created	Subscription to the UE-to-UE session performance analytics is created.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.3.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-adae-uupa/<apiVersion>/ue2ue-session-performance/{u2uPerfId}

7.10.3.2.2.4 Resource Custom Operations

None.

7.10.3.2.3 Resource: Individual UE-to-UE Session Performance Event Subscription

7.10.3.2.3.1 Description

7.10.3.2.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-uupa/<apiVersion>/ue2ue-session-performance/{u2uPerfId}

This resource shall support the resource URI variables defined in table 7.10.3.2.3.2-1.

Table 7.10.3.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.
u2uPerfId	string	Represents the identifier of an individual UE-to-UE session performance event subscription.

7.10.3.2.3.3 Resource Standard Methods

7.10.3.2.3.3.1 GET

This operation reads the individual unicast monitoring subscription resource. This method shall support the URI query parameters specified in table 7.10.3.2.3.3.1-1.

Table 7.10.3.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.10.3.2.3.3.1-2 and the response data structures and response codes specified in table 7.10.3.2.3.3.1-3.

Table 7.10.3.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.3.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
U2UPerfSub	M	1	200 OK	The requested individual UE-to-UE session performance event subscription is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.3.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

Table 7.10.3.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

7.10.3.2.3.3.2 DELETE

This operation deletes the Individual UE-to-UE Session Performance Event Subscription resource. This method shall support the URI query parameters specified in table 7.10.3.2.3.3.2-1.

Table 7.10.3.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.3.2.3.3.2-2 and the response data structures and response codes specified in table 7.10.3.2.3.3.2-3.

Table 7.10.3.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.3.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual UE-to-UE session performance event subscription matching the u2uPerfId is deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.3.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.3.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

7.10.3.2.3.4 Resource Custom Operations

None.

7.10.3.3 Notifications

7.10.3.3.1 General

Table 7.10.3.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
UE-to-UE session performance event notification	{notifUri}	POST	Notification on the UE-to-UE session performance analytics

7.10.3.3.2 UE-to-UE session performance event notification

7.10.3.3.2.1 Description

UE-to-UE session performance event notification is to notify on the event of the UE-to-UE session performance analytics.

7.10.3.3.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the consumer during the subscription to the event.

Callback URI: {notifUri}

This method shall support the URI query parameters specified in table 7.10.3.3.2.2-1.

Table 7.10.3.3.2.2-1: 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 7.10.3.3.2.2-2 and the response data structures and response codes specified in table 7.10.3.3.2.2-3.

Table 7.10.3.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
U2UPerfNotif	M	1	Notification information of the UE-to-UE session performance analytics.

Table 7.10.3.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Notification for the UE-to-UE session performance analytics event is accepted.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.3.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.3.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.3.4 Data Model

7.10.3.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.3.4.1-1 specifies the data types defined specifically for the SS_ADAE_Ue2UePerformanceAnalytics API service.

Table 7.10.3.4.1-1: SS_ADAE_Ue2UePerformanceAnalytics API specific Data Types

Data type	Section defined	Description	Applicability
U2UAnalytics	7.10.3.4.3.1	Represents the UE-to-UE analytics types.	
U2UAnalyticsData	7.10.3.4.2.6	Represents the UE-to-UE analytics data.	
U2UPair	7.10.3.4.2.7	Represents the UE-to-UE pair.	
U2UPerfNotif	7.10.3.4.2.3	Represents the UE-to-UE session performance analytics notification.	
U2UPerfSub	7.10.3.4.2.2	Represents the UE-to-UE session performance analytics subscription.	
U2UReportingGranularity	7.10.3.4.3.2	Represents the UE-to-UE reporting granularity.	
U2UThreshold	7.10.3.4.2.5	Represents the threshold for UE-to-UE session performance analytics.	

Table 7.10.3.4.1-2 specifies data types re-used by the SS_ADAE_Ue2UePerformanceAnalytics API service:

Table 7.10.3.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Type of analytics for the event of the VAL application performance analytics.	
DurationSec	3GPP TS 29.122 [3]	Represents a period of time in units of seconds.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
MatchingDirection	3GPP TS 29.520 [33]	Used to indicate a threshold matching direction.	
NotificationMethod	3GPP TS 29.508 [32]	Used to indicate the reporting mode.	
PacketErrRate	3GPP TS 29.571 [21]	Used to represent packet error rate.	
ReportingInformation	3GPP TS 29.523 [20]	Used to indicate the reporting requirement, only the following information are applicable for SEAL: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the supported optional features of the API.	
TimeWindow	3GPP TS 29.122 [3]	Used to indicate the time window.	
UInteger	3GPP TS 29.571 [21]	Used to represent integer attributes.	
Uri	3GPP TS 29.122 [3]	Used to indicate the notification URI.	
ValTargetUe	Clause 7.3.1.4.2.3	Used to indicate either VAL User ID or VAL UE ID.	

7.10.3.4.2 Structured data types

7.10.3.4.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.3.4.2.2 Type: U2UPerfSub

Table 7.10.3.4.2.2-1: Definition of type U2UPerfSub

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsType	AnalyticsType	M	1	Represents the type of the UE-to-UE session performance analytics.	
valUelds	array(ValTargetUe)	M	1..N	Represent the list of VAL UEs, whose UE-to-UE session analytics are subscribed to.	
valServiceId	string	O	0..1	Represents the VAL service for which the subscription applies.	
confLevel	UInteger	O	0..1	Indicates the preferred accuracy level for the UE-to-UE session prediction. Minimum = 0. Maximum = 100.	
area	LocationArea5G	O	0..1	Represents the geographical or service area, to which the UE-to-UE session performance analytics subscription is applied.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirements of the subscription.	
reportingInds	array(U2UAnalytics)	O	1..N	Indicates the list of the requested analytics.	
reportingThrs	array(U2UThreshold)	C	1..N	Identifies reporting threshold corresponding to the application QoS index(es). (NOTE)	
reportingGrn	U2UReportingGranularity	O	0..1	Indicates the reporting granularity.	
notifUri	Uri	M	1	Represents the notification URI.	
timeInterval	TimeWindow	O	0..1	The time interval as the start time and end time, to which the UE-to-UE session performance analytics subscription is applied.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features. This attribute shall be present only if feature negotiation needs to take place.	
NOTE: This attribute may be provided if the "notifMethod" attribute within the ReportingInformation data type provided in the "repReq" attribute is set to "ON_EVENT_DETECTION".					

7.10.3.4.2.3 Type: U2UPerfNotif

Table 7.10.3.4.2.3-1: Definition of type U2UPerfNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsOutput	array(U2UAnalyticsData)	M	1..N	UE-to-UE session performance analytics for prediction or statistics depending on the type.	
confLevel	UInteger	C	0..1	Indicates the confidence of the prediction. This attribute shall be provided if the "analyticsType" attribute in the request is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	

7.10.3.4.2.4 Void

7.10.3.4.2.5 Type: U2UThreshold

Table 7.10.3.4.2.5-1: Definition of type U2UThreshold

Attribute name	Data type	P	Cardinality	Description	Applicability
value	U2UAnalyticsData	M	1	Indicates the value for the analytics threshold.	
thrDirect	MatchingDirection	M	1	Indicates the threshold matching direction for the analytics threshold provided in the "value" attribute.	

7.10.3.4.2.6 Type: U2UAnalyticsData

Table 7.10.3.4.2.6-1: Definition of type U2UAnalyticsData

Attribute name	Data type	P	Cardinality	Description	Applicability
valUes	U2UPair	O	0..1	Represent the pair of VAL UEs, whose UE-to-UE session analytics are observed. This attribute shall represent a sub-set of the VAL UEs defined in the "valUelds" attribute within the U2UPerfSub data type. If omitted, the analytics data is applied for all active VAL UE sessions.	
avgLatency	UInteger	C	0..1	The average latency in milliseconds. (NOTE)	
avgPer	PacketErrRate	C	0..1	The average packet error rate. (NOTE)	
avgDataRate	BitRate	C	0..1	The average data rate. (NOTE)	
jitter	Float	C	0..1	The jitter. (NOTE)	
NOTE: At least one of these attributes shall be provided.					

7.10.3.4.2.7 Type: U2UPair

Table 7.10.3.4.2.7-1: Definition of type U2UPair

Attribute name	Data type	P	Cardinality	Description	Applicability
valUeA	ValTargetUe	M	1	Represent the first VAL UE in the pair.	
valUeB	ValTargetUe	M	1	Represent the second VAL UE in the pair.	

7.10.3.4.3 Simple data types and enumerations

7.10.3.4.3.1 Enumeration: U2UAnalytics

Table 7.10.3.4.3.1-1: Enumeration U2UAnalytics

Enumeration value	Description	Applicability
AVG_LATENCY	The indication for requesting the average latency analytics.	
AVG_PER	The indication for requesting the average packet error rate analytics.	
AVG_DATA_RATE	The indication for requesting the average data rate analytics.	
JITTER	The indication for requesting the jitter analytics.	

7.10.3.4.3.2 Enumeration: U2UReportingGranularity

Table 7.10.3.4.3.2-1: Enumeration U2UReportingGranularity

Enumeration value	Description	Applicability
GROUP	The indication for requesting the analytics for all VAL UE-to-UE application sessions.	
INDIVIDUAL	The indication for requesting the analytics for individual VAL UE-to-UE application sessions.	

7.10.3.5 Error Handling

7.10.3.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.10.3.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the SS_ADAE_Ue2UePerformanceAnalytics API.

7.10.3.5.3 Application Errors

The application errors defined for SS_ADAE_Ue2UePerformanceAnalytics API are listed in table 7.10.3.5.3-1.

Table 7.10.3.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.3.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.10.3.6-1 lists the supported features for SS_ADAE_Ue2UePerformanceAnalytics API.

Table 7.10.3.6-1: Supported Features

Feature number	Feature Name	Description

7.10.4 SS_ADAE_LocationAccuracyAnalytics API

7.10.4.1 API URI

The SS_ADAE_LocationAccuracyAnalytics service shall use the SS_ADAE_LocationAccuracyAnalytics API.

The request URIs used in HTTP requests from the VAL server towards the ADAE server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-adae-laa".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.10.4.2.

7.10.4.2 Resources

7.10.4.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.4.2.1-1 depicts the resource URIs structure for the SS_ADAE_LocationAccuracyAnalytics API.

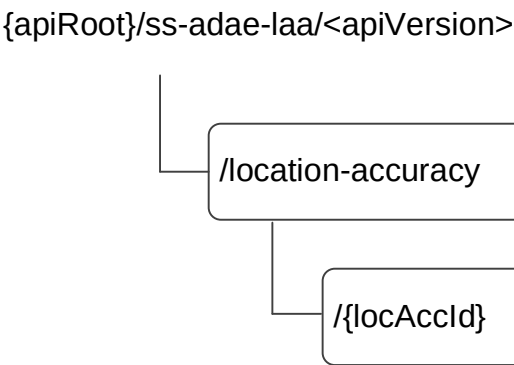


Figure 7.10.4.2.1-1: Resource URI structure of the SS_ADAE_LocationAccuracyAnalytics API

Table 7.10.4.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.4.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Location accuracy event subscription	/location-accuracy	POST	Subscription to the event of the location accuracy performance analytics.
Individual location accuracy event subscription	/location-accuracy/{locAcclId}	GET	Request the retrieval of an existing "Individual location accuracy event subscription" resource.
		DELETE	Request the deletion of an existing "Individual location accuracy event subscription" resource.

7.10.4.2.2 Resource: Location accuracy event subscription

7.10.4.2.2.1 Description

Subscription to the event of the location accuracy analytics.

7.10.4.2.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-adae-laa/<apiVersion>/location-accuracy**

This resource shall support the resource URI variables defined in the table 7.10.4.2.2.2-1.

Table 7.10.4.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.4.2.2.3 Resource Standard Methods

7.10.4.2.2.3.1 POST

This method to subscribe to the event of the location accuracy analytics and shall support the URI query parameters specified in table 7.10.4.2.2.3.1-1.

Table 7.10.4.2.2.3.1-1: 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 7.10.4.2.2.3.1-2 and the response data structures and response codes specified in table 7.10.4.2.2.3.1-3.

Table 7.10.4.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocAccurSub	M	1	Subscription to the location accuracy analytics event.

Table 7.10.4.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocAccurSub	M	1	201 Created	Subscription to the location accuracy analytics is created.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.4.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-adae-laa/<apiVersion>/location-accuracy/{locAccId}

7.10.4.2.2.4 Resource Custom Operations

None.

7.10.4.2.3 Resource: Individual location accuracy event subscription

7.10.4.2.3.1 Description

The Individual location accuracy event subscription resource represents an individual event subscription of a service consumer to the location accuracy analytics of the ADAE server.

7.10.4.2.3.2 Resource Definition

Resource URI: **{apiRoot}/ss-adae-iaa/<apiVersion>/location-accuracy/{locAccId}**

This resource shall support the resource URI variables defined in the table 7.10.4.2.3.2-1.

Table 7.10.4.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
locAccId	string	Identifies an Individual Events Subscription

7.10.4.2.3.3 Resource Standard Methods

7.10.4.2.3.3.1 GET

This operation retrieves an individual location accuracy event subscription resource. This method shall support the URI query parameters specified in table 7.10.4.2.3.3.1-1.

Table 7.10.4.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.4.2.3.3.1-2 and the response data structures and response codes specified in table 7.10.4.2.3.3.1-3.

Table 7.10.4.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.4.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocAccurSub	M	1	200 OK	The requested individual location accuracy event subscription is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.4.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.4.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.4.2.3.3.2 DELETE

This method shall support the URI query parameters specified in table 7.10.4.2.3.3.2-1.

Table 7.10.4.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.4.2.3.3.2-2 and the response data structures and response codes specified in table 7.10.4.2.3.3.2-3.

Table 7.10.4.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.4.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual subscription is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.4.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.4.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.4.2.3.4 Resource Custom Operations

None.

7.10.4.3 Notifications

7.10.4.3.1 General

Table 7.10.4.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Location accuracy event notification	{notifUri}	POST	Notification on the location accuracy analytics

7.10.4.3.2 Location accuracy event notification

7.10.4.3.2.1 Description

Location accuracy event notification is to notify on the event of the location accuracy analytics.

7.10.4.3.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the consumer during the subscription to the event.

Callback URI: **{notifUri}**

This method shall support the URI query parameters specified in table 7.10.4.3.2.2-1.

Table 7.10.4.3.2.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

If the notification is on the location accuracy analytics, this method shall support the request data structures specified in table 7.10.4.3.2.2-2 and the response data structures and response codes specified in table 7.10.4.3.2.2-3.

Table 7.10.4.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocAccurNotif	M	1	Notification information of the location accuracy analytics.

Table 7.10.4.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Notification for the location accuracy analytics event is accepted.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.4.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.4.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.4.4 Data Model

7.10.4.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.4.4.1-1 specifies the data types defined specifically for the SS_ADAE_LocationAccuracyAnalytics API service.

Table 7.10.4.4.1-1: SS_ADAE_LocationAccuracyAnalytics API specific Data Types

Data type	Section defined	Description	Applicability
LocAccurAnalytics	7.10.4.4.3.3	Represents the analytics identifier for location accuracy analytics.	ADAE_Ext1
LocAccurAnalyticsOutput	7.10.4.4.2.4	Represents the location accuracy analytics output.	ADAE_Ext1
LocAccurChange	7.10.4.4.3.4	Represents the type of location accuracy change.	ADAE_Ext1
LocAccurPrediction	7.10.4.4.2.5	Represents the location accuracy prediction analytics output.	ADAE_Ext1
LocAccurSustain	7.10.4.4.2.6	Represents the location accuracy sustainability analytics output.	ADAE_Ext1
LocAccurNotif	7.10.4.4.2.3	Notification information of the location accuracy analytics event.	
LocAccurSub	7.10.4.4.2.2	Subscription to the location accuracy analytics event.	

Table 7.10.4.4.1-2 specifies data types re-used by the SS_ADAE_LocationAccuracyAnalytics API service:

Table 7.10.4.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
Accuracy	3GPP TS 29.122 [3]	Represent the desired level of accuracy of the requested location information.	
AnalyticsType	Clause 7.10.1.4.2.6	Represents the type of analytics.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
ReportingInformation	3GPP TS 29.523 [20]	Used to indicate the reporting requirement, only the following information are applicable for SEAL: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the supported features.	
UeMobility	3GPP TS 29.520 [33]	Represents UE Mobility and route information.	
UInteger	3GPP TS 29.571 [21]	Represents an unsigned integer.	
Uri	3GPP TS 29.122 [3]	Represents a URI.	
ValTargetUe	Clause 7.3.1.4.2.3	Indicate either VAL User ID or VAL UE ID.	

7.10.4.4.2 Structured data types

7.10.4.4.2.1 Introduction

This clause defines the data structures to be used in resource representations of this service.

7.10.4.4.2.2

Type: LocAccurSub

Table 7.10.4.4.2.2-1: Definition of type LocAccurSub

Attribute name	Data type	P	Cardinality	Description	Applicability
notifUri	Uri	M	1	Represents the notification URI.	
analyticsId	LocAccurAnalytics	C	0..1	Represents the analytics identifier. This attribute shall be present when "ADAE_Ext1" feature is supported.	ADAE_Ext1
analyticsType	AnalyticsType	M	1	Identifies the type of the location accuracy analytics.	
valUeIds	array(ValTargetUe)	M	1..N	A list of identities of one or more VAL UEs whose location accuracy analytics are subscribed to.	
accuracy	Accuracy	M	1	Represents the desired level of accuracy of the requested location information.	
valServiceId	string	O	0..1	The identifier of the VAL service for which location accuracy analytics is requested.	
confLevel	UInteger	O	0..1	Indicates the preferred confidence level of the prediction. Minimum = 0. Maximum = 100.	
area	LocationArea5G	O	0..1	The geographical or service area to which the location accuracy analytics subscription is applied.	
timeValidity	TimeWindow	O	0..1	The time validity of the location accuracy analytics subscription.	
ueMobs	array(UeMobility)	O	1..N	Mobility and route information of the one or more target VAL UE.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirement of the location accuracy analytics subscription.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.10.4.6. This attribute shall be present only when feature negotiation needs to take place.	

7.10.4.4.2.3

Type: LocAccurNotif

Table 7.10.4.4.2.3-1: Definition of type LocAccurNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsOutput	LocAccurAnalyticsOutput	C	0..1	Contains location accuracy analytics output. (NOTE)	ADAE_Ext1
output	string	C	0..1	Location accuracy analytics output. (NOTE)	
confLevel	UInteger	C	0..1	Indicates the achieved confidence level in the case of prediction. This attribute shall be provided if the "analyticsType" attribute in the subscription is set to "PREDICTIVE". Minimum = 0. Maximum = 100. When the "ADAE_Ext1" feature is supported, this attribute shall be only present when the "output" attribute is present.	
NOTE: When the "ADAE_Ext1" feature is supported, these attributes are mutually exclusive and only one of them shall be present.					

7.10.4.4.2.4 Type: LocAccurAnalyticsOutput

Table 7.10.4.4.2.4-1: Definition of type LocAccurAnalyticsOutput

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsId	LocAccAnalytics	M	1	Represents the analytics identifier.	
valUelds	array(string)	O	1..N	Contains a list of identities of one or more VAL UEs whose location accuracy analytics are subscribed to.	
valServId	string	O	0..1	Represents the identifier of VAL service.	
predictions	array(LocAccurPredictions)	C	1..N	Represents the location accuracy prediction. This attribute shall be present only if the "analyticsId" is set to "LOCATION_ACCURACY_PREDICTION".	
sustainAnalytics	LocAccurSustain	C	0..1	Represents the location accuracy prediction. This attribute shall be present only if the "analyticsId" is set to "LOCATION_ACCURACY_SUSTAINABILITY".	

7.10.4.4.2.5 Type: LocAccurPrediction

Table 7.10.4.4.2.5-1: Definition of type LocAccurPrediction

Attribute name	Data type	P	Cardinality	Description	Applicability
accurChange	LocAccurChange	M	1	Contains the predicted or expected location accuracy change.	
areas	array(LocationArea5G)	O	0..1	Contains the applicable areas.	
timeWnd	TimeWindow	O	0..1	Contains the time period that the analytics applies to.	
confLevel	integer	O	0..1	Contains the achieved confidence level in the case of prediction. Minimum = 0. Maximum = 100.	

7.10.4.4.2.6 Type: LocAccurSustain

Table 7.10.4.4.2.6-1: Definition of type LocAccurSustain

Attribute name	Data type	P	Cardinality	Description	Applicability
areas	array(LocationArea5G)	O	0..1	Represents the applicable areas.	
timeWnd	TimeWindow	O	0..1	Represents the time period that the analytics applies to.	
thrs	FFS	O	1..N	Represents the met reporting thresholds	
confLevel	integer	O	0..1	Indicates the achieved confidence level in the case of prediction. Minimum = 0. Maximum = 100.	

Editor's note: The data type for the "thrs" attribute is FFS.

7.10.4.4.3 Simple data types and enumerations

7.10.4.4.3.1 Introduction

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

7.10.4.4.3.2 Simple data types

The simple data types defined in table 7.10.4.4.3.2-1 shall be supported.

Table 7.10.4.4.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

7.10.4.4.3.3 Enumeration: LocAccurAnalytics

The enumeration LocAccurAnalytics represents the analytic IDs for location accuracy analytics. It shall comply with the provisions defined in table 7.10.4.4.3.3-1.

Table 7.10.4.4.3.3-1: Enumeration LocAccurAnalytics

Enumeration value	Description	Applicability
LOCATION_ACCURACY_PREDICTION	Indicates that the requested analytics is location accuracy prediction.	
LOCATION_ACCURACY_SUSTAINABILITY	Indicates that the requested analytics is location accuracy sustainability.	

7.10.4.4.3.4 Enumeration: LocAccurChange

The enumeration LocAccurChange represents the change . It shall comply with the provisions defined in table 7.10.4.4.3.4-1.

Table 7.10.4.4.3.4-1: Enumeration LocAccurChange

Enumeration value	Description	Applicability
DOWNGRADE	Indicates the downgrade of the location accuracy.	
UPGRADE	Indicates the upgrade of the location accuracy.	

7.10.4.5 Error Handling

7.10.4.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.10.4.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the SS_ADAE_LocationAccuracyAnalytics API.

7.10.4.5.3 Application Errors

The application errors defined for SS_ADAE_LocationAccuracyAnalytics API are listed in table 7.10.4.5.3-1.

Table 7.10.4.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.4.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.10.4.6-1 lists the supported features for SS_ADAE_LocationAccuracyAnalytics API.

Table 7.10.4.6-1: Supported Features

Feature number	Feature Name	Description
1	ADAE_Ext1	Indicates the support of the ADAE enhancements in Release-19. Within this feature, the following enhancements are covered: - Support of the detailed analytics output.

7.10.5 SS_ADAE_ServiceApiAnalytics API

7.10.5.1 API URI

The SS_ADAE_ServiceApiAnalytics service shall use the SS_ADAE_ServiceApiAnalytics API.

The request URIs used in HTTP requests from the VAL server towards the ADAE server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-adae-sa".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.10.5.2.

7.10.5.2 Resources

7.10.5.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.5.2.1-1 depicts the resource URIs structure for the SS_ADAE_ServiceApiAnalytics API.

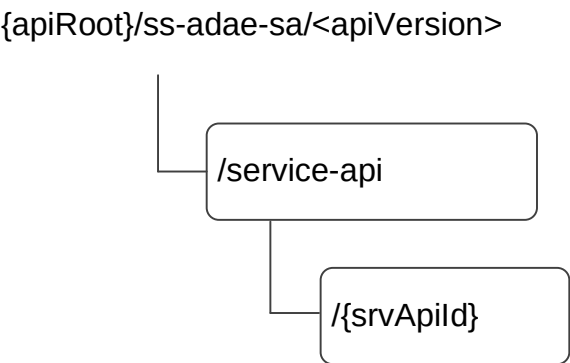


Figure 7.10.5.2.1-1: Resource URI structure of the SS_ADAE_ServiceApiAnalytics API

Table 7.10.5.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.5.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Service API event subscription	/service-api	POST	Subscription to the event of the service API analytics.
Individual service API event subscription	/service-api/{srvApiId}	GET	Request the retrieval of an existing "Individual service API event subscription" resource.
		DELETE	Request the deletion of an existing "Individual service API event subscription" resource.

7.10.5.2.2 Resource: Service API event subscription

7.10.5.2.2.1 Description

Subscription to the event of the service API analytics.

7.10.5.2.2.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-sa/<apiVersion>/service-api

This resource shall support the resource URI variables defined in the table 7.10.5.2.2.2-1.

Table 7.10.5.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.5.2.2.3 Resource Standard Methods

7.10.5.2.2.3.1 POST

This method to subscribe to the event of the service API analytics and shall support the URI query parameters specified in table 7.10.5.2.2.3.1-1.

Table 7.10.5.2.2.3.1-1: 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 7.10.5.2.2.3.1-2 and the response data structures and response codes specified in table 7.10.5.2.2.3.1-3.

Table 7.10.5.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SrvApiSub	M	1	Subscription to the service API analytics event.

Table 7.10.5.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SrvApiSub	M	1	201 Created	Subscription to the service API analytics is created.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.5.2.3.1-4: 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}/ss-adae-sa/<apiVersion>/service-api/{srvApiId}

7.10.5.2.2.4 Resource Custom Operations

None.

7.10.5.2.3 Resource: Individual Service API event subscription

7.10.5.2.3.1 Description

The Individual Service API event subscription resource represents an individual event subscription of a service consumer to the Service API analytics of the ADAE server.

7.10.5.2.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-laa/<apiVersion>/service-api/{srvApiId}

This resource shall support the resource URI variables defined in the table 7.10.5.2.3.2-1.

Table 7.10.5.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
srvApiId	string	Identifies an Individual Events Subscription

7.10.5.2.3.3 Resource Standard Methods

7.10.5.2.3.3.1 GET

This operation retrieves an individual service API event subscription resource. This method shall support the URI query parameters specified in table 7.10.5.2.3.3.1-1.

Table 7.10.5.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.5.2.3.3.1-2 and the response data structures and response codes specified in table 7.10.5.2.3.3.1-3.

Table 7.10.5.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.5.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SrvApiSub	M	1	200 OK	The requested individual service API event subscription is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.5.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.5.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.5.2.3.3.2 DELETE

This method shall support the URI query parameters specified in table 7.10.5.2.3.3.2-1.

Table 7.10.5.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.5.2.3.3.2-2 and the response data structures and response codes specified in table 7.10.5.2.3.3.2-3.

Table 7.10.5.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.5.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual subscription is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.5.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.5.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.5.2.3.4 Resource Custom Operations

None.

7.10.5.3 Notifications

7.10.5.3.1 General

Table 7.10.5.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Service API event notification	{notifUri}	POST	Notification on the service API analytics

7.10.5.3.2 Service API event notification

7.10.5.3.2.1 Description

Service API event notification is to notify on the event of the service API analytics.

7.10.5.3.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the consumer during the subscription to the event.

Callback URI: {notifUri}

This method shall support the URI query parameters specified in table 7.10.5.3.2.2-1.

Table 7.10.5.3.2.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

If the notification is on the service API analytics, this method shall support the request data structures specified in table 7.10.5.3.2.2-2 and the response data structures and response codes specified in table 7.10.5.3.2.2-3.

Table 7.10.5.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SrvApiNotif	M	1	Notification information of the service API analytics.

Table 7.10.5.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Notification for the service API analytics event is accepted.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.5.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.5.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.5.4 Data Model

7.10.5.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.5.4.1-1 specifies the data types defined specifically for the SS_ADAE_ServiceApiAnalytics API service.

Table 7.10.5.4.1-1: SS_ADAE_ServiceApiAnalytics API specific Data Types

Data type	Section defined	Description	Applicability
SrvApiNotif	7.10.5.4.2.3	Notification information of the service API analytics event.	
SrvApiSub	7.10.5.4.2.2	Subscription to the service API analytics event.	

Table 7.10.5.4.1-2 specifies data types re-used by the SS_ADAE_ServiceApiAnalytics API service:

Table 7.10.5.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Type of analytics for the event of the VAL application performance analytics.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
ReportingInformation	3GPP TS 29.523 [20]	Used to indicate the reporting requirement, only the following information are applicable for SEAL: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the supported features.	
TimeWindow	3GPP TS 29.122 [3]	Represents a time window.	
UInteger	3GPP TS 29.571 [21]	Represents an unsigned integer.	
Uri	3GPP TS 29.122 [3]	Represents a URI.	

7.10.5.4.2 Structured data types

7.10.5.4.2.1 Introduction

This clause defines the data structures to be used in resource representations of this service.

7.10.5.4.2.2 Type: SrvApiSub

Table 7.10.5.4.2.2-1: Definition of type SrvApiSub

Attribute name	Data type	P	Cardinality	Description	Applicability
notifUri	Uri	M	1	Represents the notification URI.	
analyticsType	AnalyticsType	M	1	Identifies the type of the service API analytics.	
eventCriteria	string	M	1	Criteria matching the service API analytics event.	
serviceApiName	string	C	0..1	The Service API name. (NOTE)	
serviceApiType	string	C	0..1	The Service API type. (NOTE)	
area	LocationArea5G	O	0..1	The geographical or service area to which the service API analytics subscription is applied.	
timeValidity	TimeWindow	O	0..1	The time validity of the service API analytics subscription.	
timeHorizon	TimeWindow	O	0..1	Time horizon for the predictions.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirement of the service API analytics subscription.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.10.5.6. This attribute shall be present only when feature negotiation needs to take place.	
NOTE: Only one of these attributes shall be provided.					

7.10.5.4.2.3 Type: SrvApiNotif

Table 7.10.5.4.2.3-1: Definition of type SrvApiNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
requestorId	string	M	1	The identifier of the requestor of these analytics.	
output	string	M	1	Service API analytics for prediction or statistics depending on the type. (NOTE)	
area	LocationArea5G	O	0..1	The geographical or service area to which the service API analytics subscription is applied.	
confLevel	UInteger	C	0..1	Indicates the achieved confidence level in the case of prediction. This attribute shall be provided if the "analyticsType" is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	
NOTE: The content of "output" attribute is not defined in this Release of the specification.					

7.10.5.4.3 Simple data types and enumerations

7.10.5.4.3.1 Introduction

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

7.10.5.4.3.2 Simple data types

None.

7.10.5.5 Error Handling

7.10.5.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.10.5.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the SS_ADAE_ServiceApiAnalytics API.

7.10.5.5.3 Application Errors

The application errors defined for SS_ADAE_ServiceApiAnalytics API are listed in table 7.10.5.5.3-1.

Table 7.10.5.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.5.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.10.5.6-1 lists the supported features for SS_ADAE_ServiceApiAnalytics API.

Table 7.10.5.6-1: Supported Features

Feature number	Feature Name	Description

7.10.6 SS_ADAE_SliceUsagePatternAnalytics API

7.10.6.1 API URI

The SS_ADAE_SliceUsagePatternAnalytics service shall use the SS_ADAE_SliceUsagePatternAnalytics API.

The request URIs used in HTTP requests from the service consumer towards the ADAE server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-adae-sup".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.10.6.2.

7.10.6.2 Resources

7.10.6.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.6.2.1-1 depicts the resource URIs structure for the SS_ADAE_SliceUsagePatternAnalytics API.

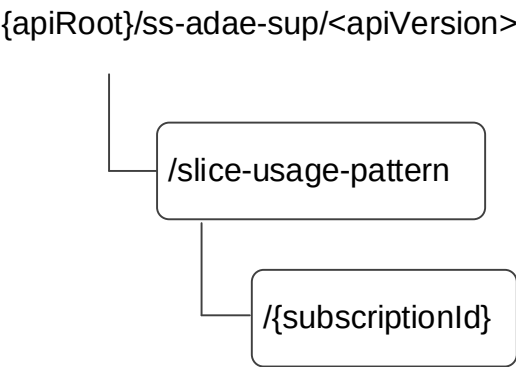


Figure 7.10.6.2.1-1: Resource URI structure of the SS_ADAE_SliceUsagePatternAnalytics API

Table 7.10.6.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.6.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Slice usage pattern event subscription	/slice-usage-pattern	POST	Subscriptions to the event of the slice usage pattern analytics
Individual slice usage pattern event subscription	/slice-usage-pattern/{subscriptionId}	GET	Request the retrieval of an existing "Individual slice usage pattern event subscription" resource identified by {subscriptionId}.
		DELETE	Request the deletion of an existing "Individual slice usage pattern event subscription" resource identified by {subscriptionId}.

7.10.6.2.2 Resource: Slice usage pattern event subscriptions

7.10.6.2.2.1 Description

Slice usage pattern event subscriptions to the event of the slice usage pattern analytics.

7.10.6.2.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-adae-sup/<apiVersion>/slice-usage-pattern**

This resource shall support the resource URI variables defined in the table 7.10.6.2.2.2-1.

Table 7.10.6.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.6.2.2.3 Resource Standard Methods

7.10.6.2.2.3.1 POST

This method is used to subscribe to the event of the slice usage pattern analytics and shall support the URI query parameters specified in table 7.10.6.2.2.3.1-1.

Table 7.10.6.2.2.3.1-1: 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 7.10.6.2.2.3.1-2 and the response data structures and response codes specified in table 7.10.6.2.2.3.1-3.

Table 7.10.6.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SUPSub	M	1	Subscription to the slice usage pattern analytics event.

Table 7.10.6.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SUPSub	M	1	201 Created	Subscription to the slice usage pattern analytics is created.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.6.2.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/ss-adae-sup/<apiVersion>/slice-usage-pattern/{subscriptionId}

7.10.6.2.2.4 Resource Custom Operations

None.

7.10.6.2.3 Resource: Individual slice usage pattern event subscription

7.10.6.2.3.1 Description

The Individual Slice usage pattern event subscription resource represents an individual event subscription of a service consumer to the slice usage pattern analytics of the ADAE server.

7.10.6.2.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-sup/<apiVersion>/slice-usage-pattern/{subscriptionId}

This resource shall support the resource URI variables defined in the table 7.10.6.2.3.2-1.

Table 7.10.6.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
subscriptionId	string	Identifies an Individual Events Subscription

7.10.6.2.3.3 Resource Standard Methods

7.10.6.2.3.3.1 GET

This operation retrieves an individual slice usage pattern event subscription resource. This method shall support the URI query parameters specified in table 7.10.6.2.3.3.1-1.

Table 7.10.6.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.6.2.3.3.1-2 and the response data structures and response codes specified in table 7.10.6.2.3.3.1-3.

Table 7.10.6.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.6.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SUPSub	M	1	200 OK	The requested individual slice usage pattern subscription is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.6.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.6.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.6.2.3.3.2 DELETE

This method shall support the URI query parameters specified in table 7.10.6.2.3.3.2-1.

Table 7.10.6.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.6.2.3.3.2-2 and the response data structures and response codes specified in table 7.10.6.2.3.3.2-3.

Table 7.10.6.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.6.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual subscription is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.6.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.6.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.6.2.3.4 Resource Custom Operations

None.

7.10.6.3 Notifications

7.10.6.3.1 General

Table 7.10.6.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Slice usage pattern event notification	{notifUri}	POST	Notification on the slice usage pattern analytics

7.10.6.3.2 Slice usage pattern event notification

7.10.6.3.2.1 Description

Slice usage pattern event notification is to notify on the event of the slice usage pattern analytics.

7.10.6.3.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the consumer during the subscription to the event.

Callback URI: {notifUri}

This method shall support the URI query parameters specified in table 7.10.6.3.2.2-1.

Table 7.10.6.3.2.2-1: 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 7.10.6.3.2.2-2 and the response data structures and response codes specified in table 7.10.6.3.2.2-3.

Table 7.10.6.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SUPNotif	M	1	Notification information of the slice usage pattern analytics

Table 7.10.6.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Notification for the slice usage pattern analytics event is accepted.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.6.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.6.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.6.4 Data Model

7.10.6.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.6.4.1-1 specifies the data types defined specifically for the SS_ADAE_SliceUsagePatternAnalytics API service.

Table 7.10.6.4.1-1: SS_ADAE_SliceUsagePatternAnalytics API specific Data Types

Data type	Section defined	Description	Applicability
SUPNotif	7.10.6.4.2.3	Notification information of the slice usage pattern analytics event.	
SUPSub	7.10.6.4.2.2	Subscription to the slice usage pattern analytics event.	

Table 7.10.6.4.1-2 specifies data types re-used by the SS_ADAE_SliceUsagePatternAnalytics API service:

Table 7.10.6.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Represents the type of analytics.	
Dnn	3GPP TS 29.571 [21]	Identifies a DNN.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
ReportingInformation	3GPP TS 29.523 [20]	Used to indicate the reporting requirement, only the following information are applicable for SEAL: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
Snssai	3GPP TS 29.571 [21]	Identifies the S-NSSAI.	
SupportedFeatures	3GPP TS 29.571 [21]	Supported features.	
TimeWindow	3GPP TS 29.122 [3]	A time window.	
UInteger	3GPP TS 29.571 [21]	Unsigned integer.	
Uri	3GPP TS 29.122 [3]	Represents a URI.	
ValTargetUe	Clause 7.3.1.4.2.3	Indicate either VAL User ID or VAL UE ID.	

7.10.6.4.2 Structured data types

7.10.6.4.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.6.4.2.2

Type: SUPSub

Table 7.10.6.4.2.2-1: Definition of type SUPSub

Attribute name	Data type	P	Cardinality	Description	Applicability
notifUri	Uri	M	1	Represents the notification URI.	
analyticsType	AnalyticsType	M	1	Identifies the type of the slice usage pattern analytics. Only the "mode" attribute is applicable.	
sliceld	Snssai	M	1	Identity of the network slice.	
dnn	Dnn	O	0..1	Associated target DNN.	
valUelds	array(ValTargetUe)	O	1..N	A list of identities of one or more VAL UEs, whose slice usage patterns are subscribed to.	
valServerId	string	O	0..1	If the consumer is different from the VAL server, this identifier represents the VAL server, to which the slice usage pattern analytics subscription is applied.	
confLevel	UInteger	O	0..1	Indicates the preferred confidence level of the prediction. Minimum = 0. Maximum = 100.	
area	LocationArea5G	O	0..1	The geographical or service area, to which the slice usage pattern analytics subscription is applied.	
timeValidity	TimeWindow	O	0..1	The time validity of the subscription.	
historicTimeInt	TimeWindow	C	0..1	The historic time interval as the start and the end time, to which the slice usage pattern analytics subscription is applied. This attribute shall be provided in case immediate reporting of statistics is requested.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirement of the slice usage pattern analytics subscription.	
immNotif	SUPNotif	C	0..1	Immediate notifications. It shall only be provided in the subscription request, if immediate reporting is requested and the outputs are available.	
dataId	string	C	0..1	Identity of the slice usage statistics data which is to be collected. It shall be provided if immediate reporting of statistics is requested and may not be provided otherwise.	
valServiceId	string	C	0..1	The identifier of the VAL service, for which the request applies. It shall be provided if immediate reporting of statistics is requested and may not be provided otherwise.	
supFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones as defined in clause 7.10.6.6. This attribute shall be present only when feature negotiation needs to take place.	

7.10.6.4.2.3 Type: SUPNotif

Table 7.10.6.4.2.3-1: Definition of type SUPNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
output	string	M	1	Slice usage pattern analytics. The format is up to the implementation.	
confLevel	UInteger	C	0..1	Indicates the achieved confidence level in the case of prediction. This attribute shall be provided if the "analyticsType" attribute in the subscription is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	

7.10.6.4.2.4 Void

7.10.6.4.2.5 Void

7.10.6.4.3 Simple data types and enumerations

7.10.6.4.3.1 Introduction

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

7.10.6.4.3.2 Simple data types

None.

7.10.6.4.3.3 Void

7.10.6.5 Error Handling

7.10.6.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.10.6.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the SS_ADAE_SliceUsagePatternAnalytics API.

7.10.6.5.3 Application Errors

The application errors defined for SS_ADAE_SliceUsagePatternAnalytics API are listed in table 7.10.6.5.3-1.

Table 7.10.6.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.6.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.10.6.6-1 lists the supported features for SS_ADAE_SliceUsagePatternAnalytics API.

Table 7.10.6.6-1: Supported Features

Feature number	Feature Name	Description

7.10.7 SS_ADAE_EdgeLoadAnalytics API

7.10.7.1 API URI

The SS_ADAE_EdgeLoadAnalytics service shall use the SS_ADAE_EdgeLoadAnalytics API.

The request URIs used in HTTP requests from the VAL server towards the ADAE server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-adae-el".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.10.7.2.

7.10.7.2 Resources

7.10.7.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.7.2.1-1 depicts the resource URIs structure for the SS_ADAE_EdgeLoadAnalytics API.

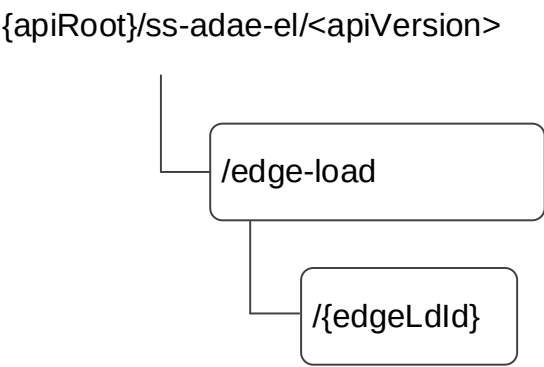


Figure 7.10.7.2.1-1: Resource URI structure of the SS_ADAE_EdgeLoadAnalytics API

Table 7.10.7.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.7.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Edge Load Event Subscription	/edge-load	POST	Creates a new individual Event Subscription for edge load analytics.
Individual Edge Load Event Subscription	/edge-load/{edgeLdId}	GET	Retrieve an individual edge load analytics according to query parameter on the resource identified by {edgeLdId}. If there are no query parameter, fetch the whole edge load resource identified by {edgeLdId}.
		DELETE	Deletes an individual Event Subscription identified by the {edgeLdId}.

7.10.7.2.2 Resource: Edge Load Event Subscription

7.10.7.2.2.1 Description

The edge load event subscription to the event of the edge load analytics.

7.10.7.2.2.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-el/<apiVersion>/edge-load

This resource shall support the resource URI variables defined in the table 7.10.7.2.2.2-1.

Table 7.10.7.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.

7.10.7.2.2.3 Resource Standard Methods

7.10.7.2.2.3.1 POST

This method to subscribe to the event of the edge load analytics and shall support the URI query parameters specified in table 7.10.7.2.2.3.1-1.

Table 7.10.7.2.2.3.1-1: 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 7.10.7.2.2.3.1-2 and the response data structures and response codes specified in table 7.10.7.2.2.3.1-3.

Table 7.10.7.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
EdgeSub	M	1	Create a new individual Event Subscription to the event of edge load analytics.

Table 7.10.7.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EdgeSub	M	1	201 Created	Edge load Event Subscription resource created successfully. The URI of the created resource shall be returned in the "Location" HTTP header.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.7.2.3.1-4: 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}/ss-adae-el/<apiVersion>/edge-load/{edgeLdId}

7.10.7.2.2.4 Resource Custom Operations

None.

7.10.7.2.3 Resource: Individual Edge Load Event Subscription

7.10.7.2.3.1 Description

The Individual Edge Load Event Subscription resource represents an individual event subscription of the edge load analytics.

7.10.7.2.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-el/<apiVersion>/edge-load/{edgeLdId}

This resource shall support the resource URI variables defined in the table 7.10.7.2.3.2-1.

Table 7.10.7.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.
edgeLdId	string	Identifies an Individual Edge Load Events Subscription.

7.10.7.2.3.3 Resource Standard Methods

7.10.7.2.3.3.1 GET

This operation reads the individual edge load subscription resource. This method shall support the URI query parameters specified in table 7.10.7.2.3.3.1-1.

Table 7.10.7.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.10.7.2.3.3.1-2 and the response data structures and response codes specified in table 7.10.7.2.3.3.1-3.

Table 7.10.7.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.7.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EdgeSub	M	1	200 OK	The requested individual edge load subscription is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.7.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

Table 7.10.7.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

7.10.7.2.3.3.2 DELETE

This method shall support the URI query parameters specified in table 7.10.7.2.3.3.2-1.

Table 7.10.7.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.7.2.3.3.2-2 and the response data structures and response codes specified in table 7.10.7.2.3.3.2-3.

Table 7.10.7.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.7.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual Edge Load Events Subscription matching the edgeLdId is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.7.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

Table 7.10.7.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

7.10.7.2.3.4 Resource Custom Operations

None.

7.10.7.3 Notifications

7.10.7.3.1 General

Table 7.10.7.3.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Edge load event notification	{notifUri}	POST	Notification on the event of the edge load analytics or the edge load analytics data.

7.10.7.3.2 Edge load event notification

7.10.7.3.2.1 Description

Edge load event notification is to notify on the event of the edge load analytics or the edge load analytics data.

7.10.7.3.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the consumer during the subscription to the event.

Callback URI: {notifUri}

This method shall support the URI query parameters specified in table 7.10.7.3.2.2-1.

Table 7.10.7.3.2.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

If the notification is on the edge load analytics and the edge load analytics data, this method shall support the request data structures specified in table 7.10.7.3.2.2-2 and the response data structures and response codes specified in table 7.10.7.3.2.2-3.

Table 7.10.7.3.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
EdgeNotif	M	1	Notification information on edge load analytics or edge load analytics data.

Table 7.10.7.3.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The receipt of the Notification is acknowledged.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.7.3.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.7.3.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.7.4 Data Model

7.10.7.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.7.4.1-1 specifies the data types defined specifically for the SS_ADAE_EdgeLoadAnalytics API service.

Table 7.10.7.4.1-1: SS_ADAE_EdgeLoadAnalytics API specific Data Types

Data type	Section defined	Description	Applicability
AnalyticsIdEl	7.10.7.4.3.3	Represents the analytics identifier for the edge load analytics.	ADAE_Ext1
AnalyticsOutputEl	7.10.7.4.2.7	Represents the edge load analytics output.	ADAE_Ext1
EasAnalytics	7.10.7.4.2.10	Represents the EAS analytics data.	ADAE_Ext1
EesAnalytics	7.10.7.4.2.9	Represents the EES analytics data.	ADAE_Ext1
EdgePlatformAnalytics	7.10.7.4.2.8	Represents the edge platform analytics data.	ADAE_Ext1
EdgeNotif	7.10.7.4.2.3	Notification information of the edge load analytics event.	
EdgeSub	7.10.7.4.2.2	Represents the subscription to the edge load event.	

Table 7.10.7.4.1-2 specifies data types re-used by the SS_ADAE_EdgeLoadAnalytics API service:

Table 7.10.7.4.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Type of analytics for the event of the edge load analytics.	
Dnai	3GPP TS 29.571 [21]	Identifies a user plane access to one or more DN(s).	
Dnn	3GPP TS 29.571 [21]	Identifies a DNN.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
NotificationMethod	3GPP TS 29.508 [32]	Used to indicate the reporting mode.	
ProdProfileInfo	Clause 7.10.1.4.2.4	Information about the data producer's support data collection and its access to the produced data.	
ReportingInformation	3GPP TS 29.523 [20]	Used to indicate the reporting requirement, only the following information are applicable for SEAL: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the supported optional features of the API.	
TimeWindow	3GPP TS 29.122 [3]	Represents a period of time with start time and end time.	
UInteger	3GPP TS 29.571 [21]	Used to represent integer attributes.	
Uri	3GPP TS 29.122 [3]	Used to indicate the notification URI.	

7.10.7.4.2 Structured data types

7.10.7.4.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.7.4.2.2

Type: EdgeSub

Table 7.10.7.4.2.2-1: Definition of type EdgeSub

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsId	AnalyticsIdEl	C	0..1	Represents the analytics identifier. This attribute shall be present when the "ADAE_Ext1" feature is supported.	ADAE_Ext1
analyticsType	AnalyticsType	M	1	Represents the analytics type of the edge load analytics.	
destinationEasInfo	string	O	0..1	Represents the information for the destination EAS, including destination EAS ID and destination EAS address. (NOTE 1)	
destinationEesId	string	O	0..1	The identifier of the destination EES. (NOTE 1)	
dnai	Dnai	O	0..1	Represents the Data Network Access Identifier of user plane access to DN(s) which the subscription applies. (NOTE 1)	
dnn	Dnn	O	0..1	Represents the target DNN which the subscription applies. (NOTE 1)	
dataProdProfile	ProdProfileInfo	O	0..1	Represents the characteristics of the data producer to be used.	
confLevel	UInteger	O	0..1	Represents the accuracy level for the edge load analytics in case of prediction. Minimum = 0. Maximum = 100.	
area	LocationArea5G	O	0..1	Represents the geographical or service area, to which the edge load analytics subscription is applied.	
notifUri	Uri	M	1	Represents the notification URI.	
report	EdgeNotif	C	0..1	Indicates the reporting data for one-time immediate report. It shall be provided if one-time immediate reporting is requested by indicated in the "reportReq" attribute, and the outputs are available.	
reportReq	ReportingInformation	O	0..1	Represents the reporting requirements of the subscription. (NOTE 2)	
timeInterval	TimeWindow	O	0..1	The time interval as the start and the end time, to which the edge load analytics subscription applies.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features. This attribute shall be present only if feature negotiation needs to take place.	

NOTE 1: At least one of the attributes, "destinationEasInfo", "destinationEesId", and either "dnai" or "dnn", shall be present.

NOTE 2: If absent, the applied reporting parameters are based on local configuration.

7.10.7.4.2.3 Type: EdgeNotif

Table 7.10.7.4.2.3-1: Definition of type EdgeNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
output	AnalyticsOutputEl	C	0..1	Represents the analytics output. (NOTE)	ADAE_Ext1
analyticsOutput	string	C	0..1	Represents the edge load analytics. (NOTE)	
confLevel	UInteger	C	0..1	Represents the accuracy level of the edge load analytics in case of prediction. Minimum = 0. Maximum = 100. This attribute shall be provided if the analyticsType in the subscription request is set to "PREDICTIVE". When the "ADAE_Ext1" feature is supported, this attribute shall be only present when the "analyticsOutput" attribute is present.	
NOTE: When the "ADAE_Ext1" feature is supported, these attributes are mutually exclusive and only one of them shall be present.					

7.10.7.4.2.4 Void

7.10.7.4.2.5 Void

7.10.7.4.2.6 Void

7.10.7.4.2.7 Type: AnalyticsOutputEl

Table 7.10.7.4.2.7-1: Definition of type AnalyticsOutputEl

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsId	AnalyticsIdEl	M	1	Represents the analytics identifier.	
platAnalytics	EdgePlatformAnalytics	C	0..1	Represents the edge platform analytics output. This attribute shall be present only if the "analyticsId" is set to "EDGE_PLATFORM".	
eesAnalytics	EesAnalytics	C	0..1	Represents the EES analytics output. This attribute shall be present only if the "analyticsId" is set to "EES".	
easAnalytics	EasAnalytics	C	0..1	Represents the EAS analytics output. This attribute shall be present only if the "analyticsId" is set to "EAS".	

7.10.7.4.2.8 Type: EdgePlatformAnalytics

Table 7.10.7.4.2.8-1: Definition of type EdgePlatformAnalytics

Attribute name	Data type	P	Cardinality	Description	Applicability
easConn	UInteger	C	0..1	Represents the number of EAS connections. (NOTE)	
eesConn	UInteger	C	0..1	Represents the number of EES connections. (NOTE)	
confLevel	integer	C	0..1	Represents the accuracy level in case of prediction. Minimum = 0. Maximum = 100. This attribute shall be present if the analyticsType in the subscription request is set to "PREDICTIVE".	
timeWnd	TimeWindow	O	0..1	Represents the time period that the analytics applies to.	
NOTE: At least one of these attributes shall be present.					

7.10.7.4.2.9 Type: EesAnalytics

Table 7.10.7.4.2.9-1: Definition of type EesAnalytics

Attribute name	Data type	P	Cardinality	Description	Applicability
eesUnavail	array(Scheduled CommunicationTime)	C	1..N	Represents the EES unavailability information. (NOTE)	
eesUnavailPer	integer	C	0..1	Represents the percentage of EES unavailability. Minimum = 0. Maximum = 100. (NOTE)	
confLevel	integer	C	0..1	Represents the accuracy level in case of prediction. Minimum = 0. Maximum = 100. This attribute shall be present if the analyticsType in the subscription request is set to "PREDICTIVE".	
timeWnd	TimeWindow	O	0..1	Represents the time period that the analytics applies to.	
NOTE: At least one of these attributes shall be present.					

7.10.7.4.2.10 Type: EasAnalytics

Table 7.10.7.4.2.10-1: Definition of type EasAnalytics

Attribute name	Data type	P	Cardinality	Description	Applicability
easUnavail	array(Scheduled CommunicationTime)	C	1..N	Represents the EAS unavailability information. (NOTE)	
easUnavailPer	integer	C	0..1	Represents the percentage of EAS unavailability. Minimum = 0. Maximum = 100. (NOTE)	
confLevel	integer	C	0..1	Represents the accuracy level in case of prediction. Minimum = 0. Maximum = 100. This attribute shall be present if the analyticsType in the subscription request is set to "PREDICTIVE".	
timeWnd	TimeWindow	O	0..1	Represents the time period that the analytics applies to.	
NOTE: At least one of these attributes shall be present.					

7.10.7.4.3 Simple data types and enumerations

7.10.7.4.3.1 Introduction

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

7.10.7.4.3.2 Simple data types

None.

7.10.7.4.3.3 Enumeration: AnalyticsIdEl

Table 7.10.7.4.3.3-1: Enumeration AnalyticsIdEl

Enumeration value	Description	Applicability
EDGE_PLATFORM	Indicates that the analytics identifier is edge platform analytics.	
EES	Indicates that the analytics identifier is EES analytics.	
EAS	Indicates that the analytics identifier is EAS analytics.	

7.10.7.5 Error Handling

7.10.7.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.10.7.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the SS_ADAE_EdgeLoadAnalytics API.

7.10.7.5.3 Application Errors

The application errors defined for SS_ADAE_EdgeLoadAnalytics API are listed in table 7.10.7.5.3-1.

Table 7.10.7.5.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.7.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.10.7.6-1 lists the supported features for SS_ADAE_EdgeLoadPatternAnalytics API.

Table 7.10.7.6-1: Supported Features

Feature number	Feature Name	Description

7.10.8 SS_AADRF_DataManagement API

7.10.8.1 API URI

The SS_AADRF_DataManagement service shall use the SS_AADRF_DataManagement API.

The request URIs used in HTTP requests from the ADAE server towards the A-ADRF shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName> shall be "ss-aadrf-datamanagement".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.10.8.2

7.10.8.2 Resources

7.10.8.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.8.2.1-1 depicts the resource URIs structure for the SS_AADRF_DataManagement API.

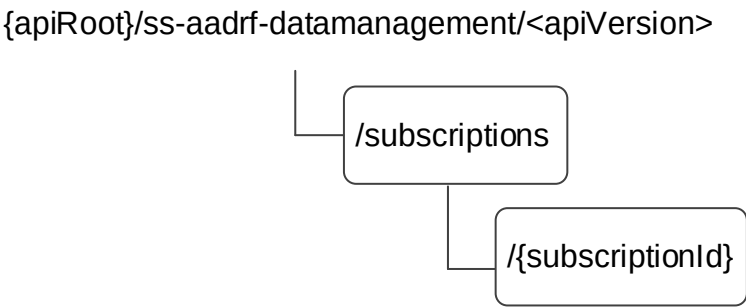


Figure 7.10.8.2.1-1: Resource URI structure of the SS_AADRF_DataManagement API

Table 7.10.8.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.8.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
A-ADRF Data Management Subscriptions	/subscriptions	POST	Creates a new Individual A-ADRF Data Management Subscription resource.
Individual A-ADRF Data Management Subscription	/subscriptions/{subscriptionId}	DELETE	Deletes an Individual A-ADRF Data Management Subscription identified by {subscriptionId}.

7.10.8.2.2 Resource: A-ADRF Data Management Subscriptions

7.10.8.2.2.1 Description

The A-ADRF Data Management Subscriptions resource represents all the subscriptions stored at A-ADRF. The resource allows an NF service consumer to create a new Individual A-ADRF Data Management Subscription resource.

7.10.8.2.2.2 Resource Definition

Resource URI: {apiRoot}/ss-aadrf-datamanagement/<apiVersion>/subscriptions

This resource shall support the resource URI variables defined in the table 7.10.8.2.2.2-1.

Table 7.10.8.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.

7.10.8.2.2.3 Resource Standard Methods

7.10.8.2.2.3.1 POST

This method shall support the URI query parameters specified in table 7.10.8.2.2.3.1-1.

Table 7.10.8.2.2.3.1-1: 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 7.10.8.2.2.3.1-2 and the response data structures and response codes specified in table 7.10.8.2.2.3.1-3.

Table 7.10.8.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DataManageSub	M	1	Create a new Individual A-ADRF Data Management Subscription resource.

Table 7.10.8.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataManageSub	M	1	201 Created	The creation of an Individual A-ADRF Data Management Subscription resource is confirmed and a representation of that resource is returned.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.8.2.3.1-4: 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}/ss-aadr-datanagement/<apiVersion>/subscriptions/{subscriptionId}

7.10.8.2.2.4 Resource Custom Operations

None in this release of the specification.

7.10.8.2.3 Resource: Individual A-ADRF Data Management Subscription

7.10.8.2.3.1 Description

The Individual A-ADRF Data Management Subscription resource represents a single subscription to the SS_AADRF_DataManagement Service at a given A-ADRF.

7.10.8.2.3.2 Resource definition

Resource URI: **{apiRoot}/ss-aadr-datanagement/<apiVersion>/subscriptions/{subscriptionId}**

The <apiVersion> shall be set as described in clause 7.10.8.2.3.2-1.

This resource shall support the resource URI variables defined in table 7.10.8.2.3.2-1.

Table 7.10.8.2.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.5.
subscriptionId	string	Identifies a subscription to the SS_AADRF_DataManagement Service.

7.10.8.2.3.3 Resource Standard Methods

7.10.8.2.3.3.1 DELETE

This method shall support the URI query parameters specified in table 7.10.8.2.3.3.1-1.

Table 7.10.8.2.3.3.1-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.8.2.3.3.1-2 and the response data structures and response codes specified in table 7.10.8.2.3.3.1-3.

Table 7.10.8.2.3.3.1-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.8.2.3.3.1-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case: The Individual A-ADRF Data Management Subscription resource matching the subscriptionId was deleted.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative A-ADRF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative A-ADRF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.8.2.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative A-ADRF.

Table 7.10.8.2.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server-ADRF.

7.10.8.2.3.4 Resource Custom Operations

None in this release of the specification.

7.10.8.3 Custom Operations without associated resources

7.10.8.3.1 Overview

The structure of the custom operation URIs of the SS_AADRF_DataManagement API is shown in Figure 7.10.8.3.1-1.

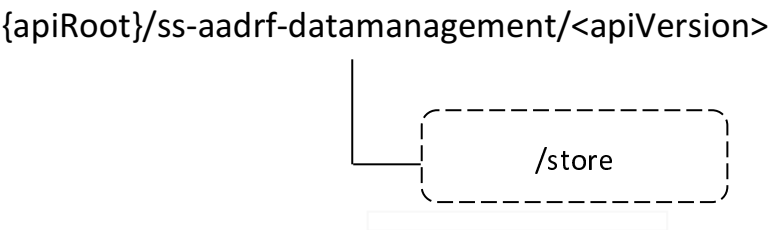


Figure 7.10.8.3.1-1: Custom operation URI structure of the SDD_Transmission API

Table 7.10.8.3.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the SS_ADRF_DataManagement API.

Table 7.10.8.3.1-1: Custom operations without associated resources

Custom operation name	Custom operation URI	Mapped HTTP method	Description
Store	/store	POST	Enables a service consumer to request data storage.

The custom operations shall support the URI variables defined in table 7.10.8.3.1-2.

Table 7.10.8.3.1-2: URI variables for this custom operation

Name	Data type	Definition
apiRoot	string	See clause 7.10.8.1.

7.10.8.3.2 Operation: Store

7.10.8.3.2.1 Description

The custom operation enables a service consumer to request the data storage at A-ADRF.

7.10.8.3.2.2 Operation Definition

This operation shall support the request data structures specified in table 7.10.8.3.2.2-1 and the response data structures and response codes specified in table 7.10.8.3.2.2-2.

Table 7.10.8.3.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DataStoreReq	M	1	Contains the parameters to request data storage.

Table 7.10.8.3.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataStoreResp	1	M	200 OK	Successful case. The data storage request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative A-ADRF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative A-ADRF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.8.3.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative A-ADRF.

Table 7.10.8.3.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative A-ADRF.

7.10.8.4 Notifications

7.10.8.4.1 General

Table 7.10.8.4.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Event Notification	{notifUri}	POST	Report the subscribed data.

7.10.8.4.2 Event Notification

7.10.8.4.2.1 Description

The Event Notification is used by the A-ADRF to report the subscribed data to an NF service consumer that has subscribed to such Notifications.

7.10.8.4.2.2 Notification definition

Callback URI: **{notifUri}**

The operation shall support the callback URI variables defined in Table 7.10.8.4.2.2-1, the request data structures specified in table 7.10.8.4.2.2-2 and the response data structure and response codes specified in Table 7.10.8.4.2.2-3.

Table 7.10.8.4.2.2-1: Callback URI variables

Name	Data type	Definition
notifUri	Uri	The Notification Uri is assigned within the Individual A-ADRF Data Management Subscription Resource and described within the DataManageSub type.

Table 7.10.8.4.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DataManageNotification	M	1	Provides information about the requested data.

Table 7.10.8.4.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The receipt of the Notification is acknowledged.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.8.4.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative notification destination towards which the notification is redirected.

Table 7.10.8.4.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative notification destination instance towards which the notification is redirected.

7.10.8.5 Data Model

7.10.8.5.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API

Table 7.10.8.5.1-1 specifies the data types defined specifically for the SS_AADRF_DataManagement API service.

Table 7.10.8.5.1-1: SS_AADRF_DataManagement API specific Data Types

Data type	Section defined	Description	Applicability
AdaeAnalyticsId	7.10.8.5.3.5	Represents the ADAE analytics identifier.	
AnalyticsMode	7.10.8.5.2.16	Represents the analytics mode.	
AadrEvent	7.10.8.5.3.1	Indicates the subscribed events.	
ApiLogInfo	7.10.8.5.2.7	Represents the API log data.	
ApiLogReq	7.10.8.5.2.5	Represents the API log request requirement.	
Data	7.10.8.5.2.11	Represent the data for storage at A-ADRF.	
DataManageNotification	7.10.8.5.2.6	Represents the notification to the consumer.	
DataManageSub	7.10.8.5.2.2	Represents the events subscription.	
DataProducerProfile	7.10.8.5.2.12	Represents the data producer profile.	
DataSourceInfo	7.10.8.5.2.13	Represents the data source information.	
DataStoreReq	7.10.8.5.2.9	Represents the data storage request.	
DataStoreResp	7.10.8.5.2.15	Represents the data storage response.	
DataStoreSub	7.10.8.5.2.10	Represents the requirements for subscription based data storage.	
DataType	7.10.8.5.3.3	Represents the type of data.	
EdgeInfo	7.10.8.5.2.8	Represents the EDGE related data.	
EdgeReq	7.10.8.5.2.4	Represents the EDGE data request requirement.	
EventSubscription	7.10.8.5.2.3	Represents the event subscription.	
ExposureLevel	7.10.8.5.3.2	Indicates the exposure level.	
Mode	7.10.8.5.3.4	Represents the supported modes of analytics.	
S2SAalyticsInfo	7.10.8.5.2.18	Represents the Server to Server Analytics related data.	EdgeApp_3
S2SAalyticsReq	7.10.8.5.2.17	Represents the Server to Server Analytics request requirements.	EdgeApp_3
StorageHandlingInfo	7.10.8.5.2.14	Represent the storage handling information.	
UERatAnalyticsInfo	7.10.8.5.2.20	Represents UE RAT Connectivity Analytics data.	5GSatApp_1
UERatAnalyticsReq	7.10.8.5.2.19	Represents UE RAT Connectivity Analytics requirements.	5GSatApp_1

Table 7.10.8.5.1-2 specifies data types re-used by the SS_AADRF_DataManagement API service.

Table 7.10.8.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
DateTime	3GPP TS 29.122 [3]	Represents data and time.	
Dnai	3GPP TS 29.571 [21]	Identifies a user plane access to one or more DN(s).	
Dnn	3GPP TS 29.571 [21]	Used to Identify a DNN.	
DurationSec	3GPP TS 29.122 [3]	Represents duration in seconds.	
Float	3GPP TS 29.571 [21]	Used to represent the fractional part of the proximity range in the reference UE details.	
LocationArea5G	3GPP TS 29.122 [3]	Represents the location information.	
S2SPerfAnalyticsData	Clause 7.10.14.6.2.5	Contains the Server to Server Analytics data.	EdgeApp_3
ServerInfo	Clause 7.10.14.6.2.6	Represents the Server Information.	EdgeApp_3
Snssai	3GPP TS 29.571 [21]	Used to Identify the S-NSSAI.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the applicability of optional features.	
TimeWindow	3GPP TS 29.122 [3]	Indicates the time window.	EdgeApp_3, 5GSatApp_1
UeRatAnalyticsOutput	Clause 7.10.12.6.2.8	Contains the UE RAT connectivity analytics output.	
UInteger	3GPP TS 29.571 [21]	Used to represent integer attributes within MeasurementData and ReportingRequirements data structures.	
Uri	3GPP TS 29.571 [21]	Used to indicate the notification URI.	
ValTargetUe	Clause 7.3.1.4.2.3	Used to indicate either VAL User ID or VAL UE ID.	
ValidityConditions	Clause 7.5.1.4.2.13	Represents the temporal and/or spatial conditions applied for the events to be monitored.	
ValUeAddrInfo	Clause 7.4.1.4.2.30	Represents VAL UE address information.	

7.10.8.5.2 Structured data types

7.10.8.5.2.1 Introduction

7.10.8.5.2.2 Type: DataManageSub

Table 7.10.8.5.2.2-1: Definition of type DataManageSub

Attribute name	Data type	P	Cardinality	Description	Applicability
eventSubscriptions	array(EventSubscription)	M	1..N	Subscribed events.	
notifUri	Uri	M	1	Identifies the recipient of Notifications sent by the A-ADRF.	
notifCorrId	string	O	0..1	Notification correlation identifier.	
supportedFeatures	SupportedFeatures	C	0..1	Contains list of supported feature(s) among the ones define in clause 7.10.8.7. This parameter shall be present only when feature negotiation needs to take place.	

7.10.8.5.2.3

Type: EventSubscription

Table 7.10.8.5.2.3-1: Definition of type EventSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
event	AadrEvent	M	1	The event that is subscribed.	
dataCollectReq	string	O	0..1	The requirements for data collection. (NOTE)	
dataProducerIds	array(string)	O	1..N	The list of Data Producer IDs.	
valUes	array(ValTargetUe)	O	1..N	The target VAL UE(s) identifiers.	
valServerId	string	O	0..1	Identifies the target VAL server for which the data collection subscription applies.	
valServiceId	string	O	0..1	The VAL service ID of the VAL application.	
profileCriteria	string	O	0..1	The characteristics of the data producers to be used. (NOTE)	
validConds	ValidityConditions	O	0..1	Represents the temporal and/or spatial conditions applied for the request.	
edgeReq	EdgeReq	O	0..1	The EDGE data collection requirement. This attribute may be present if the subscribed event is "EDGE_DATA".	
snssais	array(Snssai)	C	1..N	Identification(s) of network slice(s) to which the subscription applies. This attribute shall be present if the subscribed event is "NETWORK_SLICE".	
apiLogReq	ApiLogReq	O	0..1	The historical service API logs requirement. This attribute may be present if the subscribed event is "HISTORICAL_SERVICEAPI".	
s2sAnaReq	S2SAnalyticsReq	O	0..1	Contains the Server to Server Analytics request requirement. This attribute may be present if the subscribed event is "SERVER_TO_SERVER_ANALYTICS".	EdgeApp_3
ueRatAnaReq	UERatAnalyticsReq	O	0..1	Contains the UE RAT Connectivity analytics requirements. This attribute may be present if the subscribed event is "UE_RAT_ANALYTICS".	5GSatApp_1
NOTE: The format of this attribute is not specified in this release of the specification and is up to implementation.					

7.10.8.5.2.4

Type: EdgeReq

Table 7.10.8.5.2.4-1: Definition of type EdgeReq

Attribute name	Data type	P	Cardinality	Description	Applicability
dnais	array(Dnai)	C	1..N	Identifiers the DN Access Identifier representing location of the service flow. (NOTE)	
destEasId	string	C	0..1	Identifier for the destination EAS, for which the edge load analytics subscription or the edge load data collection subscription, is requested. (NOTE)	
destEesId	string	C	0..1	Identifier for the destination EES, for which the edge load analytics subscription or the edge load data collection subscription, is requested. (NOTE)	
dnns	array(Dnn)	C	1..N	Identifiers of the DNNs. (NOTE)	
NOTE: At least one of these attributes shall be present.					

7.10.8.5.2.5

Type: ApiLogReq

Table 7.10.8.5.2.5-1: Definition of type ApiLogReq

Attribute name	Data type	P	Cardinality	Description	Applicability
apiRequestorInfo	string	M	1	Identifier of the originated application querying service API log request.	
apild	string	O	0..1	String identifying the API invoked.	
apiName	string	O	0..1	Name of the API which was invoked, it is set as {apiName} part of the URI structure as defined in clause 5.2.4 of 3GPP TS 29.122 [3].	
apiVersion	string	O	0..1	Version of the API which was invoked.	
inputParameters	string	O	0..1	List of input parameters. (NOTE)	
result	string	O	0..1	For HTTP protocol, it contains HTTP status code of the invocation.	
apiInvokerId	string	O	0..1	Identity of the API invoker which invoked the service API.	
exposureLvl	ExposureLevel	O	0..1	The level of exposure requirement for the logs to be exposed.	
apiAggreInfo	string	O	0..1	The aggregation or abstraction/filtering requirement needs to be applied. (NOTE)	
NOTE: The content of "apiAggreInfo" and "inputParameters" attributes is not defined in this Release of the specification.					

7.10.8.5.2.6

Type: DataManageNotification

Table 7.10.1.4.2.6-1: Definition of type DataManageNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
event	AaddrfEvent	M	1	The event that is subscribed.	
notifCorrId	string	O	0..1	Notification correlation identifier.	
valServerId	string	C	0..1	Identifies the target VAL server for which the data collection subscription applies. This attribute shall be present if the subscribed event is "HISTORICAL_SERVICEAPI".	
valServiceId	string	O	0..1	The VAL service ID of the VAL application.	
valUeIds	array(ValTargetUe)	O	1..N	The target VAL UE(s) identifiers.	
locAccuracy	string	O	0..1	The requested location analytics/data. (NOTE)	
validConds	ValidityConditions	O	0..1	Represents the temporal and/or spatial conditions applied for the request.	
apiLogs	array(ApiLogInfo)	O	1..N	The API logs information. This attribute may be present if the subscribed event is "HISTORICAL_SERVICEAPI".	
rttDeviation	Float	O	0..1	Indicates the deviation value of RTT. This attribute may be present if the subscribed event is "NETWORK_SLICE".	
snssais	array(Snssai)	O	1..N	Identification(s) of network slice(s) to which the subscription applies. This attribute may be present if the subscribed event is "NETWORK_SLICE".	
edgeInfo	EdgeInfo	O	0..1	The EDGE related information. This attribute may be present if the subscribed event is "EDGE_DATA".	
s2SAnaResp	S2SAnalyticsInfo	O	0..1	Contains the Server to Server Analytics. This attribute may be present if the reported event within the "event" attribute is "SERVER_TO_SERVER_ANALYTICS".	EdgeApp_3
ueRatAnaInfo	UERatAnalyticsInfo	O	0..1	Contains UE RAT Connectivity Analytics information. This attribute may be present for the event "UE_RAT_ANALYTICS".	5GSatApp_1
NOTE: The format of this attribute is not specified in this release of the specification and it is up to the implementation.					

7.10.8.5.2.7

Type: ApiLogInfo

Table 7.10.1.4.2.7-1: Definition of type ApiLogInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
apild	string	M	1	String identifying the API invoked.	
apiName	string	O	0..1	Name of the API which was invoked, it is set as {apiName} part of the URI structure as defined in clause 5.2.4 of 3GPP TS 29.122 [3].	
failNum	UInteger	O	0..1	Indicates the number of failure API invocations.	
apiAvailableInd	boolean	O	0..1	Indicates the API availability. Set to "true" to indicate that the API is available. Default value is "false" if omitted.	
apiVerChgNum	UInteger	O	0..1	Indicates the number of API version changes.	
apiLocChg	boolean	O	0..1	Indicates the API location changes for the target API. Set to "true" to indicate that the API location has changed. Default value is "false" if omitted.	
apiThrottlingEvents	string	O	0..1	Indicates the API throttling events. (NOTE)	
invokeNum	UInteger	O	0..1	Indicates the number of API invocations.	
apiVersion	string	O	0..1	Version of the API which was invoked.	
NOTE: The format of this attribute is not specified in this release of the specification and it is up to the implementation.					

7.10.8.5.2.8

Type: EdgeInfo

Table 7.10.8.5.2.8-1: Definition of type EdgeInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
edgeReq	EdgeReq	O	0..1	Indicates the DNAI, EAS and EES information which the data applies.	
output	string	O	0..1	The reported data. (NOTE)	
NOTE: The content of "output" attribute is not defined in this Release of the specification.					

7.10.8.5.2.9

Type: DataStoreReq

Table 7.10.8.5.2.9-1: Definition of type DataStoreReq

Attribute name	Data type	P	Cardinality	Description	Applicability
subDataStore	DataStoreSub	C	0..1	Represents the requirements for subscription based data storage. (NOTE)	
dirStorage	Data	C	0..1	Represent the data for direct storage at A-ADRF. (NOTE)	
storeHandl	StorageHandlingInfo	O	0..1	Represents the storage handling information.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the supported features of the API as defined in clause 7.10.8.6. This attribute shall only be present when feature negotiation is need.	
NOTE: Only one of these attributes shall be present.					

7.10.8.5.2.10 Type: DataStoreSub

Table 7.10.8.5.2.10-1: Definition of type DataStoreSub

Attribute name	Data type	P	Cardinality	Description	Applicability
dataProdId	string	O	0..1	Represents the data producer identifier (e.g. ADAE server, A-DCCF).	
analyticsId	string	C	0..1	Represents the analytics identifier. This attribute shall be provided if "dataProdId" is provided.	
analyticsType	AnalyticsType	C	0..1	Represents the analytics type. This attribute shall be provided if "dataProdId" is provided.	
analyticsMode	AnalyticsMode	C	0..1	Represents the analytics mode. This attribute shall be provided if "dataProdId" is provided.	
profiles	array(DataProducerProfile)	C	1..N	Represent the data producer profiles. This attribute shall be provided if "dataProdId" is provided.	
area	LocationArea5G	O	0..1	Represents the location information for the data producers subscription requests.	
duration	DurationSec	O	0..1	Represents the time validity for the data producers subscription requests.	

7.10.8.5.2.11 Type: Data

Table 7.10.8.5.2.11-1: Definition of type Data

Attribute name	Data type	P	Cardinality	Description	Applicability
dataType	DataType	M	1	Represents the type of data.	
content	Bytes	M	1	Represents the data that shall be stored.	
timestamp	DateTime	M	1	Represents the timestamp	
analyticsId	AdaeAnalyticsId	M	1	Represents the analytics identifier.	
analyticsType	AnalyticsType	M	1	Represents the analytics type.	
dataSource	DataSourceInfo	M	1	Represent the data source informaion.	

7.10.8.5.2.12 Type: DataProducerProfile

Table 7.10.8.5.2.12-1: Definition of type DataProducerProfile

Attribute name	Data type	P	Cardinality	Description	Applicability
profile	string	C	0..1	Represents the data profile information. (NOTE)	

NOTE: Only one of these attributes shall be present.

7.10.8.5.2.13 Type: DataSourceInfo

Table 7.10.8.5.2.13-1: Definition of type DataSourceInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
source	string	C	0..1	Represents the data source information. (NOTE)	

NOTE: Only one of these attributes shall be present.

7.10.8.5.2.14 Type: StorageHandlingInfo

Table 7.10.8.5.2.14-1: Definition of type StorageHandlingInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
lifetime	DurationSec	C	0..1	Indicates the lifetime of the provided data or analytics as a duration in seconds.	
delNotifUri	Uri	C	0..1	Represents notification URI for receiving deletion alerts. Its presence indicates that the consumer wants to receive deletion event notifications to the URI present in this attribute.	
NOTE: At least one of these attributes shall be present.					

7.10.8.5.2.15 Type: DataStoreResp

Table 7.10.8.5.2.15-1: Definition of type DataStoreResp

Attribute name	Data type	P	Cardinality	Description	Applicability
storeHandl	StorageHandlingInfo	M	1	Represents the storage handling information approved by the A-ADRF.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the supported features of the API as defined in clause 7.10.8.6. This attribute shall only be present when feature negotiation is need.	
NOTE: At least one of these attributes shall be present.					

7.10.8.5.2.16 Type: AnalyticsMode

Table 7.10.8.5.2.16-1: Definition of type AnalyticsMode

Attribute name	Data type	P	Cardinality	Description	Applicability
mode	Mode	M	1	Represents the mode of analytics.	
isMIEnab	boolean	C	0..1	Indicates the support of ML-enabled analytics. - Set to "true" to indicate the ML-enabled analytics. - Set to "false" otherwise. - Default: "false".	

7.10.8.5.2.17 Type: S2SAalyticsReq

Table 7.10.8.5.2.17-1: Definition of type S2SAalyticsReq

Attribute name	Data type	P	Cardinality	Description	Applicability
serverInfoList	array(ServerInfo)	M	1..N	Contains the list of the identifier(s) of the server(s) for which the analytics subscription applies.	
timeVal	TimeWindow	O	0..1	Contains the time interval within which the request applies.	

Editor's Note: FFS on contents of the S2SAalyticsReq data type.

7.10.8.5.2.18 Type: S2SAnalyticsInfo

Table 7.10.8.5.2.18-1: Definition of type S2SAnalyticsInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
dataOutput	S2SPerfAnalyticsData	M	1	Contains the Server to Server Performance Analytics data.	
serverInfoList	array(ServerInfo)	M	1..N	Contains the list of the identifier(s) of the server(s) for which the analytics report applies.	

7.10.8.5.2.19 Type: UERatAnalyticsReq

Table 7.10.8.5.2.19-1: Definition of type UERatAnalyticsReq

Attribute name	Data type	P	Cardinality	Description	Applicability
area	LocationArea5G	O	0..1	Contains the geographical or service area for which the subscription request applies.	
timeVal	TimeWindow	O	0..1	Contains the time validity of the request.	
valUeAddrInfo	array(ValUeAddrInfo)	M	0..N	Contains VAL UE address information.	

7.10.8.5.2.20 Type: UERatAnalyticsInfo

Table 7.10.8.5.2.20-1: Definition of type UERatAnalyticsInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsOut	array(UeRatAnalyticsOutput)	M	1..N	Contains the reported analytics for the UE RAT connectivity, which can be in form of offline stats/historical data for a specific VAL service or for particular UE(s) or group of UEs.	

7.10.8.5.3 Simple data types and enumerations

7.10.8.5.3.1 Enumeration: AadrEvent

Table 7.10.8.5.3.1-1: Enumeration AadrEvent

Enumeration value	Description	Applicability
HISTORICAL_SERVICEAPI	The event for historical service API logs.	
NETWORK_SLICE	The event for the network slice data.	
EDGE_DATA	The event for the EDGE related data.	
LOCATION_ACCURACY	The event for the location accuracy data.	
SERVER_TO_SERVER_ANALYTICS	The event for the Server to Server analytics data.	EdgeApp_3
UE_RAT_ANALYTICS	The event for the UE RAT Connectivity Analytics.	5GSatApp_1

NOTE: The A-ADRF is not required to support all the events simultaneously. The supported events negotiation between the consumer and A-ADRF depends on SLA.

7.10.8.5.3.2 Enumeration: ExposureLevel

Table 7.10.8.5.3.2-1: Enumeration ExposureLevel

Enumeration value	Description	Applicability
READ	The exposure level for the logs to be exposed is read.	
WRITE	The exposure level for the logs to be exposed is write.	
DELETE	The exposure level for the logs to be exposed is delete.	

7.10.8.5.3.3 Enumeration: DataType

Table 7.10.8.5.3.3-1: Enumeration DataType

Enumeration value	Description	Applicability
DATA	Indicates the data.	
ANALYTICS	Indicates the analytics.	

7.10.8.5.3.4 Enumeration: Mode

Table 7.10.8.5.3.4-1: Enumeration Mode

Enumeration value	Description	Applicability
ONLINE	Indicates the online analytics mode.	
OFFLINE	Indicates the offline analytics mode.	

7.10.8.5.3.5

Enumeration: AdaeAnalyticsId

Table 7.10.8.5.3.5-1: Enumeration AdaeAnalyticsId

Enumeration value	Description	Applicability
VAL_SERVER_PERF	Indicates that requested analytics is VAL server performance analytics.	
VAL_SESSION_PERF	Indicates that requested analytics is VAL session performance analytics.	
SLICE_PERFORMANCE_ANALYTICS	Indicates that requested analytics is slice performance analytics.	
UE_TO_UE_PERFORMANCE_ANALYTICS	Indicates that requested analytics is UE-to-UE performance analytics.	
LOCATION_ACCURACY_PREDICTION	Indicates that the requested analytics is location accuracy prediction.	
LOCATION_ACCURACY_SUSTAINABILITY	Indicates that the requested analytics is location accuracy sustainability.	
SERVICE_API_ANALYTICS	Indicates that the requested analytics is service API analytics.	
SLICE_USAGE_PATTERN_ANALYTICS	Indicated that the requested analytics is slice usage pattern analytics.	
EDGE_LOAD_ANALYTICS	Indicated that the requested analytics is edge load analytics.	
GROUP_ROUTE	Indicates that the requested analytics is UE group route analytics.	
GROUP_MEMBER_DEVIATION	Indicates that the requested analytics is UE group member deviation analytics.	
TARGET_WITH_OTHER_UES	Indicates that the requested analytics is collision detection between the sets of target and other VAL UEs within a location.	
ANY_UES_IN_LOC	Indicates that the requested analytics is collision detection between any VAL UEs within given location.	
APP_MEMBER_CAPABILITY_ANALYTICS	Indicates that the identifier of the Application layer AIML member capability analytics event.	
UE_RAT_CONNECTIVITY_ANALYTICS	Indicates that the requested analytics is UE RAT connectivity analytics event.	
SERVER_TO_SERVER_PERFORMANCE	Indicates that the requested analytics is Server-to-Server Performance Analytics.	

7.10.8.6 Error Handling

7.10.8.6.1 General

HTTP error handling shall be supported as specified in clause 6.7.

7.10.8.6.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_AADRF_DataManagement API.

7.10.8.6.3 Application Errors

The application errors defined for SS_AADRF_DataManagement API are listed in table 7.10.8.6.3-1.

Table 7.10.8.6.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.8.7 Feature negotiation

General feature negotiation procedures are defined in clause 6.8.

Table 7.10.8.7-1: Supported Features

Feature number	Feature Name	Description
1	EdgeApp_3	This feature indicates the support of the second set of enhancements to the Edge Applications functionalities. The following sub-functionalities are supported: - Support Server to Server Analytics data management.
2	5GSatApp_1	This feature indicates the support of the enablements to the SEAL ADAE layer to support satellite applications. Within this feature, the following enhancements are supported: - UE RAT Connectivity analytics data management.

7.10.9 SS_ADAE_LocationRelatedUeGroupAnalytics

7.10.9.1 Introduction

The SS_ADAE_LocationRelatedUeGroupAnalytics service shall use the SS_ADAE_LocationRelatedUeGroupAnalytics.

The API URI of the SS_ADAE_LocationRelatedUeGroupAnalytics API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-adae-lruga".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5.

NOTE: When 3GPP TS 29.122 [3] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.5, the ADAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.10.9.2 Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_ADAE_LocationRelatedUeGroupAnalytics API.

7.10.9.3 Resources

7.10.9.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.9.3.1-1 depicts the resource URIs structure for the SS_ADAE_LocationRelatedUeGroupAnalytics.

{apiRoot}/ss-adae-lurga/<apiVersion>

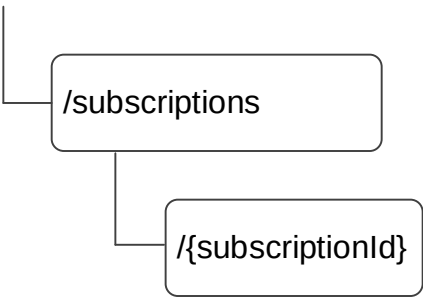


Figure 7.10.9.3.1-1: Resource URI structure of the SS_ADAE_LocationRelatedUeGroupAnalytics

Table 7.10.9.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.9.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Location-Related UE Group Analytics Subscriptions	/subscriptions	POST	Create an "Individual Location-Related UE Group Analytics Subscription" resource.
Individual Location-Related UE Group Analytics Subscription	/subscriptions/{subscriptionId}	GET	Read the "Individual Location-Related UE Group Analytics Subscription" resource.
		PUT	Update the "Individual Location-Related UE Group Analytics Subscription" resource.
		PATCH	Modify the "Individual Location-Related UE Group Analytics Subscription" resource.
		DELETE	Remove the "Individual Location-Related UE Group Analytics Subscription" resource.

7.10.9.3.2 Resource: Location-Related UE Group Analytics Subscriptions

7.10.9.3.2.1 Description

The Location-Related UE Group Analytics Subscriptions to the event of the location-related UE group analytics.

7.10.9.3.2.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-lurga/<apiVersion>/subscriptions

This resource shall support the resource URI variables defined in the table 7.10.9.3.2.2-1.

Table 7.10.9.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.9.3.2.3 Resource Standard Methods

7.10.9.3.2.3.1 POST

This method to subscribe to the event of the location-related UE group analytics and shall support the URI query parameters specified in table 7.10.9.3.2.3.1-1.

Table 7.10.9.3.2.3.1-1: 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 7.10.9.3.2.3.1-2 and the response data structures and response codes specified in table 7.10.9.3.2.3.1-3.

Table 7.10.9.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocRelUeGroupSubscription	M	1	Subscription to the location-related UE group analytics.

Table 7.10.9.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocRelUeGroupSub	M	1	201 Created	The "Individual Location-Related UE Group Analytics Subscription" resource is created.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.9.3.2.3.1-4: 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}/ss-adae-lruga/<apiVersion>/subscriptions/{subscriptionId}

7.10.9.3.2.4 Resource Custom Operations

None.

7.10.9.3.3 Resource: Individual Location-Related UE Group Analytics Subscription

7.10.9.3.3.1 Description

7.10.9.3.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-lruga/<apiVersion>/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 7.10.9.3.3.2-1.

Table 7.10.9.3.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.
subscriptionId	string	Represents the identifier of an "Individual Location-Related UE Group Analytics Subscription" resource.

7.10.9.3.3.3 Resource Standard Methods

7.10.9.3.3.3.1 GET

This operation reads the "Individual Location-Related UE Group Analytics Subscription" resource. This method shall support the URI query parameters specified in table 7.10.9.3.3.3.1-1.

Table 7.10.9.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.10.9.3.3.3.1-2 and the response data structures and response codes specified in table 7.10.9.3.3.3.1-3.

Table 7.10.9.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.9.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocRelUeGroupSubscription	M	1	200 OK	The requested "Individual Location-Related UE Group Analytics Subscription" resource is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.9.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

Table 7.10.9.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

7.10.9.3.3.3.2 DELETE

This operation deletes "Individual Location-Related UE Group Analytics Subscription" resource. This method shall support the URI query parameters specified in table 7.10.9.3.3.3.2-1.

Table 7.10.9.3.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.9.3.3.3.2-2 and the response data structures and response codes specified in table 7.10.9.3.3.3.2-3.

Table 7.10.9.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.9.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The "Individual Location-Related UE Group Analytics Subscription" resource matching the subscriptionId is deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.9.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.9.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

7.10.9.3.3.3.3 PUT

This method enables to update the "Individual Location-Related UE Group Analytics Subscription" resource.

This method shall support the URI query parameters specified in table 7.10.9.3.3.3.3-1.

Table 7.10.9.3.3.3.3-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.9.3.3.3.3-2 and the response data structures and response codes specified in table 7.10.9.3.3.3.3-3.

Table 7.10.9.3.3.3.3-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
LocRelUeGroupSub	M	1	Contains the updated representation of the "Individual Location-Related UE Group Analytics Subscription" resource.

Table 7.10.9.3.3.3.3-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocRelUeGroupSub	M	1	200 OK	Successful case. The "Individual Location-Related UE Group Analytics Subscription" resource is successfully updated, and the representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual Location-Related UE Group Analytics Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.9.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.9.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

7.10.9.3.3.3.4 PATCH

This method modifies the "Individual Location-Related UE Group Analytics Subscription" resource.

This method shall support the URI query parameters specified in table 7.10.9.3.3.3.4-1.

Table 7.10.9.3.3.4-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.9.3.3.4-2 and the response data structures and response codes specified in table 7.10.9.3.3.4-3.

Table 7.10.9.3.3.4-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
LocRelUeGroupSubscriptionPatch	M	1	Contains the modifications to be applied to the Individual Location-Related UE Group Analytics Subscription resource.

Table 7.10.9.3.3.4-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocRelUeGroupSubscription	M	1	200 OK	Successful case. The "Individual Location-Related UE Group Analytics Subscription" resource is successfully modified, and a representation of the updated resource is returned in the response.
n/a			204 No Content	Successful case. The "Individual Location-Related UE Group Analytics Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.9.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE server.

Table 7.10.9.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE server.

7.10.9.3.3.4 Resource Custom Operations

None.

7.10.9.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

7.10.9.5 Notifications

7.10.9.5.1 General

Notifications shall comply to clause 6.6.

Table 7.10.9.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Location-Related UE Group Analytics Notification	{notifUri}	POST	Notification on location-related UE group analytics.

7.10.9.5.2 Location-Related UE Group Analytics Notification

7.10.9.5.2.1 Description

Location-related UE group analytics notification is to notify on the event of location-related UE group analytics.

7.10.9.5.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the consumer during the subscription to the event.

Callback URI: {**notifUri**}

This method shall support the URI query parameters specified in table 7.10.9.5.2.2-1.

Table 7.10.9.5.2.2-1: 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 7.10.9.5.2.2-2 and the response data structures and response codes specified in table 7.10.9.5.2.2-3.

Table 7.10.9.5.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocRelUeGroup Notif	M	1	Notification information of location-related UE group analytics.

Table 7.10.9.5.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Notification for the location-related UE group analytics is accepted.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.9.5.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.9.5.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.9.6 Data Model

7.10.9.6.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.9.6.1-1 specifies the data types defined specifically for the SS_ADAE_LocationRelatedUeGroupAnalytics service.

Table 7.10.9.6.1-1: SS_ADAE_LocationRelatedUeGroupAnalytics specific Data Types

Data type	Section defined	Description	Applicability
AnalyticsIdLocGrp	7.10.9.6.3.3	Represents the analytic IDs for location related UE group analytics	
Deviation	7.10.9.6.2.12	Represents the deviation in VAL UE movement.	
LocDeviationTypeData	7.10.9.6.2.6	Represents the location-related UE group analytics deviation data.	
LocDeviationCriteria	7.10.9.6.2.7	Represents the location-related UE group analytics deviation criteria.	
LocRelUeGroupAnalytics	7.10.9.6.2.9	Represents the location-related UE group analytics output.	
LocRelUeGroupFilter	7.10.9.6.2.4	Represent the the location-related UE group analytics filtering information.	
LocRelUeGroupNotif	7.10.9.6.2.3	Represents the location-related UE group analytics notification.	
LocRelUeGroupSub	7.10.9.6.2.2	Represents the location-related UE group analytics subscription.	
LocRelUeGroupSubPatch	7.10.9.6.2.8	Represents the requested modifications to a the location-related UE group analytics subscription.	
LocDeviationCriterion	7.10.9.6.2.5	Represents the threshold for the location-related UE group analytics deviation.	
LocRelUeGroupAnalytics	7.10.9.6.2.10	Represents the UE group route analytics output.	
UeGroupMemberDevAnalytics	7.10.9.6.2.11	Represents the group member deviation analytics output.	

Table 7.10.9.6.1-2 specifies data types re-used by the SS_ADAE_LocationRelatedUeGroupAnalytics service:

Table 7.10.9.6.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Represents the type of analytics.	
AppGrpProfile	3GPP TS 29.558 [A]	Represents the application group profile.	
DurationSec	3GPP TS 29.122 [3]	Represents a period of time in units of seconds.	
Float	3GPP TS 29.571 [21]	Represents float attributes.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
MatchingDirection	3GPP TS 29.520 [33]	Indicates a threshold matching direction.	
Direction	Clause 7.10.10.6.2.10	Represents the direction.	
ReportingInformation	3GPP TS 29.523 [20]	Indicates the reporting requirements.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the supported optional features of the API.	
TimeWindow	3GPP TS 29.122 [3]	Indicates the time window.	
Uri	3GPP TS 29.122 [3]	Indicate the notification URI.	

7.10.9.6.2 Structured data types

7.10.9.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.9.6.2.2 Type: LocRelUeGroupSub

Table 7.10.9.6.2.2-1: Definition of type LocRelUeGroupSub

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsType	AnalyticsType	M	1	Represents the type of the location-related UE group analytics.	
analyticsId	AnalyticsIdLocGrp	O	0..1	Represents the analytics ID.	
analyticsFilt	LocRelUeGroup Filter	M	1	Represents the analytics filter information.	
confLevel	integer	C	0..1	Indicates the preferred accuracy level prediction. This attribute shall be provided if the "analyticsType" attribute in the request is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirements of the subscription.	
notifUri	Uri	M	1	Represents the notification URI.	
timeInterval	TimeWindow	O	0..1	The time interval as the start time and end time, to which the subscription is applied.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features. This attribute shall be present only if feature negotiation needs to take place.	

7.10.9.6.2.3 Type: LocRelUeGroupNotif

Table 7.10.9.6.2.3-1: Definition of type LocRelUeGroupNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsOutput	LocRelUeGroup Analytics	M	1	Represents the analytics output.	
timeValid	DurationSec	O	0..1	Represents the valid time duration of the analytics.	
confLevel	integer	C	0..1	Indicates the achieved confidence of the prediction. This attribute shall be provided if the "analyticsType" attribute in the request is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	

7.10.9.6.2.4 LocRelUeGroupFilter

Table 7.10.9.6.2.4-1: Definition of type LocRelUeGroupFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
groupId	string	C	0..1	Contains the identifier of the application group. (NOTE)	
valTrgUes	array(string)	C	1..N	Represents the list of VAL UEs, whose analytics are subscribed to. (NOTE)	
area	LocationArea5G	O	0..1	Represents the geographical or service area, to which the subscription is applied.	
profiles	array(AppGrpProfile)	O	1..N	Represents the application group profiles.	
deviation	array(LocDeviationCriteria)	O	1..N	Represents the deviation information.	
NOTE: Only one of these attributes shall be provided.					

7.10.9.6.2.5 Type: LocDeviationCriterion

Table 7.10.9.6.2.5-1: Definition of type LocDeviationCriterion

Attribute name	Data type	P	Cardinality	Description	Applicability
value	LocDeviationTypeData	M	1	Indicates the value for the analytics threshold.	
thrDirect	MatchingDirection	M	1	Indicates the threshold matching direction for the analytics threshold provided in the "value" attribute.	

7.10.9.6.2.6 Type: LocDeviationTypeData

Table 7.10.9.6.2.6-1: Definition of type LocDeviationTypeData

Attribute name	Data type	P	Cardinality	Description	Applicability
speed	Float	C	0..1	The speed in unit of meters per second. (NOTE)	
distance	Float	C	0..1	The distance in unit of meters. (NOTE)	
direction	Direction	C	0..1	The direction deviation. (NOTE)	
NOTE: Only one of these attributes shall be provided.					

7.10.9.6.2.7 Type: LocDeviationCriteria

Table 7.10.9.6.2.7-1: Definition of type LocDeviationCriteria

Attribute name	Data type	P	Cardinality	Description	Applicability
target	string	M	1	Represent the target VAL UE.	
criteria	array(LocDeviationCriterion)	M	1..N	Represent the deviation criteria.	

7.10.9.6.2.8 Type: LocRelUeGroupSubPatch

Table 7.10.9.6.2.8-1: Definition of type LocRelUeGroupSubPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsFilt	LocRelUeGroupFilter	O	0..1	Represents the analytics filter information.	
confLevel	integer	O	0..1	Indicates the preferred accuracy level prediction.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirements of the subscription.	
notifUri	Uri	O	0..1	Represents the notification URI.	
timeInterval	TimeWindow	O	0..1	The time interval as the start time and end time, to which the subscription is applied.	

7.10.9.6.2.9 Type: LocRelUeGroupAnalytics

Table 7.10.9.6.2.9-1: Definition of type LocRelUeGroupAnalytics

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsId	AnalyticsIdLocGrp	M	1	Represents the analytics ID.	
ueGroupRoute	array(UeGroupRouteAnalytics)	C	1..N	Represents the UE group route analytics. This attribute shall be present only if the "analyticsId" attribute is set to "GROUP_ROUTE".	
ueGrMemDev	array(UeGroupMemberDevAnalytics)	C	1..N	Represents the group member deviation analytics. This attribute shall be present only provided if the "analyticsId" attribute is set to "GROUP_MEMBER_DEVIATION".	

7.10.9.6.2.10 Type: UeGroupRouteAnalytics

Table 7.10.9.6.2.10-1: Definition of type UeGroupRouteAnalytics

Attribute name	Data type	P	Cardinality	Description	Applicability
easIds	array(string)	O	1..N	Represents the list of EAS identifier(s).	
routeId	string	M	1	Represents identifier of the common route for the UE(s) to EAS(s).	
valUes	array(string)	M	1..N	Represents the list of VAL UE ID(s) with the common route to the EAS(s).	

7.10.9.6.2.11 Type: UeGroupMemberDevAnalytics

Table 7.10.9.6.2.11-1: Definition of type UeGroupMemberDevAnalytics

Attribute name	Data type	P	Cardinality	Description	Applicability
groupId	string	M	1	Contains the identifier of the application group.	
refUe	string	O	0..1	Indicates the reference VAL UE that defines the correct UE behaviour.	
devUes	array(Deviation)	M	1..N	Represents the list of VAL UEs with different behaviour compared to majority group members in "groupId" attribute or the reference VAL UE.	

7.10.9.6.2.12 Type: Deviation

Table 7.10.9.6.2.12-1: Definition of type Deviation

Attribute name	Data type	P	Cardinality	Description	Applicability
target	string	M	1	Represent the deviating VAL UE.	
criteria	array(Loc Deviation Criterion)	M	1..N	Represent the deviation criteria.	
duration	DurationSec	O	0..1	Represent the deviation duration.	

7.10.9.6.3 Simple data types and enumerations

7.10.9.6.3.1 Introduction

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

7.10.9.6.3.2 Simple data types

The simple data types defined in table 7.10.9.6.3.2-1 shall be supported.

Table 7.10.9.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

7.10.9.6.3.3 Enumeration: AnalyticsIdLocGrp

The enumeration AnalyticsIdLocGrp represents the analytic IDs for location related UE group analytics. It shall comply with the provisions defined in table 7.10.9.6.3.3-1.

Table 7.10.9.6.3.3-1: Enumeration AnalyticsIdLocGrp

Enumeration value	Description	Applicability
GROUP_ROUTE	Indicates that the requested analytics is UE group route analytics.	
GROUP_MEMBER_DEVIATION	Indicates that the requested analytics is UE group member deviation analytics.	

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.10.9.6.5 Binary data

7.10.9.6.5.1 Binary Data Types

Table 7.10.9.6.5.1: Binary Data Types

Name	Clause defined	Content type

7.10.9.7 Error Handling

7.10.9.7.1 General

For the SS_ADAE_LocationRelatedUeGroupAnalytics API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses are applicable for the SS_ADAE_LocationRelatedUeGroupAnalytics API.

7.10.9.7.2 Protocol Errors

No specific protocol errors for the SS_ADAE_LocationRelatedUeGroupAnalytics API are specified.

7.10.9.7.3 Application Errors

The application errors defined for SS_ADAE_LocationRelatedUeGroupAnalytics are listed in table 7.10.9.7.3-1.

Table 7.10.9.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.9.8 Feature Negotiation

The optional features in table 7.10.9.8-1 are defined for the SS_ADAE_LocationRelatedUeGroupAnalytics API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.10.9.8-1: Supported Features

Feature number	Feature Name	Description

7.10.9.9 Security

The provisions of clause 9 shall apply for the SS_ADAE_LocationRelatedUeGroupAnalytics API.

7.10.10 SS_ADAE_CollisionDetectionAnalytics

7.10.10.1 Introduction

The ADAE Collision Detection Analytics service shall use the SS_ADAE_CollisionDetectionAnalytics.

The API URI of the SS_ADAE_CollisionDetectionAnalytics API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-adae-cda".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5.

NOTE: When 3GPP TS 29.122 [3] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.5, the ADAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.10.10.2 Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_ADAE_CollisionDetectionAnalytics API.

7.10.10.3 Resources

7.10.10.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.10.3.1-1 depicts the resource URIs structure for the SS_ADAE_CollisionDetectionAnalytics.

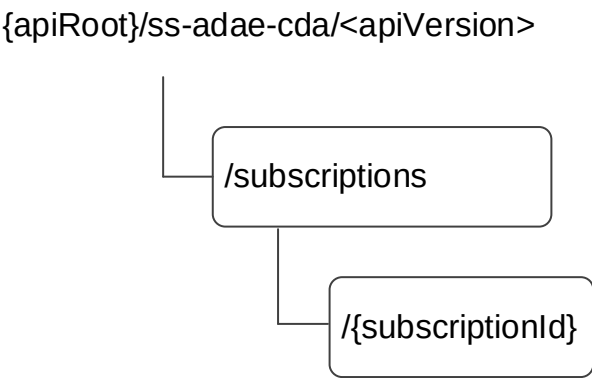


Figure 7.10.10.3.1-1: Resource URI structure of the SS_ADAE_CollisionDetectionAnalytics

Table 7.10.10.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.10.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Collision Detection Analytics Subscriptions	/subscriptions	POST	Create an "Individual Collision Detection Analytics Subscription" resource.
Individual Collision Detection Analytics Subscription	/subscriptions/{subscriptionId}	GET	Read the "Individual Collision Detection Analytics Subscription" resource.
		PUT	Update the "Individual Collision Detection Analytics Subscription" resource.
		PATCH	Modify the "Individual Collision Detection Analytics Subscription" resource.
		DELETE	Remove the "Individual Collision Detection Analytics Subscription" resource.

7.10.10.3.2 Resource: Collision Detection Analytics Subscriptions

7.10.10.3.2.1 Description

The "Collision Detection Analytics Subscriptions" resource collection represents the collision detection analytics subscriptions.

7.10.10.3.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-adae-cda/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in the table 7.10.10.3.2.2-1.

Table 7.10.10.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.10.3.2.3 Resource Standard Methods

7.10.10.3.2.3.1 POST

This method to subscribe to the event of the UE-to-UE session performance analytics and shall support the URI query parameters specified in table 7.10.10.3.2.3.1-1.

Table 7.10.10.3.2.3.1-1: 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 7.10.10.3.2.3.1-2 and the response data structures and response codes specified in table 7.10.10.3.2.3.1-3.

Table 7.10.10.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
CollisionDetectionSub	M	1	Subscription to the collision detection analytics.

Table 7.10.10.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
CollisionDetectionSub	M	1	201 Created	Subscription to the collision detection analytics is created.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.10.3.2.3.1-4: 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}/ss-adae-cda/<apiVersion>/subscriptions/{subscriptionId}

7.10.10.3.2.4 Resource Custom Operations

None.

7.10.10.3.3 Resource: Individual Collision Detection Analytics Subscription

7.10.10.3.3.1 Description

7.10.10.3.3.2 Resource Definition

Resource URI: {**apiRoot**}/ss-adae-cda/<**apiVersion**>/subscriptions/{**subscriptionId**}

This resource shall support the resource URI variables defined in table 7.10.10.3.3.2-1.

Table 7.10.10.3.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.
subscriptionId	string	Represents the identifier of an Individual Collision Detection Analytics Subscription.

7.10.10.3.3.3 Resource Standard Methods

7.10.10.3.3.3.1 GET

This operation reads the "Individual Collision Detection Analytics Subscription" resource. This method shall support the URI query parameters specified in table 7.10.10.3.3.3.1-1.

Table 7.10.10.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.10.10.3.3.3.1-2 and the response data structures and response codes specified in table 7.10.10.3.3.3.1-3.

Table 7.10.10.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.10.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
CollisionDetectionSub	M	1	200 OK	The requested "Individual Collision Detection Analytics Subscription" resource is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.10.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

Table 7.10.10.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

7.10.10.3.3.3.2 DELETE

This operation deletes the "Individual Collision Detection Analytics Subscription" resource. This method shall support the URI query parameters specified in table 7.10.10.3.3.3.2-1.

Table 7.10.10.3.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.10.3.3.3.2-2 and the response data structures and response codes specified in table 7.10.10.3.3.3.2-3.

Table 7.10.10.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.10.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The "Individual Collision Detection Analytics Subscription" resource matching the subscriptionId is deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.10.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.10.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative ADAE server.

7.10.10.3.3.3.3 PUT

This method enables to update the "Individual Collision Detection Analytics Subscription" resource.

This method shall support the URI query parameters specified in table 7.10.10.3.3.3-1.

Table 7.10.10.3.3.3-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.10.3.3.3-2 and the response data structures and response codes specified in table 7.10.10.3.3.3-3.

Table 7.10.10.3.3.3-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
CollisionDetectionSub	M	1	Contains the updated representation of the "Individual Collision Detection Analytics Subscription" resource.

Table 7.10.10.3.3.3-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
CollisionDetectionSub	M	1	200 OK	Successful case. The "Individual Collision Detection Analytics Subscription" resource is successfully updated, and the representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual Collision Detection Analytics Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.10.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.10.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

7.10.10.3.3.3.4 PATCH

This method modifies the "Individual Collision Detection Analytics Subscription" resource.

This method shall support the URI query parameters specified in table 7.10.10.3.3.3.4-1.

Table 7.10.10.3.3.3.4-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.10.3.3.3.4-2 and the response data structures and response codes specified in table 7.10.10.3.3.3.4-3.

Table 7.10.10.3.3.3.4-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
CollisionDetectionSubPatch	M	1	Contains the modifications to the "Individual Collision Detection Analytics Subscription" resource.

Table 7.10.10.3.3.4-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
CollisionDetectionSub	M	1	200 OK	Successful case. The "Individual Collision Detection Analytics Subscription" resource is successfully modified, and a representation of the updated resource is returned in the response.
n/a			204 No Content	Successful case. The "Individual Collision Detection Analytics Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.10.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE server.

Table 7.10.10.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE server.

7.10.10.3.3.4 Resource Custom Operations

None.

7.10.10.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

7.10.10.5 Notifications

7.10.10.5.1 General

Notifications shall comply to clause 6.6.

Table 7.10.10.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Collision Detection Analytics Notification	{notifUri}	POST	Notification on collision detection analytics.

7.10.10.5.2 Collision detection analytics Notification

7.10.10.5.2.1 Description

Collision detection analytics notification is to notify on the event of collision detection analytics.

7.10.10.5.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the consumer during the subscription to the event.

Callback URI: {**notifUri**}

This method shall support the URI query parameters specified in table 7.10.10.5.2.2-1.

Table 7.10.10.5.2.2-1: 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 7.10.10.5.2.2-2 and the response data structures and response codes specified in table 7.10.10.5.2.2-3.

Table 7.10.10.5.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
CollisionDetectionNotif	M	1	Notification information of collision detection analytics.

Table 7.10.10.5.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Notification for the collision detection analytics is accepted.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.10.5.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.10.5.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.10.6 Data Model

7.10.10.6.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.10.6.1-1 specifies the data types defined specifically for the SS_ADAE_CollisionDetectionAnalytics service.

Table 7.10.10.6.1-1: SS_ADAE_CollisionDetectionAnalytics specific Data Types

Data type	Section defined	Description	Applicability
Direction	7.10.10.6.2.10	Represents the direction.	
TargetToAnyUeLocAnalytics	7.10.10.6.2.9	Represents the output for collision detection analytics between any VAL UEs within given location.	
TargetToAnyUeLocFilter	7.10.10.6.2.7	Represent the analytics filter between any VAL UEs within the given location.	
CollisionDetectionFilter	7.10.10.6.2.4	Represent the the collision detection filtering information.	
CollisionDetectionNotif	7.10.10.6.2.3	Represents the collision detection analytics notification.	
CollisionDetectionSub	7.10.10.6.2.2	Represents the collision detection analytics subscription.	
CollisionDetectionSubPatch	7.10.10.6.2.11	Represents the requested modifications to a collision detection analytics subscription.	
CollisionDetectionCriteria	7.10.10.6.2.6	Represents the collision detection criteria.	
TargetOtherUesAnalytics	7.10.10.6.2.8	Represents the output for collision detection analytics between the sets of target VAL UEs and other VAL UEs.	
TargetOtherUesFilter	7.10.10.6.2.5	Represent the analytics filter between sets of target and other UEs within a location.	

Table 7.10.10.6.1-2 specifies data types re-used by the SS_ADAE_CollisionDetectionAnalytics service:

Table 7.10.10.6.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
Angle	3GPP TS 29.572 [31]	Represents the angle.	
AnalyticsType	Clause 7.10.1.4.2.6	Represents the type of analytics.	
DurationSec	3GPP TS 29.122 [3]	Represents a period of time in units of seconds.	
Float	3GPP TS 29.571 [21]	Represents float attributes.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
MatchingDirection	3GPP TS 29.520 [33]	Represents threshold matching direction.	
ReportingInformation	3GPP TS 29.523 [20]	Indicates the reporting requirements.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the supported optional features of the API.	
TimeWindow	3GPP TS 29.122 [3]	Indicate the time window.	
Uri	3GPP TS 29.122 [3]	Indicates the notification URI.	

7.10.10.6.2 Structured data types

7.10.10.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.10.6.2.2 Type: CollisionDetectionSub

Table 7.10.10.6.2.2-1: Definition of type CollisionDetectionSub

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsType	AnalyticsType	M	1	Represents the type of the collision detection analytics.	
analyticsId	AnalyticsIdCda	O	0..1	Represents the requested analytics ID.	
analyticsFilt	CollisionDetectionFilter	M	1	Represents the analytics filter information.	
colDetCriteria	CollisionDetectionCriteria	O	0..1	Represents the collision detection criteria.	
confLevel	integer	O	0..1	Indicates the preferred accuracy level prediction. This attribute shall be provided if the "analyticsType" attribute in the request is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirements of the subscription.	
notifUri	Uri	M	1	Represents the notification URI.	
timeInterval	TimeWindow	O	0..1	The time interval as the start time and end time, to which the subscription is applied.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features. This attribute shall be present only if feature negotiation needs to take place.	

7.10.10.6.2.3 Type: CollisionDetectionNotif

Table 7.10.10.6.2.3-1: Definition of type CollisionDetectionNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsId	AnalyticsIdCda	M	1	Represents the analytics ID.	
targetOther	array(TargetOtherUesAnalytics)	C	1..N	Represents the output for collision detection analytics between the sets of target VAL UEs and other VAL UEs. This attribute shall be present only if the "analyticsId" attribute is set to "TARGET_WITH_OTHER_UES".	
anyInLoc	array(TargetToAnyUeLocAnalytics)	C	1..N	Represents the output for collision detection analytics between any VAL UEs within given location. This attribute shall be present only if the "analyticsId" attribute is set to "ANY_UES_IN_LOC".	

7.10.10.6.2.4 CollisionDetectionFilter

Table 7.10.10.6.2.4-1: Definition of type CollisionDetectionFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
trgToOther	TargetOtherUesFilter	C	0..1	Represents the filter information for the collision detection between two sets of VAL UEs within the given area.	
targetToAnyUeLoc	TargetToAnyUeLocFilter	C	0..1	Represents the filter information for the collision detection between any VAL UEs within the given location.	
NOTE: Only one of these attributes shall be present.					

7.10.10.6.2.5 Type: TargetOtherUesFilter

Table 7.10.10.6.2.5-1: Definition of type TargetOtherUesFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
trgValServerId	string	O	0..1	Represents the target VAL Server ID for which the analytics subscription applies.	
targetUes	array(string)	M	1..N	Represent the list of VAL UEs, whose analytics are subscribed to.	
otherUes	array(string)	O	1..N	Represent the list of any VAL UEs collision with that shall be analysed.	
area	LocationArea5G	O	0..1	Represents the geographical or service area, to which the subscription is applied.	

7.10.10.6.2.6 Type: CollisionDetectionCriteria

Table 7.10.10.6.2.6-1: Definition of type CollisionDetectionCriteria

Attribute name	Data type	P	Cardinality	Description	Applicability
distance	Float	C	0..1	The distance in unit of meters. The collision is detected when the distance is less than given value within this attribute. (NOTE)	
NOTE: At least one of these attributes shall be provided.					

7.10.10.6.2.7 Type: TargetToAnyUeLocFilter

Table 7.10.10.6.2.7-1: Definition of type TargetToAnyUeLocFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
trgValServerId	string	O	0..1	Represents the target VAL Server ID for which the analytics subscription applies.	
area	LocationArea5G	M	1	Represents the geographical or service area, where the collision between any VAL UEs is requested to be detected.	

7.10.10.6.2.8 Type: TargetOtherUesAnalytics

Table 7.10.10.6.2.8-1: Definition of type TargetOtherUesAnalytics

Attribute name	Data type	P	Cardinality	Description	Applicability
targetUe	string	M	1	Represents the target VAL UE.	
otherUe	string	M	1	Represents the other VAL UE.	
colTime	DateTime	M	1	Represents the time of potential collision.	
location	LocationArea5G	M	1	Represents the location of potential collision.	
targetUeVel	Float	O	0..1	Represents the velocity of the target UE in units of meters per second.	
otherUeVel	Float	O	0..1	Represents the velocity of the other UE in units of meters per second.	
targetUeDir	Direction	O	0..1	Represents the direction of the target UE.	
otherUeDir	Direction	O	0..1	Represents the direction of the other UE.	
confLevel	integer	O	0..1	Indicates the achieved confidence of the prediction. Minimum = 0. Maximum = 100.	

7.10.10.6.2.9 Type: TargetToAnyUeLocAnalytics

Table 7.10.10.6.2.9-1: Definition of type TargetToAnyUeLocAnalytics

Attribute name	Data type	P	Cardinality	Description	Applicability
ues	array(string)	M	2..2	Represents the colliding VAL UEs.	
colTime	DateTime	M	1	Represents the time of potential collision between VAL UEs.	
location	LocationArea5G	M	1	Represents the location of potential collision between VAL UEs.	
confLevel	integer	O	0..1	Indicates the achieved confidence of the prediction. Minimum = 0. Maximum = 100.	

7.10.10.6.2.10 Type: Direction

Table 7.10.10.6.2.10-1: Definition of type Direction

Attribute name	Data type	P	Cardinality	Description	Applicability
azimuthDirection	Angle	M	0..1	Identifies the azimuth direction.	
elevationDirection	Angle	M	0..1	Identifies the elevation direction.	

7.10.10.6.2.11 Type: CollisionDetectionSubPatch

Table 7.10.10.6.2.11-1: Definition of type CollisionDetectionSubPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsFilt	CollisionDetectionFilter	O	0..1	Represents the analytics filter information.	
colDetCriteria	CollisionDetectionCriteria	O	0..1	Represents the collision detection criteria.	
confLevel	integer	O	0..1	Indicates the preferred accuracy level prediction.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirements of the subscription.	
notifUri	Uri	O	0..1	Represents the notification URI.	
timeInterval	TimeWindow	O	0..1	The time interval as the start time and end time, to which the subscription is applied.	

7.10.10.6.3 Simple data types and enumerations

7.10.10.6.3.1 Introduction

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

7.10.10.6.3.2 Simple data types

The simple data types defined in table 7.10.10.6.3.2-1 shall be supported.

Table 7.10.10.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

7.10.10.6.3.3 Enumeration: AnalyticsIdCda

The enumeration AnalyticsIdCda represents the analytic IDs for Collision Detection Analytics. It shall comply with the provisions defined in table 7.10.10.6.3.3-1.

Table 7.10.10.6.3.3-1: Enumeration AnalyticsIdCda

Enumeration value	Description	Applicability
TARGET_WITH_OTHER_UES	Indicates that the requested analytics is collision detection between the sets of target and other VAL UEs within a location.	
ANY_UES_IN_LOC	Indicates that the requested analytics is collision detection between any VAL UEs within given location.	

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.10.10.6.5 Binary data

7.10.10.6.5.1 Binary Data Types

Table 7.10.10.6.5.1: Binary Data Types

Name	Clause defined	Content type

7.10.10.7 Error Handling

7.10.10.7.1 General

For the SS_ADAE_CollisionDetectionAnalytics API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses are applicable for the SS_ADAE_CollisionDetectionAnalytics API.

7.10.10.7.2 Protocol Errors

No specific protocol errors for the SS_ADAE_CollisionDetectionAnalytics API are specified.

7.10.10.7.3 Application Errors

The application errors defined for SS_ADAE_CollisionDetectionAnalytics are listed in table 7.10.10.7.3-1.

Table 7.10.10.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.10.8 Feature Negotiation

The optional features in table 7.10.10.8-1 are defined for the SS_ADAE_CollisionDetectionAnalytics API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.10.10.8-1: Supported Features

Feature number	Feature Name	Description

7.10.10.9 Security

The provisions of clause 9 shall apply for the SS_ADAE_CollisionDetectionAnalytics API.

7.10.11 SS_ADAE_AIMLMemberCapabilityAnalytics API

7.10.11.1 Introduction

The SS_ADAE_AIMLMemberCapabilityAnalytics service shall use the SS_ADAE_AIMLMemberCapabilityAnalytics API.

The API URI of the SS_ADAE_AIMLMemberCapabilityAnalytics Service API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-adae-aimlmca".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clauses 7.10.11.3 and 7.10.11.3A.

NOTE: When 3GPP TS 29.122 [3] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 7.10.11, the ADAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.10.11.2 Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_ADAE_AIMLMemberCapabilityAnalytics API.

7.10.11.3 Resources

7.10.11.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.11.3.1-1 depicts the resource URIs structure for the SS_ADAE_AIMLMemberCapabilityAnalytics API.

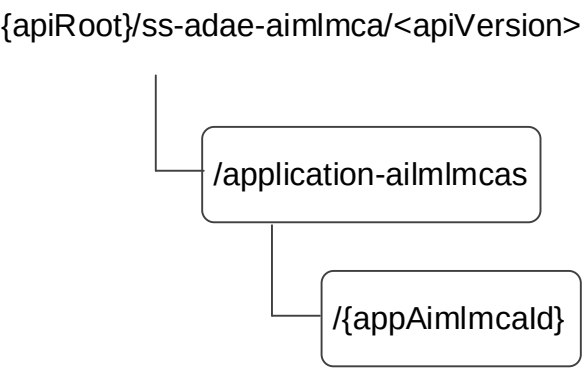


Figure 7.10.11.3.1-1: Resource URI structure of the SS_ADAE_AIMLMemberCapabilityAnalytics API

Table 7.10.11.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.11.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
AIML Member Capability Analytics Subscriptions	/application-aimlmcas	POST	Request the creation of AIML Member Capability Analytics Subscription.
Individual AIML Member Capability Analytics Subscription	/application-aimlmcas/{appAimlmcald}	GET	Retrieve an existing "Individual AIML Member Capability Analytics Subscription" resource.
		PUT	Request the update of an existing "Individual AIML Member Capability Analytics Subscription" resource.
		PATCH	Request the modification of an existing "Individual AIML Member Capability Analytics Subscription" resource.
		DELETE	Delete an existing "Individual AIML Member Capability Analytics Subscription" resource.

7.10.11.3.2 Resource: AIML Member Capability Analytics Subscriptions

7.10.11.3.2.1 Description

The "AIML Member Capability Analytics Subscriptions" resource collection represents the AIML Member Capability Analytics Subscriptions.

7.10.11.3.2.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-aimlmca/<apiVersion>/application-aimlmcas

This resource shall support the resource URI variables defined in the table 7.10.11.3.2.2-1.

Table 7.10.11.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.11.3.2.3 Resource Standard Methods

7.10.11.3.2.3.1 POST

This method shall support the URI query parameters specified in table 7.10.11.3.2.3.1-1.

Table 7.10.11.3.2.3.1-1: 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 7.10.11.3.2.3.1-2 and the response data structures and response codes specified in table 7.10.11.3.2.3.1-3.

Table 7.10.11.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AppAimlMemCapSub	M	1	Subscription to the AIML member capability analytics.

Table 7.10.11.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AppAimlMemCapSub	M	1	201 Created	The subscription to the AIML member capability analytics is created.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.11.3.2.3.1-4: 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}/ss-adae-aimlmca/<apiVersion>/application-aimlmcas/{appAimlmcaId}

7.10.11.3.2.4 Resource Custom Operations

None.

7.10.11.3.3 Resource: Individual AIML Member Capability Analytics Subscription

7.10.11.3.3.1 Description

The Individual AIML member capability analytics subscription resource represents an individual event subscription of a service consumer to the AIML member capability analytics analytics of the ADAE server.

7.10.11.3.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-aimlmca/<apiVersion>/application-aimlmcas/{appAimlmcaId}

This resource shall support the resource URI variables defined in the table 7.10.11.3.3.2-1.

Table 7.10.11.3.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
appAimlmcald	string	Identifies an Individual Events Subscription

7.10.11.3.3.3 Resource Standard Methods

7.10.11.3.3.3.1 GET

This method shall support the URI query parameters specified in table 7.10.11.3.3.3.1-1.

Table 7.10.11.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.11.3.3.3.1-2 and the response data structures and response codes specified in table 7.10.11.3.3.3.1-3.

Table 7.10.11.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.11.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AppAimlMemCap Sub	M	1	200 OK	The requested "Individual AIML Member Capability Analytics Subscription" resource is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.11.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.11.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.11.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 7.10.11.3.3.3.2-1.

Table 7.10.11.3.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.11.3.3.3.2-2 and the response data structures and response codes specified in table 7.10.11.3.3.3.2-3.

Table 7.10.11.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.11.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The "Individual AIML Member Capability Analytics Subscription" resource matching the appAimlmcald is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.11.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

Table 7.10.11.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative server.

7.10.11.3.3.3.3 PUT

This method shall support the URI query parameters specified in table 7.10.11.3.3.3.3-1.

Table 7.10.11.3.3.3.3-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.11.3.3.3.3-2 and the response data structures and response codes specified in table 7.10.11.3.3.3.3-3.

Table 7.10.11.3.3.3-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
AppAimlMemCapSub	M	1	Represents the updated representation of "Individual AIML Member Capability Analytics Subscription" resource.

Table 7.10.11.3.3.3-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AppAimlMemCapSub	M	1	200 OK	Successful case. The "Individual AIML Member Capability Analytics Subscription" resource is updated successfully, and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual AIML Member Capability Analytics Subscription" resource is updated successfully, and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.11.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.11.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

7.10.11.3.3.4 PATCH

This method shall support the URI query parameters specified in table 7.10.11.3.3.4-1.

Table 7.10.11.3.3.4-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.11.3.3.4-2 and the response data structures and response codes specified in table 7.10.11.3.3.4-3.

Table 7.10.11.3.3.4-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
AppAimlMemCapSubPatch	M	1	Represents the requested modifications to the "Individual AIML Member Capability Analytics Subscription" resource.

Table 7.10.11.3.3.4-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AppAimlMemCapSub	M	1	200 OK	Successful case. The "Individual AIML Member Capability Analytics Subscription" resource is modified successfully, and a representation of the modified resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual AIML Member Capability Analytics Subscription" resource is modified successfully, and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.11.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.11.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

7.10.11.3.3.4 Resource Custom Operations

None.

7.10.11.3A Custom Operations without associated resources

There are no custom operations without associated resources in the present release of the document.

7.10.11.4 Notifications

7.10.11.4.1 General

Notifications shall comply to clause 6.6.

Table 7.10.11.4.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
AIML Member Capability Analytics Notification	{notifUri}	POST	Notification on AIML member capability analytics.

7.10.11.4.2 AIML Member Capability Analytics Notification

7.10.11.4.2.1 Description

AIML member capability analytics notification is to notify on the event of the AIML member capability analytics.

7.10.11.4.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the service consumer during the subscription to the event.

Callback URI: {**notifUri**}

This method shall support the URI query parameters specified in table 7.10.11.4.2.2-1.

Table 7.10.11.4.2.2-1: 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 7.10.11.4.2.2-2 and the response data structures and response codes specified in table 7.10.11.4.2.2-3.

Table 7.10.11.4.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AppAimlMemCapNotif	M	1	Notification information on AIML member capability analytics.

Table 7.10.11.4.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The notification for the AIML member capability analytics event is accepted.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.11.4.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.11.4.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.11.5 Data Model

7.10.11.5.1 General

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

Table 7.10.11.5.1-1 specifies the data types defined specifically for the SS_ADAE_AIMLMemberCapabilityAnalytics API service.

Table 7.10.11.5.1-1: SS_ADAE_AIMLMemberCapabilityAnalytics API specific Data Types

Data type	Section defined	Description	Applicability
AimlMemCapability	7.10.11.5.2.8	Represents AIML member capability information in the notification.	
AnalyticsOutput	7.10.11.5.2.7	Represents analytics output parameters in the notification.	
AppAimlMemCapAnalytics	7.10.11.5.3.3	Represents AIML member capability analytics event.	
AppAimlMemCapAnalyticsOutput	7.10.11.5.2.6	Represents analytics output information in the notification.	
AppAimlMemCapAnalyticsSub	7.10.11.5.2.5	Represents the information related to the analytics subscription.	
AppAimlMemCapAttributes	7.10.11.5.3.4	Represents AIML member capability attributes to be analyzed at the ADAE client.	
AppAimlMemCapNotif	7.10.11.5.2.3	Represent the AIML member capability analytics notification.	
AppAimlMemCapSub	7.10.11.5.2.2	Represents the AIML member capability analytics subscription details.	
AppAimlMemCapSubPatch	7.10.11.5.2.4	Represents the AIML member capability analytics analytics subscription patch details.	

Table 7.10.11.5.1-2 specifies data types re-used by the SS_ADAE_AIMLMemberCapabilityAnalytics API service:

Table 7.10.11.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Represents the type of analytics.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
ReportingInformation	3GPP TS 29.523 [20]	Used to indicate the reporting requirement, only the following information are applicable: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
ScheduledCommunicationTime	3GPP TS 29.122 [3]	Used to define the time frame.	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the supported features.	
TimeWindow	3GPP TS 29.122 [3]	Represents a time window.	
Uri	3GPP TS 29.122 [3]	Represents a URI.	

7.10.11.5.2 Structured data types

7.10.11.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.11.5.2.2 Type: AppAimlMemCapSub

Table 7.10.11.5.2.2-1: Definition of type AppAimlMemCapSub

Attribute name	Data type	P	Cardinality	Description	Applicability
notifUri	Uri	M	1	Represents the notification URI.	
analyticsId	AppAimlMemCapAnalytics	M	1	Represents the analytics ID.	
analyticsType	AnalyticsType	M	1	Represents the type of the AIML member capability analytics.	
analyticsSub	AppAimlMemCapAnalyticsSub	M	1	Contains the requested analytics details.	
confLevel	Integer	C	0..1	Indicates the preferred confidence level of the prediction. This attribute shall be provided if the "analyticsType" attribute in the request is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	
timeValidity	TimeWindow	O	0..1	Contains the time interval as the start and the end time, to which the AIML member capability analytics subscription is applied..	
repReq	ReportingInformation	O	0..1	Represents the reporting requirement of the AIML member capability analytics subscription.	
suppFeat	SupportedFeatures	C	0..1	Contains supported features information, used to negotiate the applicability of optional features. This attribute shall be present only if feature negotiation needs to take place.	

7.10.11.5.2.3 Type: Type: AppAimlMemCapNotif

Table 7.10.11.5.2.3-1: Definition of type AppAimlMemCapNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsOutput	AppAimlMemCapAnalyticsOutput	M	1	Represents the analytics output	
confLevel	integer	C	0..1	Indicates the achieved confidence level in the case of prediction. This attribute shall be provided if the "analyticsType" attribute in the request is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	

7.10.11.5.2.4 Type: AppAimlMemCapSubPatch

Table 7.10.11.5.2.4-1: Definition of type AppAimlMemCapSubPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsSub	AppAimlMemCapAnalyticsSub	O	0..1	Contains the requested analytics information to be modified.	
notifUri	Uri	O	0..1	Contains the notification URI.	
confLevel	integer	O	0..1	Indicates the preferred confidence level of the prediction.	
timeValidity	TimeWindow	O	0..1	Contains the time interval as the start and the end time, to which the AIML member capability analytics subscription is applied.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirement of the AIML member capability analytics subscription.	

7.10.11.5.2.5 Type: AppAimlMemCapAnalyticsSub

Table 7.10.11.5.2.5-1: Definition of type AppAimlMemCapAnalyticsSub

Attribute name	Data type	P	Cardinality	Description	Applicability
uelds	array(string)	C	1..N	Contains a list of identities of one or more VAL UEs whose AIML member capability analytics are subscribed to. (NOTE)	
aimlMemberIds	array(AimlMemberId)	C	1..N	Contains a list of identities of one or more AI/ML members whose AIML member capability analytics are subscribed to. (NOTE)	
aimlMemCapAttribute	AppAimlMemCapAttributes	M	1	Contains AIML member capability attributes to be analyzed at the ADAE client.	
area	LocationArea5G	O	0..1	Contains the geographical or service area to which the AIML member capability analytics subscription is applied.	
NOTE: Either "uelds" or "aimlMemberIds" shall be provided.					

7.10.11.5.2.6 Type: AppAimlMemCapAnalyticsOutput

Table 7.10.11.5.2.6-1: Definition of type AppAimlMemCapAnalyticsOutput

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsId	AppAimlMemCapAnalytics	M	1	Identity of the Analytics consumer, the data collection is related to, in the case of the notification is on the AIML member capability data collection.	
analyticsOutput	array(AnalyticsOutput)	C	1..N	A list of identities of one or more VAL UEs or AIML members, the data collection is related to, in the case of the notification is on the AIML member capability data collection. This attribute shall be present if the "analyticsId" attribute is set to "APP_MEMBER_CAPABILITY_ANALYTICS".	

7.10.11.5.2.7 Type: AnalyticsOutput

Table 7.10.11.5.2.7-1: Definition of type AnalyticsOutput

Attribute name	Data type	P	Cardinality	Description	Applicability
ueld	string	C	0..1	Represents the VAL ID for which the analytics output is applied.	
aimlMemberId	AimlMemberId	C	0..1	Represents the AIML member ID for which the analytics output is applied.	
timeValidity	TimeWindow	O	0..1	Contains the time window to which the analytics is applied to.	
aimlMemAvails	array(ScheduledCommunicationTime)	M	1..N	Contains the statistical or the predicted time window during which the AI/ML member is expected to be operational or down.	
aimlMemCap	AimlMemCapability	C	0..1	Contains the statistical or the predicted AIMLE member capability. This attribute shall be present only if the "AppAimlMemCapAttributes" attribute is set to "COMMUNICATION_CAPABILITY".	
NOTE: Either "ueld" or "aimlMemberId" shall be provided.					

7.10.11.5.2.8 Type: AimlMemCapability

Table 7.10.11.5.2.8-1: Definition of type AimlMemCapability

Attribute name	Data type	P	Cardinality	Description	Applicability
maxAimlMemConn	UInteger	C	0..1	Contains the statistical or the predicted maximum number of supported active connections.	
minAimlMemConn	UInteger	C	0..1	Contains the statistical or the predicted minimum number of supported active connections.	

7.10.11.5.3 Simple data types and enumerations

7.10.11.5.3.1 Introduction

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

7.10.11.5.3.2 Simple data types

The simple data types defined in table 7.10.11.5.3.2-1 shall be supported.

Table 7.10.11.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability
AimlMemberId	string	Represents unique identifier of a AIMLE Member.	

7.10.11.5.3.3 Enumeration: AppAimlMemCapAnalytics

The enumeration AppAimlMemCapAnalytics represents a analytics event. It shall comply with the provisions defined in table 6.1.6.3.3-1.

Table 7.10.11.5.3.3-1: Enumeration AppAimlMemCapAnalytics

Enumeration value	Description	Applicability
APP_MEMBER_CAPABILITY_ANALYTICS	Indicates that the identifier of the Application layer AIML member capability analytics event.	

7.10.11.5.3.4 Enumeration: AppAimlMemCapAttributes

The enumeration AppAimlMemCapAttributes represents the AIML member capability attributes to be analyzed at the ADAE client. It shall comply with the provisions defined in table 7.10.11.5.3.4-1.

Table 7.10.11.5.3.4-1: Enumeration AppAimlMemCapAttributes

Enumeration value	Description	Applicability
COMMUNICATION_CAPABILITY	Indicates that the requested attribute to be analyzed is communication capability.	

7.10.11.6 Error Handling

7.10.11.6.1 General

For the SS_ADAE_AIMLMemberCapabilityAnalytics API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply for the SS_ADAE_AIMLMemberCapabilityAnalytics API.

7.10.11.6.2 Protocol Errors

No specific protocol errors for the SS_ADAE_AIMLMemberCapabilityAnalytics API are specified.

7.10.11.6.3 Application Errors

The application errors defined for SS_ADAE_AIMLMemberCapabilityAnalytics API are listed in table 7.10.11.6.3-1.

Table 7.10.11.6.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.11.7 Feature Negotiation

The optional features in Table 7.10.11.7-1 are defined for the SS_ADAE_AIMLMemberCapabilityAnalytics API. They shall be negotiated using the extensibility mechanism defined in clause 6.8

Table 7.10.11.7-1: Supported Features

Feature number	Feature Name	Description

7.10.11.8 Security

The provisions of clause 9 shall apply for the SS_ADAE_AIMLMemberCapabilityAnalytics API.

7.10.12 SS_ADAE_UeRatConnectivityAnalytics API

7.10.12.1 Introduction

The SS_ADAE_UeRatConnectivityAnalytics service shall use the SS_ADAE_UeRatConnectivityAnalytics API.

The API URI of the SS_ADAE_UeRatConnectivityAnalytics API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-adae-uerat".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clauses 7.10.12.3 and 7.10.12.4.

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 7.10.12, the ADAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.10.12.2 Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_ADAE_UeRatConnectivityAnalytics API.

7.10.12.3 Resources

7.10.12.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.12.3.1-1 depicts the resource URIs structure for the SS_ADAE_UeRatConnectivityAnalytics API.

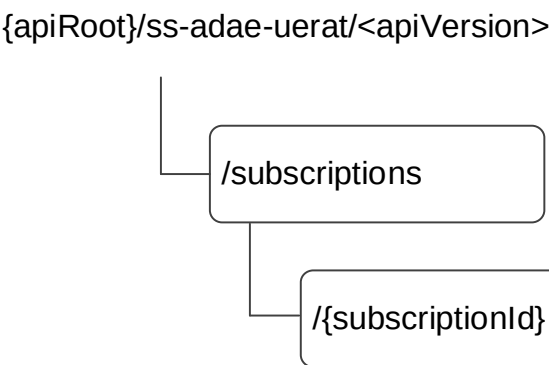


Figure 7.10.12.3.1-1: Resource URI structure of the SS_ADAE_UeRatConnectivityAnalytics API

Table 7.10.12.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.12.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
UE RAT Connectivity Analytics Subscriptions	/subscriptions	POST	Create a new UE RAT Connectivity Analytics Subscription.
Individual UE RAT Connectivity Analytics Subscription	/subscriptions/{subscriptionId}	GET	Retrieve an existing "Individual UE RAT Connectivity Analytics Subscription" resource.
		PUT	Update an existing "Individual UE RAT Connectivity Analytics Subscription" resource.
		PATCH	Modify an existing "Individual UE RAT Connectivity Analytics Subscription" resource.
		DELETE	Delete an existing "Individual UE RAT Connectivity Analytics Subscription" resource.

7.10.12.3.2 Resource: UE RAT Connectivity Analytics Subscriptions

7.10.12.3.2.1 Description

This resource represents the collection of UE RAT Connectivity Analytics Subscriptions managed by the ADAE Server.

7.10.12.3.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-adae-uerat/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in the table 7.10.12.3.2.2-1.

Table 7.10.12.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.10.12.1.

7.10.12.3.2.3 Resource Standard Methods

7.10.12.3.2.3.1 POST

The HTTP POST method enables a service consumer to request the creation of a new UE RAT Connectivity Analytics Subscription at the ADAE Server.

This method shall support the URI query parameters specified in table 7.10.12.3.2.3.1-1.

Table 7.10.12.3.2.3.1-1: 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 7.10.12.3.2.3.1-2 and the response data structures and response codes specified in table 7.10.12.3.2.3.1-3.

Table 7.10.12.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
UeRatConnectivitySub	M	1	Represents the parameters to request the creation of a UE RAT Connectivity Analytics Subscription.

Table 7.10.12.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UeRatConnectivitySub	M	1	201 Created	Successful case. The UE RAT Connectivity Analytics Subscription is successfully created and a representation of the created "Individual UE RAT Connectivity Analytics Subscription" resource shall be returned in the response body. An HTTP "Location" header that contains the URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.12.3.2.3.1-4: 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}/ss-adae- uerat/<apiVersion>/subscriptions/{subscriptionId}

7.10.12.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.10.12.3.3 Resource: Individual UE RAT Connectivity Analytics Subscription

7.10.12.3.3.1 Description

This resource represents an "Individual UE RAT Connectivity Analytics Subscription" resource managed by the ADAE Server.

7.10.12.3.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-uerat/<apiVersion>/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in the table 7.10.12.3.3.2-1.

Table 7.10.12.3.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.10.12.1.
subscriptionId	string	Represents the identifier of the "Individual UE RAT Connectivity Analytics Subscription" resource.

7.10.12.3.3.3 Resource Standard Methods

7.10.12.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual UE RAT Connectivity Analytics Subscription" resource at the ADAE Server.

This method shall support the URI query parameters specified in table 7.10.12.3.3.3.1-1.

Table 7.10.12.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.10.12.3.3.3.1-2 and the response data structures and response codes specified in table 7.10.12.3.3.3.1-3.

Table 7.10.12.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.12.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UeRatConnectivitySub	M	1	200 OK	Successful case. The requested "Individual UE RAT Connectivity Analytics Subscription" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.12.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.12.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

7.10.12.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual UE RAT Connectivity Analytics Subscription" resource at the ADAE Server.

This method shall support the URI query parameters specified in table 7.10.12.3.3.3.2-1.

Table 7.10.12.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.12.3.3.3.2-2 and the response data structures and response codes specified in table 7.10.12.3.3.3.2-3.

Table 7.10.12.3.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
UeRatConnectivitySub	M	1	Contains the updated representation of the "Individual UE RAT Connectivity Analytics Subscription" resource.

Table 7.10.12.3.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UeRatConnectivitySub	M	1	200 OK	Successful case. The "Individual UE RAT Connectivity Analytics Subscription" resource is successfully updated, and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual UE RAT Connectivity Analytics Subscription" resource is successfully updated, and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.12.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI of the resource located in an alternative ADAE Server.

Table 7.10.12.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI of the resource located in an alternative ADAE Server.

7.10.12.3.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual UE RAT Connectivity Analytics Subscription" resource at the ADAE Server.

This method shall support the URI query parameters specified in table 7.10.12.3.3.3.3-1.

Table 7.10.12.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.12.3.3.3.3-2 and the response data structures and response codes specified in table 7.10.12.3.3.3.3-3.

Table 7.10.12.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
UeRatConnectivitySubPatch	M	1	Contains the requested modifications to the "Individual UE RAT Connectivity Analytics Subscription" resource.

Table 7.10.12.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
UeRatConnectivitySub	M	1	200 OK	Successful case. The "Individual UE RAT Connectivity Analytics Subscription" resource is successfully modified and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual UE RAT Connectivity Analytics Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.12.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI of the resource located in an alternative ADAE Server.

Table 7.10.12.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI of the resource located in an alternative ADAE Server.

7.10.12.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual UE RAT Connectivity Analytics Subscription" resource at the ADAE Server.

This method shall support the URI query parameters specified in table 7.10.12.3.3.4-1.

Table 7.10.12.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.12.3.3.4-2 and the response data structures and response codes specified in table 7.10.12.3.3.4-3.

Table 7.10.12.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.12.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual UE RAT Connectivity Analytics Subscription" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.12.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI of the resource located in an alternative ADAE Server.

Table 7.10.12.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI of the resource located in an alternative ADAE Server.

7.10.12.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.10.12.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

7.10.12.5 Notifications

7.10.12.5.1 General

Notifications shall comply to clause 6.6.

Table 7.10.12.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
UE RAT Connectivity Analytics Notification	{notifUri}	POST	Enables the ADAE Server to notify a previously subscribed service consumer on UE RAT connectivity analytics related event(s).

7.10.12.5.2 UE RAT Connectivity Analytics Notification

7.10.12.5.2.1 Description

The UE RAT Connectivity Analytics Notification is used by the ADAE Server to to notify a previously subscribed service consumer on UE RAT connectivity analytics related event(s).

7.10.12.5.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 7.10.12.5.2.2-1.

Table 7.10.12.5.2.2-1: Callback URI variables

Name	Definition
notifUri	Represents the callback URI encoded as a string formatted as a URI.

7.10.12.5.2.3 Standard Methods

7.10.12.5.2.3.1 POST

This method shall support the URI query parameters specified in table 7.10.12.5.2.3.1-1.

Table 7.10.12.5.2.3.1-1: 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 7.10.12.5.2.3.1-2 and the response data structures and response codes specified in table 7.10.12.5.2.3.1-3.

Table 7.10.12.5.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
UeRatConnectivityNotif	M	1	Contains the UE RAT Connectivity Analytics Notification.

Table 7.10.12.5.2.3.1-3: 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 UE RAT Connectivity Analytics Notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.12.5.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 7.10.12.5.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

7.10.12.6 Data Model

7.10.12.6.1 General

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

Table 7.10.12.6.1-1 specifies the data types defined for the SS_ADAE_UeRatConnectivityAnalytics API.

Table 7.10.12.6.1-1: SS_ADAE_UeRatConnectivityAnalytics API specific Data Types

Data type	Section defined	Description	Applicability
AnalyticsIdUeRat	7.10.12.6.3.3	Represents the analytics ID for UE RAT connectivity.	
AreaPrediction	7.10.12.6.2.5	Represents the RAT type changes for a given way point.	
TimeWindowPrediction	7.10.12.6.2.6	Represents the RAT type changes for a given set of time period(s).	
UeRatAnalyticsSub	7.10.12.6.2.7	Represents the UE RAT Connectivity Analytics Subscription related information.	
UeRatAnalyticsOutput	7.10.12.6.2.8	Represents the UE RAT Connectivity Analytics output information.	
UeRatConnectivityNotif	7.10.12.6.2.4	Represents the UE RAT Connectivity Analytics Notification.	
UeRatConnectivitySub	7.10.12.6.2.2	Represents the UE RAT Connectivity Analytics Subscription.	
UeRatConnectivitySubPatch	7.10.12.6.2.3	Represents the requested modifications to a UE RAT Connectivity Analytics Subscription.	

Table 7.10.12.6.1-2 specifies data types re-used by the SS_ADAE_UeRatConnectivityAnalytics API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SS_ADAE_UeRatConnectivityAnalytics API.

Table 7.10.12.6.1-2: SS_ADAE_UeRatConnectivityAnalytics API Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Represents the type of analytics.	
LocationArea5G	3GPP TS 29.122 [3]	Represents the location information.	
RatType	3GPP TS 29.571 [21]	Represents the RAT type.	
ReportingInformation	3GPP TS 29.523 [20]	Represents the reporting requirements information.	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
TimeWindow	3GPP TS 29.122 [3]	Represents a time window.	
UeMobility	3GPP TS 29.520 [33]	Represents the UE Mobility and route information.	
Uri	3GPP TS 29.122 [3]	Represent a URI.	

7.10.12.6.2 Structured data types

7.10.12.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.12.6.2.2 Type: UeRatConnectivitySub

Table 7.10.12.6.2.2-1: Definition of type UeRatConnectivitySub

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsSubs	array(UeRatAnalyticsSub)	M	1..N	Contains the UE RAT connectivity analytics subscription details.	
notifUri	Uri	M	1	Contains the URI via which the notifications shall be delivered.	
reports	array(UeRatAnalyticsOutput)	C	1..N	Contains the UE RAT Connectivity report(s). This attribute shall be present only in the response to a UA RAT Connectivity Analytics Subscription Creation/Update request and only when immediate reporting was requested via the "reportingReqs" attribute and the report(s) are available.	
reportingReqs	ReportingInformation	O	0..1	Contains the reporting requirements of the subscription.	
timeInterval	TimeWindow	O	0..1	Contains the time interval within which the UE RAT Connectivity Analytics Subscription applies.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 7.10.12.8. This attribute shall be present only when feature negotiation is required.	

7.10.12.6.2.3 Type: UeRatConnectivitySubPatch

Table 7.10.12.6.2.3-1: Definition of type UeRatConnectivitySubPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsSubs	array(UeRatAnalyticsSub)	O	1..N	Contains the updated UE RAT connectivity analytics subscription details.	
notifUri	Uri	O	0..1	Contains the updated URI via which the notifications shall be delivered.	
reportingReqs	ReportingInformation	O	0..1	Contains the reporting requirements of the subscription.	
timeInterval	TimeWindow	O	0..1	Contains the updated time interval within which the UE RAT Connectivity Analytics Subscription applies.	

7.10.12.6.2.4 Type: UeRatConnectivityNotif

Table 7.10.12.6.2.4-1: Definition of type UeRatConnectivityNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriptionId	string	M	1	Contains the identifier of the UE RAT Connectivity Analytics Subscription to which the notification is related.	
analyticsOut	array(UeRatAnalyticsOutput)	M	1..N	Contains the UE RAT Connectivity Analytics output report(s).	

7.10.12.6.2.5 Type: AreaPrediction

Table 7.10.12.6.2.5-1: Definition of type AreaPrediction

Attribute name	Data type	P	Cardinality	Description	Applicability
satRatType	RatType	M	1	Contains the predicted or expected satellite RAT type.	
area	LocationArea5G	M	1	Contains the set of location co-ordinates or waypoints for which the analytics output is applicable.	
timePer	TimeWindow	O	0..1	Contains the time period within which the analytics apply.	
confLevel	integer	C	0..1	Contains the confidence level of the prediction. Minimum = 0. Maximum = 100. This attribute shall be present only if the "analyticsType" attribute within the corresponding UE RAT Connectivity Analytics Subscription is set to "PREDICTIVE".	

7.10.12.6.2.6 Type: TimeWindowPrediction

Table 7.10.12.6.2.6-1: Definition of type TimeWindowPrediction

Attribute name	Data type	P	Cardinality	Description	Applicability
satRatType	RatType	M	1	Contains the predicted or expected satellite RAT type.	
timePer	TimeWindow	M	0..1	Contains the time period within which the analytics output apply.	
confLevel	UInteger	C	0..1	Contains the confidence level of the prediction. Minimum = 0. Maximum = 100. This attribute shall be present only if the "analyticsType" attribute within the corresponding UE RAT Connectivity Analytics Subscription is set to "PREDICTIVE".	

7.10.12.6.2.7 Type: UeRatAnalyticsSub

Table 7.10.12.6.2.7-1: Definition of type UeRatAnalyticsSub

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsIds	array(AnalyticsId UeRat)	M	1..N	Contains the subscribed analytics ID(s).	
analyticsType	AnalyticsType	M	1	Contains the type of the UE RAT Connectivity Analytics subscription. In this release of the specification, the only applicable value for this attribute is "PREDICTIVE".	
valUelds	array(string)	C	1..N	Contains the list of the identifier(s) of the VAL UE(s) to which the subscription is related. (NOTE)	
valGroupId	string	C	0..1	Contains the identifier of the VAL group to which the subscription is related. (NOTE)	
ueMobs	map(UeMobility)	O	1..N	Contains the mobility and route information of the target VAL UE(s). The key of the map shall be set to the value of the identifier of the VAL UE (among either the ones provided within the "valUelds" attribute or the member(s) of the VAL group identified by the "valGroupId" attribute) to which the mobility and route information provided within the map value is related.	
valSvcId	string	O	0..1	Contains the identifier of the VAL service for which the subscription is related.	
confLevel	integer	O	0..1	Contains the preferred accuracy level for the UE RAT Connectivity Analytics in case of prediction. Minimum = 0. Maximum = 100.	
area	LocationArea5G	O	0..1	Contains the area within which the subscription applies.	
NOTE: These attributes are mutually exclusive and only one of them shall be present.					

7.10.12.6.2.8 Type: UeRatAnalyticsOutput

Table 7.10.12.6.2.8-1: Definition of type UeRatAnalyticsOutput

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsId	array(AnalyticsIdUeRat)	M	1..N	Contains the reported analytics ID(s).	
areaApp	AreaPrediction	C	0..1	Contains a predicted or expected RAT type changes for the given waypoints. (NOTE)	
timeApp	TimeWindowPrediction	C	0..1	Contains a predicted or expected RAT type changes for the given time period. (NOTE)	
valUeIds	array(string)	O	1..N	Contains the list of the identifier(s) of the VAL UE(s) to which the reported analytics output is related.	
valSvcId	string	O	0..1	Contains the identifier of the VAL service for which the the reported analytics output is related.	
NOTE: At least one of these attributes shall be present.					

7.10.12.6.3 Simple data types and enumerations

7.10.12.6.3.1 Introduction

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

7.10.12.6.3.2 Simple data types

The simple data types defined in table 7.10.12.6.3.2-1 shall be supported.

Table 7.10.12.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

7.10.12.6.3.3 Enumeration: AnalyticsIdUeRat

The enumeration AnalyticsIdUeRat represents the analytic ID for UE RAT Connectivity. It shall comply with the provisions defined in table 7.10.12.6.3.3-1.

Table 7.10.12.6.3.3-1: Enumeration AnalyticsIdUeRat

Enumeration value	Description	Applicability
UE_RAT_CONNECTIVITY_ANALYTICS	Indicates that the analytics ID for UE RAT Connectivity is UE RAT connectivity analytics.	

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

There are no data types describing alternative data types and combinations of data types in this release of the specification.

7.10.12.6.5.1 Binary Data Types

Table 7.10.12.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

7.10.12.7 Error Handling

7.10.12.7.1 General

For the SS_ADAE_UeRatConnectivityAnalytics API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses are applicable for the SS_ADAE_UeRatConnectivityAnalytics API.

7.10.12.7.2 Protocol Errors

No specific protocol errors for the SS_ADAE_UeRatConnectivityAnalytics API are specified.

7.10.12.7.3 Application Errors

The application errors defined for SS_ADAE_UeRatConnectivityAnalytics API are listed in table 7.10.12.7.3-1.

Table 7.10.12.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.12.8 Feature Negotiation

The optional features in table 7.10.12.8-1 are defined for the SS_ADAE_UeRatConnectivityAnalytics API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.10.12.8-1: Supported Features

Feature number	Feature Name	Description

7.10.12.9 Security

The provisions of clause 9 shall apply for the SS_ADAE_UeRatConnectivityAnalytics API.

7.10.13 SS_ADCCF_DataCollection

7.10.13.1 Introduction

The A-DCCF Data Collection service shall use the SS_ADCCF_DataCollection API.

The API URI of the SS_ADCCF_DataCollection API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-adccf-dc".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5.

NOTE: When 3GPP TS 29.122 [3] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.5, the A-DCCF takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.10.13.2 Usage of HTTP

The provisions of clause 6.3 shall apply for the SS_ADCCF_DataCollection API.

7.10.13.3 Resources

7.10.13.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.13.3.1-1 depicts the resource URIs structure for the SS_ADCCF_DataCollection.

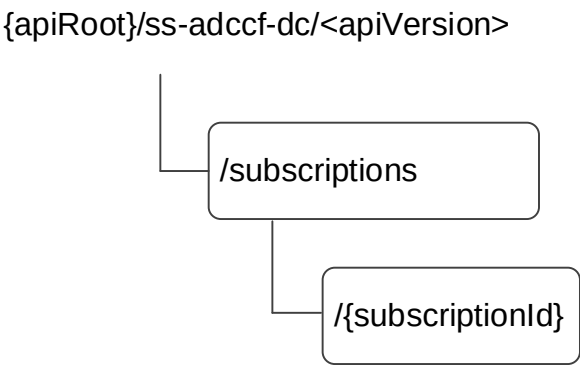


Figure 7.10.13.3.1-1: Resource URI structure of the SS_ADCCF_DataCollection

Table 7.10.13.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.13.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Data Collection Subscriptions	/subscriptions	POST	Create an "Individual Data Collection Subscription" resource.
Data Collection Subscription	/subscriptions/{subscriptionId}	GET	Read the "Individual Data Collection Subscription" resource.
		DELETE	Remove the "Individual Data Collection Subscription" resource.
		PUT	Update the "Individual Data Collection Subscription" resource.
		PATCH	Modify the "Individual Data Collection Subscription" resource.

7.10.13.3.2 Resource: Data Collection Subscriptions

7.10.13.3.2.1 Description

The Data Collection Subscriptions to the event of the location-related UE group analytics.

7.10.13.3.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-adccf-dc/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in the table 7.10.13.3.2.2-1.

Table 7.10.13.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.13.3.2.3 Resource Standard Methods

7.10.13.3.2.3.1 POST

This method to subscribe to the event of the location-related UE group analytics and shall support the URI query parameters specified in table 7.10.13.3.2.3.1-1.

Table 7.10.13.3.2.3.1-1: 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 7.10.13.3.2.3.1-2 and the response data structures and response codes specified in table 7.10.13.3.2.3.1-3.

Table 7.10.13.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DataCollectionSub	M	1	Subscription to the location-related UE group analytics.

Table 7.10.13.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataCollectionSub	M	1	201 Created	The "Individual Data Collection Subscription" resource is created.
DataCollectionResp	M	1	200 OK	The requested data collection response is returned.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.13.3.2.3.1-4: 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}/ss-adccf-dc/<apiVersion>/subscriptions/{subscriptionId}

7.10.13.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this API in this release of the specification.

7.10.13.3.3 Resource: Individual Data Collection Subscription

7.10.13.3.3.1 Description

7.10.13.3.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adccf-dc/<apiVersion>/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 7.10.13.3.3.2-1.

Table 7.10.13.3.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5.
subscriptionId	string	Represents the identifier of an "Individual Data Collection Subscription" resource.

7.10.13.3.3.3 Resource Standard Methods

7.10.13.3.3.3.1 GET

This operation reads the "Individual Data Collection Subscription" resource. This method shall support the URI query parameters specified in table 7.10.13.3.3.3.1-1.

Table 7.10.13.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.10.13.3.3.3.1-2 and the response data structures and response codes specified in table 7.10.13.3.3.3.1-3.

Table 7.10.13.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.13.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataCollectionSub	M	1	200 OK	The requested "Individual Data Collection Subscription" resource is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative A-DCCF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative A-DCCF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.13.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative A-DCCF.

Table 7.10.13.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative A-DCCF.

7.10.13.3.3.2 DELETE

This operation deletes "Individual Data Collection Subscription" resource. This method shall support the URI query parameters specified in table 7.10.13.3.3.2-1.

Table 7.10.13.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.13.3.3.2-2 and the response data structures and response codes specified in table 7.10.13.3.3.2-3.

Table 7.10.13.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.13.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The "Individual Data Collection Subscription" resource matching the subscriptionId is deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative A-DCCF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative A-DCCF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.10.13.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative A-DCCF.

Table 7.10.13.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative A-DCCF.

7.10.13.3.3.3 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual Data Collection Subscription" resource at the A-DCCF.

This method shall support the URI query parameters specified in table 7.10.13.3.3.3-1.

Table 7.10.13.3.3.3-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.13.3.3.3-2 and the response data structures and response codes specified in table 7.10.13.3.3.3-3.

Table 7.10.13.3.3.3-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
DataCollectionSub	M	1	Contains the updated representation of the "Individual Data Collection Subscription" resource.

Table 7.10.13.3.3.3-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataCollectionSub	M	1	200 OK	Successful case. The "Individual Data Collection Subscription" resource is successfully updated, and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual Data Collection Subscription" resource is successfully updated, and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative A-DCCF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative A-DCCF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.13.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI of the resource located in an alternative A-DCCF.

Table 7.10.13.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI of the resource located in an alternative A-DCCF.

7.10.13.3.3.4 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual Data Collection Subscription" resource at the A-DCCF.

This method shall support the URI query parameters specified in table 7.10.13.3.3.4-1.

Table 7.10.13.3.3.4-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.13.3.3.4-2 and the response data structures and response codes specified in table 7.10.13.3.3.4-3.

Table 7.10.13.3.3.4-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
DataCollectionSubPatch	M	1	Contains the requested modifications to the "Individual Data Collection Subscription" resource.

Table 7.10.13.3.3.4-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataCollectionSub	M	1	200 OK	Successful case. The "Individual Data Collection Subscription" resource is successfully modified and a representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual Data Collection Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative A-DCCF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative A-DCCF. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.13.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI of the resource located in an alternative A-DCCF.

Table 7.10.13.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI of the resource located in an alternative A-DCCF.

7.10.13.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this API in this release of the specification.

7.10.13.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

7.10.13.5 Notifications

7.10.13.5.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [2].

Table 7.10.13.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Data Collection Notification	{notifUri}	POST	Notification on location-related UE group analytics.

7.10.13.5.2 Data Collection Notification

7.10.13.5.2.1 Description

Data Collection Notification is to notify on the event of location-related UE group analytics.

7.10.13.5.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the consumer during the subscription to the event.

Callback URI: {**notifUri**}

This method shall support the URI query parameters specified in table 7.10.13.5.2.2-1.

Table 7.10.13.5.2.2-1: 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 7.10.13.5.2.2-2 and the response data structures and response codes specified in table 7.10.13.5.2.2-3.

Table 7.10.13.5.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DataCollectionNotification	M	1	Notification information of data collection events.

Table 7.10.13.5.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Notification for the data collection event is accepted.
n/a			307 Temporary Redirect	Temporary redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.13.5.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

Table 7.10.13.5.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative notification destination towards which the notification should be redirected.

7.10.13.6 Data Model

7.10.13.6.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.13.6.1-1 specifies the data types defined specifically for the SS_ADCCF_DataCollection service.

Table 7.10.13.6.1-1: SS_ADCCF_DataCollection specific Data Types

Data type	Section defined	Description	Applicability
AdccfDataType	7.10.13.6.2.6	Represents type of A-DCCF data.	
DataCollectionNotif	7.10.13.6.2.3	Represents the Data Collection Notification.	
DataCollectionReq	7.10.13.6.2.4	Represents the data collection requirements.	
DataCollectionResp	7.10.13.6.2.10	Represents the data collection response.	
DataCollectionSub	7.10.13.6.2.2	Represents the Data Collection Subscription.	
DataCollectionSubPatch	7.10.13.6.2.9	Represents the requested modifications to a Data Collection Subscription.	
DataOutput	7.10.13.6.2.8	Represents the A-DCCF data output.	
DataType	7.10.13.6.3.3	Represents the type of data.	
GranularityType	7.10.13.6.3.4	Represents the granularity type.	
ProcessingReq	7.10.13.6.2.5	Represents the data processing requirements.	
StorageRequirements	7.10.13.6.2.7	Represents the data storage requirements.	

Table 7.10.13.6.1-2 specifies data types re-used by the SS_ADCCF_DataCollection service:

Table 7.10.13.6.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Represents the type of analytics.	
DataProducerProfile	Clause 7.10.8.5.2.12	Represents the data producer profile.	
DurationSec	3GPP TS 29.122 [3]	Represents a period of time in units of seconds.	
DataFormat	3GPP TS 29.222 [16]	Represents the data format.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
ReportingInformation	3GPP TS 29.523 [20]	Represents the reporting requirements information.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the supported optional features of the API.	
Uri	3GPP TS 29.122 [3]	Indicate the notification URI.	

7.10.13.6.2 Structured data types

7.10.13.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.13.6.2.2 Type: DataCollectionSub

Table 7.10.13.6.2.2-1: Definition of type DataCollectionSub

Attribute name	Data type	P	Cardinality	Description	Applicability
dataColEvtId	string	M	1	Represents data collection event identifier.	
dataColReq	DataCollectionReq	M	1	Represents data collection requirements.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirements of the subscription.	
analyticsId	string	O	0..1	Represents the analytics ID.	
dataProdIds	array(string)	O	0..1	Represents list of data producer identifier(s).	
profiles	array(DataProducerProfile)	C	1..N	Represent the data producer profile criteria. This attribute shall be provided if "dataProdId" is provided.	
area	LocationArea5G	O	0..1	Represents the location information for the data producers subscription requests.	
duration	DurationSec	O	0..1	Represents the time validity for the data producers subscription requests.	
procReq	ProcessingReq	O	0..1	Represents the processing requirements.	
storageReqs	StorageRequirements	O	1..N	Represents the storage requirements.	
notifUri	Uri	M	1	Represents the notification URI.	
imReport	DataCollectionNotif	C	0..1	Represents the immediate report. This attribute shall be present only when immediate reporting was requested and there are available report(s).	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features. This attribute shall be present only if feature negotiation needs to take place.	

7.10.13.6.2.3 Type: DataCollectionNotif

Table 7.10.13.6.2.3-1: Definition of type DataCollectionNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
dataColEvtId	string	M	1	Represents data collection event identifier.	
analyticsId	string	O	0..1	Represents the analytics ID.	
analyticsType	AnalyticsType	O	0..1	Represents the analytics type.	
dataType	AdccfDataType	O	0..1	Represents the type of data	
dataOutput	DataOutput	M	1	Represents the data output.	
procReq	ProcessingReq	O	0..1	Represents the processing requirements.	
storageReqs	array(string)	O	1..N	Represents the list of A-ADRF ID(s) for data storage.	

7.10.13.6.2.4 DataCollectionReq

Table 7.10.13.6.2.4-1: Definition of type DataCollectionReq

Attribute name	Data type	P	Cardinality	Description	Applicability
dataFormat	DataFormat	M	1	Represents the data format.	
repFreq	DurationSec	M	1	Represents the reporting frequency.	
abstraction	integer	M	1	Represents the level of abstraction. Minimum = 0. Maximum = 100.	
accuracy	integer	M	1	Represents the level of accuracy. Minimum = 0. Maximum = 100.	

7.10.13.6.2.5 Type: ProcessingReq

Table 7.10.13.6.2.5-1: Definition of type ProcessingReq

Attribute name	Data type	P	Cardinality	Description	Applicability
req	string	C	0..1	Indicates the data processing requirements. (NOTE)	
NOTE: At least one of these attributes shall be provided.					

7.10.13.6.2.6 Type: AdccfDataType

Table 7.10.13.6.2.6-1: Definition of type AdccfDataType

Attribute name	Data type	P	Cardinality	Description	Applicability
type	DataType	C	0..1	Represents the type of data. (NOTE)	
gran	GranularityType	C	0..1	Represents the data granularity type. (NOTE)	
NOTE: These attributes are mutually exclusive and only one of them shall be present.					

7.10.13.6.2.7 Type: StorageRequirements

Table 7.10.13.6.2.7-1: Definition of type StorageRequirements

Attribute name	Data type	P	Cardinality	Description	Applicability
storageReqs	array(string)	M	1..N	Represents the list of A-ADRF ID(s) for data storage.	

7.10.13.6.2.8 Type: DataOutput

Table 7.10.13.6.2.8-1: Definition of type DataOutput

Attribute name	Data type	P	Cardinality	Description	Applicability
dataOutput	string	M	1	Represents the data output.	

7.10.13.6.2.9 Type: DataCollectionSubPatch

Table 7.10.13.6.2.9-1: Definition of type DataCollectionSubPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
dataColReq	DataCollectionReq	O	0..1	Represents data collection requirements.	
repReq	ReportingInformation	O	0..1	Represents the reporting requirements of the subscription.	
dataProdIds	array(string)	O	1..N	Represents list of data producer identifier(s).	
profiles	array(DataProducerProfile)	O	1..N	Represent the data producer profile criteria.	
duration	DurationSec	O	0..1	Represents the time validity for the data producers subscription requests.	
notifUri	Uri	O	0..1	Represents the notification URI.	

7.10.13.6.2.10 Type: DataCollectionResp

Table 7.10.13.6.2.10-1: Definition of type DataCollectionResp

Attribute name	Data type	P	Cardinality	Description	Applicability
reports	array(DataCollectionNotif)	M	1..N	Represents the data collection reports.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features. This attribute shall be present only if feature negotiation needs to take place.	

7.10.13.6.3 Simple data types and enumerations

7.10.13.6.3.1 Introduction

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

7.10.13.6.3.2 Simple data types

The simple data types defined in table 7.10.13.6.3.2-1 shall be supported.

Table 7.10.13.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

7.10.13.6.3.3 Enumeration: DataType

The enumeration DataType represents the types of data samples. It shall comply with the provisions defined in table 7.10.13.6.3.3-1.

Table 7.10.13.6.3.3-1: Enumeration DataType

Enumeration value	Description	Applicability
UE_DATA	Indicates that the data sample related to the UE data.	
NETWORK_DATA	Indicates that the data sample related to the network data.	
APP_DATA	Indicates that the data sample related to the application data.	
EDGE_DATA	Indicates that the data sample related to the edge data.	

7.10.13.6.3.4 Enumeration: GranularityType

The enumeration GranularityType represents the types of data granularity. It shall comply with the provisions defined in table 7.10.13.6.3.4-1.

Table 7.10.13.6.3.4-1: Enumeration GranularityType

Enumeration value	Description	Applicability
REAL_TIME	Indicates that the data granularity is real time.	
NON_REAL_TIME	Indicates that the data granularity is non-real time.	

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.10.13.6.5 Binary data

7.10.13.6.5.1 Binary Data Types

Table 7.10.13.6.5.1: Binary Data Types

Name	Clause defined	Content type

7.10.13.7 Error Handling

7.10.13.7.1 General

For the SS_ADCCF_DataCollection API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses are applicable for the SS_ADCCF_DataCollection API.

7.10.13.7.2 Protocol Errors

No specific protocol errors for the SS_ADCCF_DataCollection API are specified.

7.10.13.7.3 Application Errors

The application errors defined for SS_ADCCF_DataCollection are listed in table 7.10.13.7.3-1.

Table 7.10.13.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.13.8 Feature Negotiation

The optional features in table 7.10.13.8-1 are defined for the SS_ADCCF_DataCollection API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.10.13.8-1: Supported Features

Feature number	Feature Name	Description

7.10.13.9 Security

The provisions of clause 9 shall apply for the SS_ADCCF_DataCollection API.

7.10.15 SS_ADAE_DN_energy_analytics API

7.10.15.1 Introduction

The SS_ADAE_DN_energy_analytics service shall use the SS_ADAE_DN_energy_analytics API.

The API URI of the SS_ADAE_DN_energy_analytics API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-adae-dnea".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 7.10.15.3.

NOTE: When 3GPP TS 29.122 [3] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 5, the service producer (e.g. ADAE Server) takes the role of the SCEF and the service consumer (i.e. ADAE service consumer, e.g. VAL server) takes the role of the SCS/AS.

7.10.15.2 Usage of HTTP and common API related aspects

The provisions of clause 5.2.1 of 3GPP TS 29.122 [3] shall apply for the SS_ADAE_DN_energy_analytics API.

7.10.15.3 Resources

7.10.15.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.15.3.1-1 depicts the resource URIs structure for the SS_ADAE_DN_energy_analytics Service API.

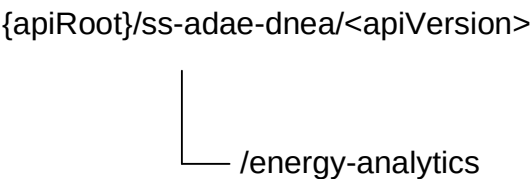


Figure 7.10.15.3.1-1: Resource URI structure of the SS_ADAE_DN_energy_analytics Service API

Table 7.10.15.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.15.3.1-1: Resources and methods overview

Resource purpose/name	Resource URI (relative path after API URI)	HTTP method or custom operation	Description (service operation)
ADAE DN Energy Analytics	/energy-analytics	GET	Request the ADAE DN Energy Analytics according to the filtering criteria.

7.10.15.3.2 Resource: ADAE DN Energy Analytics

7.10.15.3.2.1 Description

The "ADAE DN Energy Analytics" resource represents the ADAE DN Energy Analytics.

7.10.15.3.2.2 Resource Definition

Resource URI: **{apiRoot}/aimles-tlmsa/<apiVersion>/pre-trained-models**

This resource shall support the resource URI variables defined in the table 7.10.15.3.2.2-1.

Table 7.10.15.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5

7.10.15.3.2.3 Resource Standard Methods

7.10.15.3.2.3.1 GET

This method shall support the URI query parameters specified in table 7.10.15.3.2.3.1-1.

Table 7.10.15.3.2.3.1-1: URI query parameters supported by the GET method on this resource

Name		Data type	P	Cardinality	Description
filt-criteria		DNEnergyAnalytics	M	1	Represents the ADAE DN Energy Analytics filtering criteria.
supported-features		SupportedFeatures	C	0..1	Contains supported features information, used to negotiate the applicability of optional features. This query parameter shall be present only if feature negotiation needs to take place.

This method shall support the request data structures specified in table 7.10.15.3.2.3.1-2 and the response data structures and response codes specified in table 7.10.15.3.2.3.1-3.

Table 7.10.15.3.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.15.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DNEnergyAnalytics	M	1	200 OK	Successful case. The response body contains energy efficiently and consumption analytics.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.15.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.15.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

7.10.15.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.10.15.4 Custom Operations without associated resources

There are no custom operations without associated resources in the present release of the document.

7.10.15.5 Notifications

There are no notifications in the present release of the document.

7.10.15.6 Data Model

7.10.15.6.1 General

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

Table 7.10.15.6.1-1 specifies the data types defined for the SS_ADAE_DN_energy_analytics API.

Table 7.10.15.6.1-1: SS_ADAE_DN_energy_analytics API specific Data Types

Data type	Section defined	Description	Applicability
DNEnergyAnalytics	7.10.15.6.2.2	Represents the energy analytics for a DN.	
EnergyMetrics	7.10.15.6.2.3	Represents the metrics of the energy for a DN.	

Table 7.10.15.6.1-2 specifies data types re-used by the SS_ADAE_DN_energy_analytics API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SS_ADAE_DN_energy_analytics API.

Table 7.10.15.6.1-2: SS_ADAE_DN_energy_analytics API Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Identifies type of the analytics.	
Dnai	3GPP TS 29.571 [21]	Identifies a user plane access to one or more DN(s).	
Dnn	3GPP TS 29.571 [21]	Identifies a DNN.	
LocationArea	3GPP TS 29.122 [3]	Represents the user location area.	
TimeWindow	3GPP TS 29.122 [3]	Represents a time interval.	
ReportingRequirements	Clause 7.4.2.4.2.5	Identifies the requirements for the energy analytics reporting.	
UInteger	3GPP TS 29.571 [21]	Used to represent integer attributes within measurement data.	

7.10.15.6.2 Structured data types

7.10.15.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.15.6.2.2 Type: DNEnergyAnalytics

Table 7.10.15.6.2.2-1: Definition of type DNEnergyAnalytics

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsId	AnalyticsId	M	1	Represents the identity of the analytics event.	
analyticsType	AnalyticsType	M	1	Represents the type of the analytics event.	
dnai	Dnai	C	0..1	Represents the Data Network Access Identifier of user plane access to DN(s) which the subscription applies. (NOTE 1)	
dnn	Dnn	C	0..1	Represents the target DNN which the subscription applies. (NOTE 1)	
energyMetrics	EnergyMetrics	O	0..1	In the request, represents the necessary metrics for predicting the energy efficiency and consumption. In the response, represents the predicted metrics of the energy efficiency and consumption.	
profileCriteria	string	O	0..1	The characteristics of the data producers to be used. (NOTE)	
confLevel	integer	C	0..1	Indicates the preferred confidence level of the prediction. This attribute shall be provided if the "analyticsType" attribute in the request is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	
area	LocationArea	O	0..1	Represents the area of interest.	
timeVal	TimeWindow	O	0..1	Represents the time validity of the request.	
reportReqs	ReportingRequirements	O	0..1	Represents the reporting requirements.	
NOTE 1: At least one of the attributes, either "dnai" or "dnn", shall be present.					
NOTE 2: The format of this attribute is not specified in this release of the specification and is up to implementation.					

7.10.15.6.2.3 Type: EnergyMetrics

Table 7.10.15.6.2.3-1: Definition of type EnergyMetrics

Attribute name	Data type	P	Cardinality	Description	Applicability
powUseEffect	UInteger	O	0..1	Represents Power Usage Effectiveness (PUE) which measures the ratio of total facility energy consumption to the energy consumed by IT equipment.	
specEnergyCons	UInteger	O	0..1	Represents Specific Energy Consumption (SEC) which measures the energy consumed in kilowatt-hours (kWh).	

7.10.15.6.3 Simple data types and enumerations

7.10.15.6.3.1 Introduction

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

7.10.15.6.3.2 Simple data types

The simple data types defined in table 7.10.15.6.3.2-1 shall be supported.

Table 7.10.15.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

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

There are no data types describing alternative data types and combinations of data types in this release of the specification.

7.10.15.6.5 Binary data

There are no binary data defined in this release of the specification.

7.10.15.7 Error Handling

7.10.15.7.1 General

For the SS_ADAE_DN_energy_analytics API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses are applicable for the SS_ADAE_DN_energy_analytics API.

7.10.15.7.2 Protocol Errors

No specific procedures for the SS_ADAE_DN_energy_analytics API are specified.

7.10.15.7.3 Application Errors

The application errors defined for SS_ADAE_DN_energy_analytics API are listed in table 7.10.15.7.3-1.

Table 7.10.15.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.15.8 Feature Negotiation

The optional features in table 7.10.15.8-1 are defined for the SS_ADAE_DN_energy_analytics API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.10.15.8-1: Supported Features

Feature number	Feature Name	Description

7.10.15.9 Security

The provisions of clause 9 shall apply for the SS_ADAE_DN_energy_analytics API.

7.11 AIML Enablement APIs

AIML Enablement APIs are defined in 3GPP TS 29.482 [48].

7.10.14 SS_ADAE_ServerToServerPerformanceAnalytics API

7.10.14.1 Introduction

The ADAE Server to Server Performance Analytics service shall use the SS_ADAE_ServerToServerPerformanceAnalytics API.

The API URI of the SS_ADAE_ServerToServerPerformanceAnalytics API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-adae-sspa".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5.

NOTE: When 3GPP TS 29.122 [3] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.5, the ADAE Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.10.14.2 Usage of HTTP

The provisions of clause 6.3 of 3GPP TS 29.549 [15] shall apply for the SS_ADAE_ServerToServerPerformanceAnalytics API.

7.10.14.3 Resources

7.10.14.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.10.14.3.1-1 depicts the resource URIs structure for the SS_ADAE_ServerToServerPerformanceAnalytics.

{apiRoot}/ss-adae-sspa/<apiVersion>

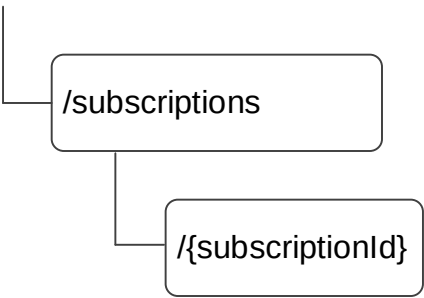


Figure 7.10.14.3.1-1: Resource URI structure of the SS_ADAE_ServerToServerPerformanceAnalytics

Table 7.10.14.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.10.14.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Server to Server Performance Analytics Subscriptions	/subscriptions	POST	Create an "Individual Server to Server Performance Analytics Subscription" resource.
Individual Server to Server Performance Analytics Subscription	/subscriptions/{subscriptionId}	GET	Retrieve the "Individual Server to Server Performance Analytics Subscription" resource.
		PUT	Update the "Individual Server to Server Performance Analytics Subscription" resource.
		PATCH	Modify the "Individual Server to Server Performance Analytics Subscription" resource.
		DELETE	Delete the "Individual Server to Server Performance Analytics Subscription" resource.

7.10.14.3.2 Resource: Server to Server Performance Analytics Subscriptions

7.10.14.3.2.1 Description

The "Server to Server Performance Analytics Subscriptions" resource collection represents Server to Server Performance analytics subscriptions.

7.10.14.3.2.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-sspa/<apiVersion>/subscriptions

This resource shall support the resource URI variables defined in the table 7.10.14.3.2.2-1.

Table 7.10.14.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.10.14.1.

7.10.14.3.2.3 Resource Standard Methods

7.10.14.3.2.3.1 POST

The HTTP POST method allows a service consumer to request the creation of a Server to Server Performance Analytics Subscription at the ADAE Server.

This method shall support the URI query parameters specified in table 7.10.14.3.2.3.1-1.

Table 7.10.14.3.2.3.1-1: 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 7.10.14.3.2.3.1-2 and the response data structure and response codes specified in table 7.10.14.3.2.3.1-3.

Table 7.10.14.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
S2SPerfSubsc	M	1	Contains the parameters to request the creation of a Server to Server Performance Analytics Subscription.

Table 7.10.14.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
S2SPerfSubsc	M	1	201 Created	Successful case. The Server to Server Performance Analytics Subscription is successfully created and a representation of the created "Individual Server to Server Performance Analytics Subscription" resource shall be returned. An HTTP "Location" header that contains the URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.14.3.2.3.1-4: 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}/ss-adae-sspa/<apiVersion>/subscriptions/{subscriptionId}

7.10.14.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.10.14.3.3 Resource: Individual Server to Server Performance Analytics Subscription

7.10.14.3.3.1 Description

7.10.14.3.3.2 Resource Definition

Resource URI: {apiRoot}/ss-adae-sspa/<apiVersion>/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 7.10.14.3.3.2-1.

Table 7.10.14.3.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.10.14.1.
subscriptionId	string	Represents the identifier of the "Individual Server to Server Performance Analytics Subscription" resource.

7.10.14.3.3.3 Resource Standard Methods

7.10.14.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual Server to Server Performance Analytics Subscription" resource at the ADAE Server.

This method shall support the URI query parameters specified in table 7.10.14.3.3.3.1-1.

Table 7.10.14.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 7.10.14.3.3.3.1-2 and the response data structures and response codes specified in table 7.10.14.3.3.3.1-3.

Table 7.10.14.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.14.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
S2SPerfSubsc	M	1	200 OK	Successful case. The requested "Individual Server to Server Performance Analytics Subscription" resource is returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.14.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE server.

Table 7.10.14.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE server.

7.10.14.3.3.2 PUT

This method enables to update an existing "Individual Server to Server Performance Analytics Subscription" resource at the ADAE Server.

This method shall support the URI query parameters specified in table 7.10.14.3.3.2-1.

Table 7.10.14.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.14.3.3.2-2 and the response data structures and response codes specified in table 7.10.14.3.3.2-3.

Table 7.10.14.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
S2SPerfSubsc	M	1	Contains the updated representation of the "Individual Server to Server Performance Analytics Subscription" resource.

Table 7.10.14.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
S2SPerfSubsc	M	1	200 OK	Successful case. The "Individual Server to Server Performance Analytics Subscription" resource is successfully updated, and the representation of the updated resource is returned in the response body.
n/a			204 No Content	Successful case. The "Individual Server to Server Performance Analytics Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.14.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.14.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

7.10.14.3.3.3 PATCH

This method modifies an existing "Individual Server to Server Performance Analytics Subscription" resource at the ADAE Server.

This method shall support the URI query parameters specified in table 7.10.14.3.3.3-1.

Table 7.10.14.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.14.3.3.3-2 and the response data structures and response codes specified in table 7.10.14.3.3.3-3.

Table 7.10.14.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
S2SPerfSubscPatch	M	1	Contains the requested modifications to the "Individual Server to Server Performance Analytics Subscription" resource.

Table 7.10.14.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
S2SPerfSubsc	M	1	200 OK	Successful case. The "Individual Server to Server Performance Analytics Subscription" resource is successfully modified, and a representation of the updated resource is returned in the response.
n/a			204 No Content	Successful case. The "Individual Server to Server Performance Analytics Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.14.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.14.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

7.10.14.3.3.4 DELETE

This method enables to delete an existing "Individual Server to Server Performance Analytics Subscription" resource at the ADAE Server.

This method shall support the URI query parameters specified in table 7.10.14.3.3.4-1.

Table 7.10.14.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.10.14.3.3.4-2 and the response data structures and response codes specified in table 7.10.14.3.3.4-3.

Table 7.10.14.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.10.14.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual Server to Server Performance Analytics Subscription" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ADAE Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.14.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

Table 7.10.14.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative ADAE Server.

7.10.14.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

7.10.14.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

7.10.14.5 Notifications

7.10.14.5.1 General

Table 7.10.14.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Server to Server Performance Analytics Notification	{notifUri}	POST	Enables the ADAE Server to notify a previously subscribed service consumer on Server to Server Performance Analytics related event(s).

7.10.14.5.2 Server to Server Performance analytics Notification

7.10.14.5.2.1 Description

Server to Server Performance Analytics Notification is used by the ADAE Server to notify a previously subscribed service consumer on Server to Server Performance Analytics related event(s).

7.10.14.5.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 7.10.14.5.2.2-1.

Table 7.10.14.5.2.2-1: Callback URI variables

Name	Data type	Definition
notifUri	Uri	Represents the callback URI encoded as a string formatted as a URI.

7.10.14.5.2.3 Standard Methods

The HTTP POST method shall be used for delivering the Server to Server Performance Analytics Notification.

This method shall support the URI query parameters specified in table 7.10.14.5.2.3-1.

Table 7.10.14.5.2.3-1: 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 7.10.14.5.2.3-2 and the response data structures and response codes specified in table 7.10.14.5.2.3-3.

Table 7.10.14.5.2.3-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
S2SPerfNotif	M	1	Contains the Server to Server Performance Analytics Notification.

Table 7.10.14.5.2.3-3: 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 Server to Server Performance Analytics Notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative notification destination towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.7.1-1 of 3GPP TS 29.122 [3] shall also apply.				

Table 7.10.14.5.2.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 7.10.14.5.2.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

7.10.14.6 Data Model

7.10.14.6.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.10.14.6.1-1 specifies the data types defined specifically for the SS_ADAE_Server2ServerPerformanceAnalytics service.

Table 7.10.14.6.1-1: SS_ADAE_Server2ServerPerformanceAnalytics specific Data Types

Data type	Clause defined	Description	Applicability
S2SPerfAnalyticsData	7.10.14.6.2.5	Represents the Server to Server Performance Analytics data.	
S2SPerfNotif	7.10.14.6.2.3	Represents the Server to Server Performance Analytics Notification.	
S2SPerfSubsc	7.10.14.6.2.2	Represents the Server to Server Performance Analytics Subscription.	
S2SPerfSubscPatch	7.10.14.6.2.4	Represents the requested modifications to a Server to Server Performance Analytics Subscription.	
AnalyticsIdSspa	7.10.14.6.3.3	Represents the Analytics ID for Server to Server Performance Analytics.	
ServerInfo	7.10.14.6.2.6	Represents the Server Information.	

Table 7.10.14.6.1-2 specifies data types re-used by the SS_ADAE_Server2ServerPerformanceAnalytics service:

Table 7.10.14.6.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
AnalyticsType	Clause 7.10.1.4.2.6	Represents the type of the analytics.	
IpAddr	3GPP TS 29.571 [8]	Represents an IP Address.	
LocationArea5G	3GPP TS 29.122 [3]	Represents location information.	
ReportingInformation	3GPP TS 29.523 [20]	Indicates the reporting requirements.	
SupportedFeatures	3GPP TS 29.571 [21]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
TimeWindow	3GPP TS 29.122 [3]	Indicate the time window.	
U2UAnalyticsData	7.10.3.4.2.6	Represents the UE-to-UE analytics data.	
Uri	3GPP TS 29.122 [3]	Indicates a URI.	

7.10.14.6.2 Structured data types

7.10.14.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.10.14.6.2.2 Type: S2SPerfSubsc

Table 7.10.14.6.2.2-1: Definition of type S2SPerfSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsIds	array(AnalyticsId Sspa)	O	1..N	Contains the requested analytics ID(s).	
analyticsType	AnalyticsType	M	1	Contains the type of the Server to Server Performance analytics.	
serverInfolist	array(ServerInfo)	M	1..N	Contains the list of the identifier(s) of the server for which the analytics subscription applies.	
valServId	string	O	0..1	Contains the identifier of the VAL service for which the subscription applies.	
repReq	ReportingInformation	O	0..1	Contains the reporting requirements of the subscription.	
area	LocationArea5G	O	0..1	Contains the area within which the subscription applies.	
confLevel	integer	O	0..1	Contains the preferred confidence level of the prediction. This attribute may be provided only if the "analyticsType" attribute in the request is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	
notifUri	Uri	M	1	Contains the notification URI.	
timeVal	TimeWindow	O	0..1	Contains the time validity within which the subscription applies.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 7.10.14.8. This attribute shall be present only when feature negotiation needs to take place.	

7.10.14.6.2.3 Type: S2SPerfNotif

Table 7.10.14.6.2.3-1: Definition of type S2SPerfNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
analyticsIds	array(AnalyticsId Sspa)	O	1..N	Contains the analytics ID(s).	
analyticsOutput	S2SPerfAnalyticsData)	C	0..1	Contains the Server-to-Server Performance Analytics data. This attribute shall be present only if one of the reported analytics IDs within the "analyticsId" attribute is "SERVER_TO_SERVER_PERFORMANCE".	
confLevel	integer	O	0..1	Indicates the achieved confidence level for prediction. This attribute may be provided only if the "analyticsType" attribute in the request is set to "PREDICTIVE". Minimum = 0. Maximum = 100.	

7.10.14.6.2.4 Type: S2SPerfSubscPatch

Table 7.10.14.6.2.4-1: Definition of type S2SPerfSubscPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
serverInfolist	array(ServerInfo)	O	1..N	Contains the list of the identifier(s) of the server for which the analytics subscription applies.	
valServId	string	O	0..1	Contains the identifier of the VAL service for which the subscription applies.	
repReq	ReportingInformation	O	0..1	Contains the reporting requirements of the subscription.	
area	LocationArea5G	O	0..1	Contains the area within which the subscription applies.	
confLevel	integer	O	0..1	Contains the preferred confidence level of the prediction.	
notifUri	Uri	O	0..1	Contains the notification URI.	
timeVal	TimeWindow	O	0..1	Contains the time interval within which the subscription applies.	

7.10.14.6.2.5 S2SPerfAnalyticsData

Table 7.10.14.6.2.5-1: Definition of type S2SPerfAnalyticsData

Attribute name	Data type	P	Cardinality	Description	Applicability
performChgInd	boolean	C	0..1	Indicates whether a server-to-server session performance has changed. When present, it shall be set as follows: - "true": the performance has changed. - "false": the performance is not changed. - Default value when omitted is "false".	
timHorizOverInd	boolean	C	0..1	Indicates whether a server-to-server session performance sustainability has over a given time horizon. When present, it shall be set as follows: - "true": the performance sustainability has over the given time horizon. - "false": the performance sustainability has not over the given time horizon. - Default value when omitted is "false".	
areaOverInd	boolean	C	0..1	Indicates whether a server-to-server session performance sustainability has over in a given area. When present, it shall be set as follows: - "true": the performance sustainability has over the given area. - "false": the performance sustainability has not over the given area. - Default value when omitted is "false".	
qoSMeasureRslt	U2UAnalyticsData	C	0..1	Represents the QoS measurement result for the Server to Server Performance between any VAL UEs within the given area.	
NOTE: At least one of these attributes shall be present.					

Editor's Note: The contents of the S2SPerfAnalyticsData data type is FFS.

7.10.14.6.2.6 Type: ServerInfo

Table 7.10.14.6.2.6-1: Definition of type ServerInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
serverId	string	C	0..1	Represents the lserver identifier for which the analytics subscription applies. (NOTE)	
serverIpAddList	array(lpAddr)	C	1..N	Represents the list of server IP Address(es) for which the analytics subscription applies. (NOTE)	
NOTE: At least one of the attributes shall be included.					

7.10.14.6.3 Simple data types and enumerations

7.10.14.6.3.1 Introduction

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

7.10.14.6.3.2 Simple data types

The simple data types defined in table 7.10.14.6.3.2-1 shall be supported.

Table 7.10.14.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

7.10.14.6.3.3 Enumeration: AnalyticsIdSspa

The enumeration AnalyticsIdSspa represents the analytic ID for Server-to-Server Performance Analytics. It shall comply with the provisions defined in table 7.10.14.6.3.3-1.

Table 7.10.14.6.3.3-1: Enumeration AnalyticsIdSspa

Enumeration value	Description	Applicability
SERVER_TO_SERVER_PERFORMANCE	Indicates that the requested analytics is Server-to-Server Performance Analytics.	

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

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

7.10.14.6.5 Binary data

7.10.14.6.5.1 Binary Data Types

Table 7.10.14.6.5.1: Binary Data Types

Name	Clause defined	Content type

7.10.14.7 Error Handling

7.10.14.7.1 General

For the SS_ADAE_Server2ServerPerformanceAnalytics API, error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses are applicable for the SS_ADAE_Server2ServerPerformanceAnalytics API.

7.10.14.7.2 Protocol Errors

No specific protocol errors for the SS_ADAE_Server2ServerPerformanceAnalytics API are specified.

7.10.14.7.3 Application Errors

The application errors defined for SS_ADAE_Server2ServerPerformanceAnalytics are listed in table 7.10.14.7.3-1.

Table 7.10.14.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.10.14.8 Feature Negotiation

The optional features in table 7.10.14.8-1 are defined for the SS_ADAE_Server2ServerPerformanceAnalytics API. They shall be negotiated using the extensibility mechanism defined in clause 6.8.

Table 7.10.14.8-1: Supported Features

Feature number	Feature Name	Description

7.10.14.9 Security

The provisions of clause 9 shall apply for the SS_ADAE_Server2ServerPerformanceAnalytics API.

7.12 Metaverse Enablement APIs

Spatial Anchor Server and Spatial Map Server APIs are defined in 3GPP TS 29.437 [49].

7.13 Digital Asset APIs

7.13.1 SS_DAProfileManagement Service API

7.13.1.1 Introduction

The SS_DAProfileManagement service shall use the SS_DAProfileManagement API.

The API URI of the SS_DAProfileManagement API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-da-pm".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5.

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 5, the DA server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.13.1.2 Usage of HTTP and common API related aspects

The provisions of clause 6.3 shall apply for the SS_DAProfileManagement API.

7.13.1.3 Resources

7.13.1.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.13.1.3.1-1 depicts the resource URIs structure for the SS_DAProfileManagement API.

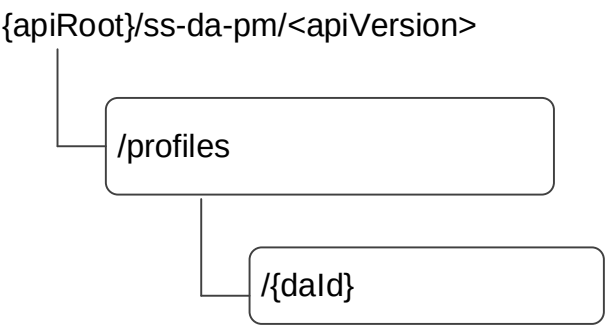


Figure 7.13.1.3.1-1: Resource URI structure of the SS_DAProfileManagement API

Table 7.13.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.13.1.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
DA Profiles	/profiles	POST	Create a new Individual DA profile.
Individual DA Profile	/profiles/{dald}	GET	Retrieves an Individual DA profile identified by {dald}.
		PUT	Updates an Individual DA profile {dald}.
		PATCH	Partially modifies an Individual DA profile {dald}.
		DELETE	Delete an Individual DA profile {dald}.

7.13.1.3.2 Resource: DA Profiles

7.13.1.3.2.1 Description

The resource allows the VAL server to request to create a new individual DA profile at the DA server.

7.13.1.3.2.2 Resource Definition

Resource URI: {apiRoot}/ss-da-pm/<apiVersion>/profiles

This resource shall support the resource URI variables defined in the table 7.13.1.3.2.2-1.

Table 7.13.1.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.13.1.1

7.13.1.3.2.3 Resource Standard Methods

7.13.1.3.2.3.1 POST

This method shall support the URI query parameters specified in table 7.13.1.3.2.3.1-1.

Table 7.13.1.3.2.3.1-1: 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 7.13.1.3.2.3.1-2 and the response data structures and response codes specified in table 7.13.1.3.2.3.1-3.

Table 7.13.1.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DigitalAssetProfile	M	1	Create DA profile

Table 7.13.1.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DigitalAssetProfile	M	1	201 Created	DA profile is created successfully.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.1.3.2.3.1-4: 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}/ss-dapm/<apiVersion>/profile/{daId}

7.13.1.3.2.4 Resource Custom Operations

None.

7.13.1.3.3 Resource: Individual DA profile

7.13.1.3.3.1 Description

The resource represents an individual DA Profile that is created at the DA server.

7.13.1.3.3.2 Resource Definition

Resource URI: {apiRoot}/ss-dapm/<apiVersion>/profile/{daId}

This resource shall support the resource URI variables defined in the table 7.13.1.3.3.2-1.

Table 7.13.1.3.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
daId	string	Represents an individual DA Profile resource.

7.13.1.3.3.3 Resource Standard Methods

7.13.1.3.3.3.1 GET

This operation retrieves an individual DA profile. This method shall support the URI query parameters specified in table 7.13.1.3.3.3.1-1.

Table 7.13.1.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.13.1.3.3.3.1-2 and the response data structures and response codes specified in table 7.13.1.3.3.3.1-3.

Table 7.13.1.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.13.1.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DigitalAssetProfile	M	1	200 OK	Successful case. The requested "Individual DA profile" is retrieved.
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.1.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative DA server.

Table 7.13.1.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative DA server.

7.13.1.3.3.2 PUT

This operation updates the individual digital asset profile. This method shall support the URI query parameters specified in table 7.13.1.3.3.2-1.

Table 7.13.1.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.13.1.3.3.2-2 and the response data structures and response codes specified in table 7.13.1.3.3.2-3.

Table 7.13.1.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
DigitalAssetProfile	M	1	Updated details of the DA profile.

Table 7.13.1.3.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DigitalAssetProfile	M	1	200 OK	The DA profile is updated successfully and the updated DA profile returned in the response.
n/a			204 No Content	The DA profile updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.1.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative DA server.

Table 7.13.1.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative DA server.

7.13.1.3.3.3.3 PATCH

This method shall support the URI query parameters specified in table 7.13.1.3.3.3.3-1.

Table 7.13.1.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.13.1.3.3.3.3-2 and the response data structures and response codes specified in table 7.13.1.3.3.3.3-3.

Table 7.13.1.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
DigitalAssetProfilePatch	M	1	Contains the modifications to be applied to the Individual DA Profile resource.

Table 7.13.1.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DigitalAssetProfile	M	1	200 OK	Individual DA Profile resource is modified successfully, and representation of the modified Individual DA Profile resource is returned.
n/a			204 No Content	The Individual DA Profile resource is modified successfully.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.1.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	An alternative URI of the resource located in an alternative SEAL server.

Table 7.13.1.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	An alternative URI of the resource located in an alternative SEAL server.

7.13.1.3.3.4 DELETE

This operation deletes the individual Digital asset profile. This method shall support the URI query parameters specified in table 7.13.1.3.3.4-1.

Table 7.13.1.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.13.1.3.3.4-2 and the response data structures and response codes specified in table 7.13.1.3.3.4-3.

Table 7.13.1.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.13.1.3.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual configuration matching the Digital asset identity is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.1.3.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	An alternative URI of the resource located in an alternative DA server.

Table 7.13.1.3.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	An alternative URI of the resource located in an alternative DA server.

7.13.1.3.3.4 Resource Custom Operations

None.

7.13.1.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

7.13.1.5 Notifications

There are no notification defined in this release of the specification.

7.13.1.6 Data Model

7.13.1.6.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.13.1.6.1-1 specifies the data types defined for the SS_DAPProfileManagement API.

Table 7.13.1.6.1-1: SS_DAProfileManagement API specific Data Types

Data type	Clause defined	Description	Applicability
AccessControlList	7.13.1.6.2.4	Represents the access control list and its corresponding operations	
AllowedUser	7.13.1.6.2.5	Represents the user allowed to access the digital asset	
DigitalAssetProfile	7.13.1.6.2.2	Represents the DA profile.	
DigitalAssetProfilePatch	7.13.1.6.2.3	Represents the requested modifications to the DA profile. Used to partially update Individual DA Profile resource.	
DigitalAssetType	7.13.1.6.3.3	Represents the different type of digital assets e.g. avatar, wallet, etc	
Operation	7.13.1.6.3.4	Represents an allowed operations for the given user	
SpatialCondition	7.13.1.6.2.6	Represents the spatial conditions (e.g. locations) where this digital asset profile is allowed to be accessed.	

Table 7.13.1.6.1-2 specifies data types re-used by the SS_DAProfileManagement API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SS_DAProfileManagement API.

Table 7.13.1.6.1-2: SS_DAProfileManagement API Re-used Data Types

Data type	Reference	Comments	Applicability
DateTime	3GPP TS 29.122 [3]	Used to represent the date and time.	
LocationInfo	3GPP TS 29.122 [3]	Used to represent the location information.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the applicability of optional features defined in table 7.13.1.6-1.	

7.13.1.6.2 Structured data types

7.13.1.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.13.1.6.2.2

Type: DigitalAssetProfile

Table 7.13.1.6.2.2-1: Definition of type DigitalAssetProfile

Attribute name	Data type	P	Cardinality	Description	Applicability
accCtrlLists	array(AccessControlList)	O	1..N	Represents the list of tuples indicating the requestors allowed to perform operations with this digital asset and the allowed operation types.	
accessories	array(Dald)	O	1..N	Represents the list of digital asset identifiers which are accessories (e.g. Hat, watch, shoes) purchased for this digital asset profile	
applds	array(string)	O	1..N	Represents the list of application IDs which are allowed to use this digital asset profile	
dald	Dald	C	0..1	Represents the identifier of the digital asset. This attribute shall be present only in the response to a Digital Asset profile creation/update request.	
daOwnerIds	array(DigitalAssetOwnerId)	O	1..N	Represents the list of identifier(s) for the digital asset owner.	
daType	DigitalAssetType	O	0..1	Represents the digital asset type.	
daUri	Uri	C	0..1	Represents the end point/URI provided at which digital asset media is to be uploaded. This attribute may be present only in the response to a Digital Asset profile creation/update request.	
expTime	DateTime	O	0..1	Represents the expiry time of the DA profile.	
spatialConds	array(SpatialCondition)	O	1..N	Represents the list of spatial conditions (e.g. locations) where this digital asset profile is allowed to be accessed	
srvProviderIds	array(string)	O	1..N	Represents the list of service providers for the digital asset.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features as defined in clause 7.13.1.6. This attribute shall be present in the create request only if feature negotiation needs to take place.	
valServerId	string	C	1	Represents the VAL server identifier. This attribute shall be present only in the response to a Digital Asset profile creation request.	

7.13.1.6.2.3 Type: DigitalAssetProfilePatch

Table 7.13.1.6.2.3-1: Definition of type DigitalAssetProfilePatch

Attribute name	Data type	P	Cardinality	Description	Applicability
accCtrlLists	array(AccessControlList)	O	1..N	Represents the list of tuples indicating the requestors allowed to perform operations with this digital asset and the allowed operation types.	
accessories	array(DalId)	O	1..N	Represents the list of digital asset identifiers which are accessories (e.g. Hat, watch, shoes) purchased for this digital asset profile.	
applIds	array(string)	O	1..N	Represents the list of application IDs which are allowed to use this digital asset profile	
daOwnerIds	array(DigitalAssetOwnerId)	O	1..N	Represents the list of identifier(s) for the digital asset owner.	
daType	DigitalAssetType	O	0..1	Represents the digital asset type	
expTime	DateTime	O	0..1	Represents the expiry time of the DA profile.	
spatialConds	array(SpatialCondition)	O	1..N	Represents the list of spatial conditions (e.g. locations) where this digital asset profile is allowed to be accessed	
srvProviderIds	array(string)	O	1..N	Represents the list of service providers for the digital asset.	

7.13.1.6.2.4 Type: AccessControlList

Table 7.13.1.6.2.4-1: Definition of type AccessControlList

Attribute name	Data type	P	Cardinality	Description	Applicability
allowedUsers	array(AllowedUser)	O	1..N	Represents the list of users allowed to access this digital asset	

7.13.1.6.2.5 Type: AllowedUser

Table 7.13.1.6.2.5-1: Definition of type AllowedUser

Attribute name	Data type	P	Cardinality	Description	Applicability
user	string	M	1	Represents the user allowed to access this digital asset	
allowedOperations	array(Operations)	O	1..N	Represents the list of operations allowed by the user.	
predModels	array(string)	O	1..N	Represents the list of one or more predictive model for the user	

7.13.1.6.2.6 Type: SpatialCondition

Table 7.13.1.6.2.6-1: Definition of type SpatialCondition

Attribute name	Data type	P	Cardinality	Description	Applicability
currLoc	LocationInfo	C	1	Represents the location where DA profile is allowed to be accessed. (NOTE)	
NOTE: At least one of these attributes shall be present					

7.13.1.6.3 Simple data types and enumerations

7.13.1.6.3.1 Introduction

This clause defines simple data types and enumerations that are referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 6.2.1 can be referenced.

7.13.1.6.3.2 Simple data types

The simple data types defined in table 7.13.1.6.3.2-1 shall be supported.

Table 7.13.1.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability
DigitalAssetOwnerId	string	Represents the identity of the digital asset owner	
Dald	string	Represents the identifier of the digital asset.	

7.13.1.6.3.3 Enumeration: DigitalAssetType

The enumeration DigitalAssetType represents the different type of digital assets e.g. avatar, wallet, etc. It shall comply with the provisions defined in table 7.13.1.6.3.3-1.

Table 7.13.1.6.3.3-1: Enumeration DigitalAssetType

Enumeration value	Description	Applicability
ACCESSORY	Represents the accessory	
AVATAR	Represents the avatar	
GIFT_CERTIFICATES	Represents the gift certificates	
SOFTWARE_LICENSE	Represents the software license	
TOKENS_AND_FILES	Represents the tokens and files	
WALLET	Represents the Digital wallet	

7.13.1.6.3.4 Enumeration: Operations

The enumeration Operation represents an allowed operations for the given user. It shall comply with the provisions defined in table 7.13.1.6.3.4-1.

Table 7.13.1.6.3.4-1: Enumeration Operations

Enumeration value	Description	Applicability
DISCOVERY	Indicates that the operation is discovery.	
RETRIEVE	Indicates that the operation is retrieve.	
CREATE	Indicates that the operation is CREATE.	
UPDATE	Indicates that the operation is UPDATE.	
DELETE	Indicates that the operation is DELETE.	
UPLOAD	Indicates that the Digital asset media operation is UPLOAD.	
DOWNLOAD	Indicates that the Digital asset media operation is DOWNLOAD.	

7.13.1.7 Error Handling

7.13.1.7.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.13.1.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_DAProfileManagement API.

7.13.1.7.3 Application Errors

The application errors defined for SS_DAProfileManagement API are listed in table 7.13.1.7.3-1.

Table 7.13.1.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.13.1.8 Feature negotiation

The optional features in table 7.13.1.8-1 are defined for the SS_DAProfileManagement API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [2].

Table 7.13.1.8-1: Supported Features

Feature number	Feature Name	Description

7.13.1.9 Security

The provisions of clause 6 of 3GPP TS 29.122 [2] shall apply for the SS_DAProfileManagement API.

7.13.2 SS_DADiscovery Service API

7.13.2.1 Introduction

The SS_DADiscovery service shall use the SS_DADiscovery API.

The API URI of the SS_DADiscovery API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-da-d".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5.

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 5, the DA server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.13.2.2 Usage of HTTP and common API related aspects

The provisions of clause 6.3 shall apply for the SS_DADiscovery API.

7.13.2.3 Resources

7.13.2.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.13.2.3.1-1 depicts the resource URIs structure for the SS_DADiscovery API.



Figure 7.13.2.3.1-1: Resource URI structure of the SS_DADiscovery API

Table 7.13.2.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.13.2.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
DA assets	/digitalasset	GET	Discover Digital asset profiles.

7.13.2.3.2 Resource: Digital Asset

7.13.2.3.2.1 Description

This resource represents the collection of Digital asset managed by the DA Server.

7.13.2.3.2.2 Resource Definition

Resource URI: `{apiRoot}/ss-da-d/<apiVersion>/digitalasset`

This resource shall support the resource URI variables defined in the table 7.13.2.3.2.2-1.

Table 7.13.2.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.13.2.1

7.13.2.3.2.3 Resource Standard Methods

7.13.2.3.2.3.1 GET

This operation allows a service consumer to discover digital assets in DA Server. This method shall support the URI query parameters specified in table 7.13.2.3.2.3.1-1.

Table 7.13.2.3.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
Allowed-users	array(AllowedUser)	C	1..N	Contains the list of allowed users (NOTE 1)
da-desc	string	O	0..1	Contains the description of the digital asset. (NOTE 1)
da-ids	array(Dald)	C	1..N	Contains the identifier(s) of the targeted digital asset(s). (NOTE 1)
da-name	string	C	0..1	Contains the Digital asset name. (NOTE 1)
da-owner-id	DigitalAssetOwnerId	C	0..1	Contains the Digital asset owner (NOTE 1)
da-type	DigitalAssetType	C	0..1	Contains the Digital asset type (NOTE 1)
spatial-condt	SpatialCondition	C	0..1	Contains the Spatial condition including location. (NOTE 1)
supp-feats	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 6.1.2.8. This attribute shall be present only when feature negotiation is required.
val-target-ue	ValTargetUe	C	0..1	Contains either VAL User ID or VAL UE ID (NOTE 1)
NOTE 1: At least one of these query parameters shall be present.				

This method shall support the request data structures specified in table 7.13.2.3.2.3.1-2 and the response data structures and response codes specified in table 7.13.2.3.2.3.1-3.

Table 7.13.2.3.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.13.2.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DaDiscResp	M	1	200 OK	Successful case. DA details matching the query filter criteria shall be returned.
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.2.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative DA server.

Table 7.13.2.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative DA server.

7.13.2.3.2.4 Resource Custom Operations

None.

7.13.2.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

7.13.2.5 Notifications

There are no notification defined in this release of the specification.

7.13.2.6 Data Model

7.13.2.6.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.13.2.6.1-1 specifies the data types defined for the SS_DADiscovery API.

Table 7.13.2.6.1-1: SS_DADiscovery API specific Data Types

Data type	Clause defined	Description	Applicability
DaDiscResp	7.13.2.6.2.2	Represents the DA discovery response	
DaDiscResult	7.13.2.6.2.3	Represents the DA discovery result	
DaStatus	7.13.2.6.3.3	Represents the DA status	

Table 7.13.2.6.1-2 specifies data types re-used by the SS_DADiscovery API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SS_DADiscovery API.

Table 7.13.2.6.1-2: SS_DADiscovery API Re-used Data Types

Data type	Reference	Comments	Applicability
AllowedUser	7.13.1.6.2.5	Represents the list of users allowed to access the digital asset.	
DigitalAssetOwnerId	7.13.1.6.3.2	Represents the identity of the digital asset owner.	
DigitalAssetProfile	7.13.1.6.2.2	Represents the DA profile.	
DigitalAssetType	7.13.1.6.3.3	Represents the different type of digital assets e.g. avatar, wallet, etc	
SpatialCondition	7.13.1.6.2.6	Represents the spatial conditions (e.g. locations) where this digital asset profile is allowed to be accessed.	
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the applicability of optional features defined in table 7.13.2.6-1.	

7.13.2.6.2 Structured data types

7.13.2.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.13.2.6.2.2 Type: DaDiscResp

Table 7.13.2.6.2.2-1: Definition of type DaDiscResp

Attribute name	Data type	P	Cardinality	Description	Applicability
results	array(DaDiscResult)	M	0..N	Contains the profile(s) of the digital asset(s) matching the provided discovery filter criteria. If there are no digital asset(s) matching the provided discovery filter criteria, an empty array shall be returned within this attribute.	
suppFeat	Supported Features	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 6.1.2.8. This attribute shall be present only when feature negotiation is required.	

7.13.2.6.2.3 Type: DaDiscResult

Table 7.13.2.6.2.3-1: Definition of type DaDiscResult

Attribute name	Data type	P	Cardinality	Description	Applicability
dald	Dald	C	0..1	Contains the identifier of the digital asset. (NOTE 1)	
daName	string	C	0..1	Contains the name of the digital asset matching the discovery criteria (NOTE 1)	
uri	Uri	O	1..N	A URL of the service provider the digital asset is associated with.	
daStatus	DaStatus	M	1	Contains the status of the digital asset.	
daDesc	string	O	0..1	Contains the description of the digital asset.	
NOTE 1: At least one of these query parameters shall be present.					

7.13.2.6.3 Simple data types and enumerations

7.13.2.6.3.1 Introduction

This clause defines simple data types and enumerations that are referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 6.2.1 can be referenced.

7.13.2.6.3.2 Simple data types

The simple data types defined in table 7.13.2.6.3.2-1 shall be supported.

Table 7.13.2.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

7.13.2.6.3.3 Enumeration: DaStatus

The enumeration DaStatus represents the status of the digital user. It shall comply with the provisions defined in table 7.13.2.6.3.3-1.

Table 7.13.2.6.3.3-1: Enumeration DaStatus

Enumeration value	Description	Applicability
IN_USE	Indicates that the digital asset is in use	
ARCHIVED	Indicates that the digital asset is Archived.	

7.13.2.7 Error Handling

7.13.2.7.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.13.2.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_DADiscovery API.

7.13.2.7.3 Application Errors

The application errors defined for SS_DADiscovery API are listed in table 7.13.2.7.3-1.

Table 7.13.2.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.13.2.8 Feature negotiation

The optional features in table 7.13.2.8-1 are defined for the SS_DADiscovery API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [2].

Table 7.13.2.8-1: Supported Features

Feature number	Feature Name	Description

7.13.2.9 Security

The provisions of clause 6 of 3GPP TS 29.122 [2] shall apply for the SS_DADiscovery API.

7.13.3 SS_DAMediaManagement Service API

7.13.3.1 Introduction

The SS_DAMediaManagement service shall use the SS_DAMediaManagement API.

The API URI of the SS_DAMediaManagement API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5, i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5.
- The <apiName> shall be "ss-da-medm".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5.

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 5, the DA server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

7.13.3.2 Usage of HTTP and common API related aspects

The provisions of clause 6.3 shall apply for the SS_DAMediaManagement API.

7.13.3.3 Resources

7.13.3.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.13.3.3.1-1 depicts the resource URIs structure for the SS_DAMediaManagement API.

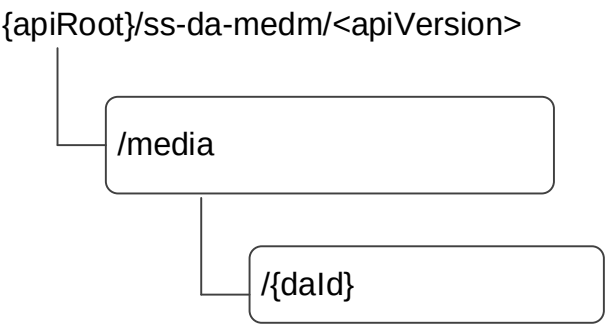


Figure 7.13.3.3.1-1: Resource URI structure of the SS_DAMediaManagement API

Table 7.13.3.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.13.3.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
DA medias	/media	POST	Upload the individual DA media information.
Individual DA media	/media/{dald}	GET	Download the Individual DA media identified by {dald}.
		PUT	Updates an Individual DA media identified by {dald}.
		PATCH	Partially modifies an Individual DA media identified by {dald}.
		DELETE	Delete an Individual DA media identified by {dald}.

7.13.3.3.2 Resource: DA medias

7.13.3.3.2.1 Description

The resource allows the VAL server to request to upload the new individual DA media at the DA server.

7.13.3.3.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-da-medm/<apiVersion>/media**

This resource shall support the resource URI variables defined in the table 7.13.3.3.2.2-1.

Table 7.13.3.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.13.3.1

7.13.3.3.2.3 Resource Standard Methods

7.13.3.3.2.3.1 POST

This method shall support the URI query parameters specified in table 7.13.3.3.2.3.1-1.

Table 7.13.3.3.2.3.1-1: 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 7.13.3.3.2.3.1-2 and the response data structures and response codes specified in table 7.13.3.3.2.3.1-3.

Table 7.13.3.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DigitalAssetMedia	M	1	DA media request.

Table 7.13.3.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DigitalAssetMedia	M	1	201 Created	DA media is created successfully.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.3.3.2.3.1-4: 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}/ss-damm/<apiVersion>/media/{daId}

7.13.3.3.2.4 Resource Custom Operations

None.

7.13.3.3.3 Resource: Individual DA media

7.13.3.3.3.1 Description

The resource represents an individual DA media information that is uploaded at the DA server.

7.13.3.3.3.2 Resource Definition

Resource URI: {apiRoot}/ss-damm/<apiVersion>/media/{daId}

This resource shall support the resource URI variables defined in the table 7.13.3.3.2-1.

Table 7.13.3.3.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.5
dald	string	Represents an individual DA media resource.

7.13.3.3.3.3 Resource Standard Methods

7.13.3.3.3.3.1 GET

This operation download an individual DA media information. This method shall support the URI query parameters specified in table 7.13.3.3.3.3.1-1.

Table 7.13.3.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.13.3.3.3.3.1-2 and the response data structures and response codes specified in table 7.13.3.3.3.3.1-3.

Table 7.13.3.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.13.3.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DigitalAssetMedia	M	1	200 OK	Successful case. The requested "Individual DA media is retrieved..
n/a			307 Temporary Redirect	Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.3.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative DA server.

Table 7.13.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative DA server.

7.13.3.3.3.2 PUT

This operation updates the individual digital asset media. This method shall support the URI query parameters specified in table 7.13.3.3.3.2-1.

Table 7.13.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.13.3.3.3.2-2 and the response data structures and response codes specified in table 7.13.3.3.3.2-3.

Table 7.13.3.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
DigitalAssetMedia	M	1	Updated details of the DA media.

Table 7.13.3.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DigitalAssetMedia	M	1	200 OK	The DA media is updated successfully and the updated DA media returned in the response.
n/a			204 No Content	The DA media updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative DA server.

Table 7.13.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located in an alternative DA server.

7.13.3.3.3.3 PATCH

This method shall support the URI query parameters specified in table 7.13.3.3.3.3-1.

Table 7.13.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.13.3.3.3.3-2 and the response data structures and response codes specified in table 7.13.3.3.3.3-3.

Table 7.13.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
DigitalAssetMedia Patch	M	1	Contains the modifications to be applied to the Individual DA media resource.

Table 7.13.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DigitalAssetMedia	M	1	200 OK	Individual DA media resource is modified successfully, and representation of the modified Individual DA media resource is returned.
n/a			204 No Content	The Individual DA media resource is modified successfully.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEAL server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	An alternative URI of the resource located in an alternative SEAL server.

Table 7.13.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	An alternative URI of the resource located in an alternative SEAL server.

7.13.3.3.3.4 DELETE

This operation deletes the individual Digital asset media. This method shall support the URI query parameters specified in table 7.13.3.3.3.4-1.

Table 7.13.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 7.13.3.3.3.4-2 and the response data structures and response codes specified in table 7.13.3.3.3.4-3.

Table 7.13.3.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 7.13.3.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual configuration matching the Digital asset identity is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DA server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 7.13.3.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	An alternative URI of the resource located in an alternative DA server.

Table 7.13.3.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	An alternative URI of the resource located in an alternative DA server.

7.13.3.3.3.4 Resource Custom Operations

None.

7.13.3.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

7.13.3.5 Notifications

There are no notification defined in this release of the specification.

7.13.3.6 Data Model

7.13.3.6.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.13.3.6.1-1 specifies the data types defined for the SS_DAMediaManagement API.

Table 7.13.3.6.1-1: SS_DAMediaManagement API specific Data Types

Data type	Clause defined	Description	Applicability
DaMediaInfo	7.13.3.6.2.7	Represents the Information related to digital asset media (e.g. URI where the media is stored).	
DigitalAssetMedia	7.13.3.6.2.2	Represents the DA media.	
DigitalAssetMediaPatch	7.13.3.6.2.3	Represents the requested modifications to the DA media. Used to partially update Individual DA media resource.	

Table 7.13.3.6.1-2 specifies data types re-used by the SS_DAMediaManagement API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SS_DAMediaManagement API.

Table 7.13.3.6.1-2: SS_DAMediaManagement API Re-used Data Types

Data type	Reference	Comments	Applicability
SupportedFeatures	3GPP TS 29.571 [21]	Used to negotiate the applicability of optional features defined in table 7.13.3.6-1.	
Uri	3GPP TS 29.122 [3]	Represents a URI.	

7.13.3.6.2 Structured data types

7.13.3.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

7.13.3.6.2.2 Type: DigitalAssetMedia

Table 7.13.3.6.2.2-1: Definition of type DigitalAssetMedia

Attribute name	Data type	P	Cardinality	Description	Applicability
dald	Dald	C	0..1	Represents the identifier of the digital asset. This attribute shall be present only in the response to a Digital Asset media creation request.	
daMediaInfo	DaMediaInfo	O	0..1	Represents the Information related to digital asset media (e.g. URI where the media is stored).	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the applicability of optional features as defined in clause 7.13.3.6. This attribute shall be present in the create request only if feature negotiation needs to take place.	
valServerId	string	C	1	Represents the VAL server identifier. This attribute shall be present only in the response to a Digital Asset media creation or update request.	

7.13.3.6.2.3 Type: DigitalAssetMediaPatch

Table 7.13.3.6.2.3-1: Definition of type DigitalAssetMediaPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
daMediaInfo	DaMediaInfo	O	0..1	Represents the Information related to digital asset media (e.g. URI where the media is stored).	
valServerId	string	C	1	Represents the VAL server identifier. This attribute shall be present only in the response to a Digital Asset media creation or update request.	

7.13.3.6.2.7 Type: DaMediaInfo

Table 7.13.3.6.2.7-1: Definition of type DaMediaInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
uri	Uri	C	0..1	Represents the URI where DA media is stored. (NOTE)	
object	string	C	0..1	Represents the DA Media object (e.g. JPG file). (NOTE)	
NOTE: At least one of these attributes shall be present					

7.13.3.6.3 Simple data types and enumerations

7.13.3.6.3.1 Introduction

This clause defines simple data types and enumerations that are referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 6.2.1 can be referenced.

7.13.3.6.3.2 Simple data types

The simple data types defined in table 7.13.3.6.3.2-1 shall be supported.

Table 7.13.3.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability
Dald	string	Represents the identifier of the digital asset.	

7.13.3.7 Error Handling

7.13.3.7.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

7.13.3.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS_DAMediaManagement API.

7.13.3.7.3 Application Errors

The application errors defined for SS_DAMediaManagement API are listed in table 7.13.3.7.3-1.

Table 7.13.3.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

7.13.3.8 Feature negotiation

The optional features in table 7.13.3.8-1 are defined for the SS_DAMediaManagement API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [2].

Table 7.13.3.8-1: Supported Features

Feature number	Feature Name	Description

7.13.3.9 Security

The provisions of clause 6 of 3GPP TS 29.122 [2] shall apply for the SS_DAMediaManagement API.

8 Using Common API Framework

8.1 General

When CAPIF is used with a SEAL service, the SEAL server shall support the following as defined in 3GPP TS 29.222 [16]:

- the API exposing function and related APIs over CAPIF-2/2e and CAPIF-3/3e reference points;

- the API publishing function and related APIs over CAPIF-4/4e reference point;
- the API management function and related APIs over CAPIF-5/5e reference point; and
- at least one of the security methods for authentication and authorization, and related security mechanisms.

In a centralized deployment as defined in 3GPP TS 23.222 [17], where the CAPIF core function and API provider domain functions are co-located, the interactions between the CAPIF core function and API provider domain functions may be independent of CAPIF-3/3e, CAPIF-4/4e and CAPIF-5/5e reference points.

When CAPIF is used with a SEAL service, the SEAL server shall register all the features for northbound APIs in the CAPIF Core Function.

8.2 Security

When CAPIF is used for external exposure, before invoking the API exposed by the SEAL server, the VAL server as API invoker shall negotiate the security method (PKI, TLS-PSK or OAuth2) with CAPIF core function and ensure the SEAL server has enough credential to authenticate the VAL server (see 3GPP TS 29.222 [16], clause 5.6.2.2 and clause 6.2.2.2).

If PKI or TLS-PSK is used as the selected security method between the VAL server and the SEAL server, upon API invocation, the SEAL server shall retrieve the authorization information from the CAPIF core function as described in 3GPP TS 29.222 [16], clause 5.6.2.4.

As indicated in 3GPP TS 33.122 [18], the access to the SEAL APIs may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [19]), using the "Client Credentials" authorization grant, where the CAPIF core function (see 3GPP TS 29.222 [16]) plays the role of the authorization server.

NOTE 1: In this release, only "Client Credentials" authorization grant is supported.

If OAuth2 is used as the selected security method between the VAL server and the SEAL server, the VAL server, prior to consuming services offered by the SEAL APIs, shall obtain a "token" from the authorization server, by invoking the Obtain_Authorization service, as described in 3GPP TS 29.222 [16], clause 5.6.2.3.2.

The SEAL APIs do not define any scopes for OAuth2 authorization. It is the SEAL server responsibility to check whether the VAL server is authorized to use an API based on the "token". Once the SEAL server verifies the "token", it shall check whether the SEAL server identifier in the "token" matches its own published identifier, and whether the API name in the "token" matches its own published API name. If those checks are passed, the VAL server has full authority to access any resource or operation for the invoked API

NOTE 2: For aforementioned security methods, the SEAL server needs to apply admission control according to access control policies after performing the authorization checks.

9 Security

9.1 General

The security aspects of SEAL reference points are specified in 3GPP TS 33.434 [26].

9.2 SEAL-S security

As specified in clause 5.1.1.8 of 3GPP TS 33.434 [26], the protection of SEAL-S reference point shall be supported according to NDS/IP as specified in 3GPP TS 33.210 [25].

When CAPIF is not used, then TLS and OAuth 2.0 shall be supported as described in clause 5.1.1.8 of 3GPP TS 33.434 [26]. When TLS is used, mutual authentication based on client and server certificates shall be performed between the SEAL server and VAL server using TLS. After the authentication, the SEAL server determines whether the VAL server is authorized to send requests to the SEAL server. The SEAL server shall authorize the requests from VAL server using OAuth-based authorization mechanism.

When CAPIF is used, the security mechanisms described in clause 8.2 shall be applied.

Annex A (normative): OpenAPI specification

A.1 General

This annex is based on the OpenAPI Specification [15] and provides corresponding representations of all APIs defined in the present specification in YAML format.

This Annex shall take precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API.

NOTE: 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 file contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see clause 5B of the 3GPP TR 21.900 [24] and clause 5.3.1 of the 3GPP TS 29.501 [14] for further information).

A.2 SS_LocationReporting API

openapi: 3.0.0

info:

```
  title: SS_LocationReporting
  description: |
    API for SEAL Location Reporting Configuration.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.3.0-alpha.4"
```

externalDocs:

```
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/
```

security:

```
- {}
- oAuth2ClientCredentials: []
```

servers:

```
- url: '{apiRoot}/ss-lr/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
```

paths:

```
  /trigger-configurations:
    post:
      description: Creates a new location reporting configuration.
      operationId: CreateLocReportingConfig
      tags:
        - SEAL Location Reporting Configurations (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocationReportConfiguration'
      responses:
        '201':
          description: Location reporting configuration resource is created successfully.
          content:
            application/json:
              schema:
```

```

    $ref: '#/components/schemas/LocationReportConfiguration'
  headers:
    Location:
      description: Contains the URI of the newly created resource.
      required: true
      schema:
        type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  NotifyLocationTriggerEvent:
    '{$request.body#/notifUri}':
      post:
        summary: Notify on location event.
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/LocationReport'
      responses:
        '204':
          description: The notification is successfully received.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  AdaptiveLocationConfig:
    '{$request.body#/notifUri}/configure':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AdaptConfigNotif'

```

```

responses:
  '200':
    description: >
      OK. The Adaptive Location Configuration
      Notification is successfully received and Adaptive Location
      Configuration related information is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AdaptConfigNotifResp'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/trigger-configurations/{configurationId}:
  get:
    description: Retrieves an individual SEAL location reporting configuration information.
    operationId: RetrieveLocReportingConfig
    tags:
      - Individual SEAL Location Reporting Configuration (Document)
    parameters:
      - name: configurationId
        in: path
        description: String identifying an individual configuration resource.
        required: true
        schema:
          type: string
    responses:
      '200':
        description: The location reporting configuration information.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocationReportConfiguration'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  put:
    description: Updates an individual SEAL location reporting configuration.
    operationId: UpdateLocReportingConfig
    tags:
      - Individual SEAL Location Reporting Configuration (Document)
    parameters:
      - name: configurationId
        in: path
        description: String identifying an individual configuration resource.
        required: true
        schema:
          type: string
    requestBody:
      description: Configuration information to be updated in location management server.
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/LocationReportConfiguration'
    responses:
      '200':
        description: The configuration is updated successfully.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocationReportConfiguration'
      '204':
        description: No Content
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  delete:
    description: Deletes an individual SEAL location reporting configuration.
    operationId: DeleteLocReportingConfig
    tags:
      - Individual SEAL Location Reporting Configuration (Document)
    parameters:
      - name: configurationId
        in: path
        description: String identifying an individual configuration resource.
        required: true
        schema:
          type: string
    responses:
      '204':
        description: The individual configuration matching configurationId is deleted.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'

```



```

    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  patch:
    description: Modify an existing SEAL Location Reporting Configuration.
    operationId: ModifyLocReportingConfig
    tags:
      - Individual SEAL Location Reporting Configuration (Document)
    parameters:
      - name: configurationId
        in: path
        description: Identifier of an individual SEAL location reporting configuration.
        required: true
        schema:
          type: string
    requestBody:
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/LocationReportConfigurationPatch'
    responses:
      '200':
        description: >
          The individual SEAL location reporting configuration is modified successfully and
          a representation of the updated SEAL location reporting configuration is returned
          in the request body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocationReportConfiguration'
      '204':
        description: >
          No Content. The individual SEAL location reporting configuration is
          modified successfully.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'

```

```
scopes: {}
```

```
schemas:
```

```
LocationReportConfiguration:
```

```
description: Represents the location reporting configuration information.
```

```
type: object
```

```
properties:
```

```
valServerId:
```

```
type: string
```

```
valTgtUe:
```

```
$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
```

```
immRep:
```

```
type: boolean
```

```
monDur:
```

```
$ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
```

```
repPeriod:
```

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
```

```
notifUri:
```

```
$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
```

```
accuracy:
```

```
$ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/Accuracy'
```

```
valSvcAreaIds:
```

```
type: array
```

```
minItems: 1
```

```
items:
```

```
$ref: 'TS29549_SS_VALServiceAreaConfiguration.yaml#/components/schemas/ValSvcAreaId'
```

```
description: >
```

```
Represents the VAL service area ID(s).
```

```
triggCriteria:
```

```
$ref: '#/components/schemas/TriggeringCriteria'
```

```
adaptRep:
```

```
$ref: '#/components/schemas/AdaptiveReporting'
```

```
suppFeat:
```

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
```

```
report:
```

```
$ref: '#/components/schemas/LocationReport'
```

```
required:
```

```
- valServerId
```

```
- valTgtUe
```

```
LocationReportConfigurationPatch:
```

```
description: Represents the location reporting configuration information patch.
```

```
type: object
```

```
properties:
```

```
valTgtUe:
```

```
$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
```

```
monDur:
```

```
$ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
```

```
repPeriod:
```

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
```

```
notifUri:
```

```
$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
```

```
accuracy:
```

```
$ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/Accuracy'
```

```
valSvcAreaIds:
```

```
type: array
```

```
minItems: 1
```

```
items:
```

```
$ref: 'TS29549_SS_VALServiceAreaConfiguration.yaml#/components/schemas/ValSvcAreaId'
```

```
description: >
```

```
Represents the VAL service area ID(s).
```

```
triggCriteria:
```

```
$ref: '#/components/schemas/TriggeringCriteria'
```

```
TriggeringCriteria:
```

```
description: Represents the location reporting triggering criteria.
```

```
type: object
```

```
properties:
```

```
reportingMode:
```

```
$ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/NotificationMethod'
```

```
repPer:
```

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
```

```
locChgCond:
```

```
$ref: '#/components/schemas/LocChangeCond'
```

```
ioInd:
```

```
$ref: '#/components/schemas/InsideOutsideInd'
```

```
repSchedules:
```

```
type: array
```

```

    minItems: 1
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ScheduledCommunicationTime'
    description: >
      Indicates the requested reporting schedule, e.g., day(s) of the week
      and/or time period(s) for the location reporting.
    required:
      - reportingMode

```

```

LocationReport:
  description: Represents the location trigger report.
  type: object
  properties:
    subscriptionId:
      type: string
      description: >
        Represents the identifier of the subscription to which the location
        reporting notification is related.
    valTgtUe:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    locInfo:
      $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
    timeStamp:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  required:
    - subscriptionId
    - valTgtUe
    - locInfo

```

```

AdaptConfigNotif:
  description: Represents the adaptive reporting notification.
  type: object
  properties:
    valTgtUe:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    suggConfig:
      $ref: '"/components/schemas/TriggeringCriteria'
  required:
    - valTgtUe
    - suggConfig

```

```

AdaptConfigNotifResp:
  description: Represents the adaptive reporting notification response.
  type: object
  properties:
    confirmation:
      $ref: '"/components/schemas/Confirmation'
  required:
    - confirmation

```

Simple data types and Enumerations

```

InsideOutsideInd:
  anyOf:
    - type: string
    enum:
      - INSIDE
      - OUTSIDE
    - type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration and is not used to encode
    content defined in the present version of this API.
  description: |
    Represents a desired condition of the location reporting,
    e.g., inside or outside the given area.
    Possible values are:
    - INSIDE: Indicates that the reporting shall occur when the UE is inside the given location.
    - OUTSIDE: Indicates that the reporting shall occur when the UE is outside the given
      location.

```

```

LocChangeCond:
  anyOf:
    - type: string
    enum:
      - CELL
      - NODEB
      - TA_RA
      - WLAN_AN

```

- CIVIC_ADDR
- GPS
- SAI
- ECGI
- RAT
- VAL_SERVICE_AREA

- type: string
description: >
This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |
Represents a desired condition of the requested location change.
Possible values are:

- CELL: The condition is cell change.
- NODEB: The condition is eNodeB or gNodeB change.
- TA_RA: The condition is TA or RA change.
- WLAN_AN: The condition is WLAN access network change (e.g., SSID or BSSID change).
- CIVIC_ADDR: The condition is civic address change.
- GPS: The condition is GPS coordinate change.
- SAI: The condition is SAI change..
- ECGI: The condition is ECGI change.
- RAT: The condition is RAT change.
- VAL_SERVICE_AREA: The condition is VAL service area change.

AdaptiveReporting:

anyOf:

- type: string
enum:
 - DIRECT_UPDATE
 - SUGGESTIVE_UPDATE
- type: string
description: >
This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |
Represents a desired adaptive reporting configuration mode.
Possible values are:

- DIRECT_UPDATE: Indicates the SEAL LMS to directly update the SEAL LM client once configuration is adjusted.
- SUGGESTIVE_UPDATE: Indicates that the VAL Server subscribes to receive the suggested configurations from the SEAL LMS. The related notifications shall be sent by SEAL LMS before updating to the SEAL LM client.

Confirmation:

anyOf:

- type: string
enum:
 - ACCEPT
 - REJECT
- type: string
description: >
This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |
Represents a confirmation response.
Possible values are:

- ACCEPT: Indicates the acceptance of the proposed action.
- REJECT: Indicates the rejection of the proposed action.

A.3 SS_GroupManagement API

openapi: 3.0.0

info:

title: SS_GroupManagement

description: |

API for SEAL Group management.

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version: "1.3.0-alpha.2"

externalDocs:

```
description: >
  3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
  Application Programming Interface (API) specification; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/
```

security:

```
- {}
- oAuth2ClientCredentials: []
```

servers:

```
- url: '{apiRoot}/ss-gm/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
```

paths:

```
/group-documents:
  post:
    description: Creates a new VAL group document.
    operationId: CreateValGroupDoc
    tags:
      - VAL Group Documents (Collection)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/VALGroupDocument'
    responses:
      '201':
        description: VAL group created sucessfully.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/VALGroupDocument'
        headers:
          Location:
            description: Contains the URI of the newly created resource.
            required: true
            schema:
              type: string
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  get:
    description: Retrieves VAL group documents satisfying filter criteria
    operationId: RetrieveValGroupDocs
    tags:
      - VAL Group Documents (Collection)
    parameters:
      - name: val-group-id
        in: query
        description: String identifying the VAL group.
        schema:
          type: string
      - name: val-service-id
        in: query
        description: String identifying the Val service.
```

```

    schema:
      type: string
  responses:
    '200':
      description: List of VAL group documents matching the query parameters in the request.
      content:
        application/json:
          schema:
            type: array
            items:
              $ref: '#/components/schemas/VALGroupDocument'
            minItems: 0
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/group-documents/{groupDocId}:
  get:
    description: Retrieves VAL group information satisfying filter criteria.
    operationId: RetrieveIndValGroupDoc
    tags:
      - Individual VAL Group Document (Document)
    parameters:
      - name: groupDocId
        in: path
        description: String identifying an individual VAL group document resource.
        required: true
        schema:
          type: string
      - name: group-members
        in: query
        description: >
          When set to true indicates the group management server to send the members
          list information of the VAL group.
        schema:
          type: boolean
      - name: group-configuration
        in: query
        description: >
          When set to true indicates the group management server to send the group
          configuration information of the VAL group.
        schema:
          type: boolean
    responses:
      '200':
        description: >
          The VAL group information based on the request from the VAL server. Includes
          VAL group members list if group-members flag is set to true in the request,
          VAL group configuration information if the group-configuration flag is set to
          true in the request, VAL group identifier, whole VAL group document resource
          if both group-members and group-configuration flags are omitted/set to false
          in the request.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/VALGroupDocument'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  description: Updates an individual VAL group document.
  operationId: UpdateIndValGroupDoc
  tags:
    - Individual VAL Group Document (Document)
  parameters:
    - name: groupDocId
      in: path
      description: String identifying an individual VAL group document resource
      required: true
      schema:
        type: string
  requestBody:
    description: VAL group document to be updated in Group management server.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/VALGroupDocument'
  responses:
    '200':
      description: VAL group document updated successfully.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/VALGroupDocument'
    '204':
      description: No Content
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  description: Deletes a VAL Group.
  operationId: DeleteIndValGroupDoc
  tags:

```

```
- Individual VAL Group Document (Document)
parameters:
- name: groupDocId
  in: path
  description: String identifying an individual VAL group document resource.
  required: true
  schema:
    type: string
responses:
'204':
  description: The individual VAL group matching groupDocId was deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
patch:
  description: Modify an existing VAL Group document.
  operationId: ModifyIndValGroupDoc
  tags:
  - Individual VAL Group Document (Document)
parameters:
- name: groupDocId
  in: path
  description: Identifier of an individual VAL group document.
  required: true
  schema:
    type: string
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/VALGroupDocumentPatch'
responses:
'200':
  description: >
    The individual VAL Group document is modified successfully and a
    representation of the updated VAL Group document is returned in the request body.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/VALGroupDocument'
'204':
  description: No Content. The individual VAL group document is modified successfully.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
```



```

'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

schemas:

```

VALGroupDocument:
  description: Represents details of the VAL group document information.
  type: object
  properties:
    valGroupId:
      type: string
      description: The VAL group identity.
    grpDesc:
      type: string
      description: The text description of the VAL group.
    members:
      type: array
      description: The list of VAL User IDs or VAL UE IDs, which are members of the VAL group.
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
    valGrpConf:
      type: string
      description: Configuration data for the VAL group.
    valServiceIds:
      type: array
      description: The list of VAL services enabled on the group.
      items:
        type: string
      minItems: 1
    valSvcInf:
      type: string
      description: VAL service specific information.
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    resUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    locInfo:
      $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
    addLocInfo:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    valSvcAreaId:
      $ref: 'TS29549_SS_VALServiceAreaConfiguration.yaml#/components/schemas/ValSvcAreaId'
    extGrpId:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
    com5GLanType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
  required:
    - valGroupId

```

VALGroupDocumentPatch:

```

description: Represents details of the partial update of VAL group document information.
type: object
properties:
  grpDesc:
    type: string
    description: The text description of the VAL group.
  members:
    type: array
    description: The list of VAL User IDs or VAL UE IDs, which are members of the VAL group.
    items:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    minItems: 1
  valGrpConf:

```

```
    type: string
    description: Configuration data for the VAL group.
  valServiceIds:
    type: array
    description: The list of VAL services enabled on the group.
    items:
      type: string
    minItems: 1
  locInfo:
    $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
  addLocInfo:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  valSvcAreaId:
    $ref: 'TS29549_SS_VALServiceAreaConfiguration.yaml#/components/schemas/ValSvcAreaId'
  extGrpId:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalGroupId'
  com5GlanType:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
```

A.4 SS_UserProfileRetrieval API

openapi: 3.0.0

```
info:
  title: SS_UserProfileRetrieval
  description: |
    API for SEAL User Profile Retrieval.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.3.0-alpha.2"

externalDocs:
  description: >
    3GPP TS 29.549 V19.3.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/ss-upr/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:
  /val-services:
    get:
      description: Retrieve VAL User or VAL UE profile information.
      operationId: RetrieveValUserProfile
      tags:
        - VAL Services
      parameters:
        - name: val-service-id
          in: query
          description: String identifying an individual VAL service
          required: false
          schema:
            type: string
        - name: val-tgt-ue
          in: query
          description: Identifying a VAL target UE.
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ValTargetUe'
      responses:
        '200':
          description: The Profile information of the VAL User or VAL UE.
          content:
            application/json:
              schema:
```

```

      type: array
      items:
        $ref: '#/components/schemas/ProfileDoc'
      minItems: 0
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

```

```

schemas:
  ProfileDoc:
    description: Represents the profile information associated with a VAL user ID or a VAL UE ID.
    type: object
    properties:
      profileInformation:
        type: string
        description: Profile information associated with the valUserId or valUeId.
      valTgtUe:
        $ref: '#/components/schemas/ValTargetUe'
    required:
      - profileInformation
      - valTgtUe

```

```

ValTargetUe:
  description: Represents the information identifying a VAL user ID or a VAL UE ID.
  type: object
  properties:
    valUserId:
      type: string
      description: Unique identifier of a VAL user.
    valUeId:
      type: string
      description: Unique identifier of a VAL UE.
  oneOf:
    - required: [valUserId]
    - required: [valUeId]

```

```

ValTargetUeRm:
  description: >
    Represents the same as the ValTargetUe data type but with the OpenAPI
    "nullable" property set to "true".
  type: object
  properties:
    valUserId:
      type: string
    valUeId:
      type: string
  oneOf:
    - required: [valUserId]
    - required: [valUeId]
  nullable: true

```

A.5 SS_NetworkResourceAdaptation API

```
openapi: 3.0.0
info:
  version: 1.3.0-alpha.5
  title: SS_NetworkResourceAdaptation
  description: |
    SS Network Resource Adaptation Service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0; Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:
  - {}
  - OAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/ss-nra/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

paths:
  /multicast-subscriptions:
    post:
      summary: Creates a new Individual Multicast Subscription resource
      operationId: CreateMulticastSubscription
      tags:
        - Multicast Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MulticastSubscription'
      responses:
        '201':
          description: Success
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/MulticastSubscription'
          headers:
            Location:
              description: >
                Contains the URI of the created individual multicast subscription resource.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    UserPlaneNotification:
      '{$request.body#/notifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/UserPlaneNotification'
          responses:
            '204':
              description: No Content, Notification was succesfull
            '307':
              $ref: 'TS29122_CommonData.yaml#/components/responses/307'
            '308':
              $ref: 'TS29122_CommonData.yaml#/components/responses/308'
            '400':
              $ref: 'TS29122_CommonData.yaml#/components/responses/400'
            '401':
              $ref: 'TS29122_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29122_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29122_CommonData.yaml#/components/responses/404'
            '411':
              $ref: 'TS29122_CommonData.yaml#/components/responses/411'
            '413':
              $ref: 'TS29122_CommonData.yaml#/components/responses/413'
            '415':
              $ref: 'TS29122_CommonData.yaml#/components/responses/415'
            '429':
              $ref: 'TS29122_CommonData.yaml#/components/responses/429'
            '500':
              $ref: 'TS29122_CommonData.yaml#/components/responses/500'
            '503':
              $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'
/multicast-subscriptions/{multiSubId}:
  get:
    summary: "Reads an existing Individual Multicast Subscription"
    operationId: GetMulticastSubscription
    tags:
      - Individual Multicast Subscription (Document)
    parameters:
      - name: multiSubId
        in: path
        description: Multicast Subscription ID
        required: true
        schema:
          type: string
    responses:
      '200':
        description: OK. Resource representation is returned
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MulticastSubscription'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'

```

```

    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  delete:
    summary: "Delete an existing Individual Multicast Subscription"
    operationId: DeleteMulticastSubscription
    tags:
      - Individual Multicast Subscription (Document)
    parameters:
      - name: multiSubId
        in: path
        description: Multicast Subscription ID
        required: true
        schema:
          type: string
    responses:
      '204':
        description: No Content. Resource was succesfully deleted
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/mbs-resources:
  post:
    summary: Request the creation of a new MBS Resource.
    operationId: CreateMBSResource
    tags:
      - MBS Resources (Collection)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MBSResourceReq'
    responses:
      '201':
        description: >
          Created. Successfull case. The requested MBS resource is successfully created and a
          representation of the created Individual MBS Resource resource is returned in the
          response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MBSResourceResp'
        headers:
          Location:
            description: >
              Contains the URI of the created Individual MBS Resource resource.
            required: true
            schema:
              type: string
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  UserPlaneNotification:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/UserPlaneNotification'
  responses:
    '204':
      description: No Content. The notification was succesfully received.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/mbs-resources/{mbsResId}:
  parameters:
    - name: mbsResId
      in: path
      description: Represents the identifier of the Individual MBS Resource resource.
      required: true
      schema:
        type: string

  get:
    summary: Request the retrieval of an existing Individual MBS Resource.
    operationId: GetIndivMBSResource
    tags:
      - Individual MBS Resource (Document)
    responses:
      '200':
        description: >
          OK. Successful case. A representation of the requested Individual MBS Resource resource
          is returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MBSResource'

```

```
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

put:

```
summary: Request the update of an existing Individual MBS Resource.
operationId: UpdateIndivMBSResource
tags:
  - Individual MBS Resource (Document)
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/MBSResource'
responses:
  '200':
    description: >
      OK. Successful case. The targeted Individual MBS Resource resource is successfully
      updated and a representation of the updated resource is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MBSResource'
  '204':
    description: >
      No Content. Successful case. The targeted Individual MBS Resource resource is
      successfully updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

patch:

```
summary: Request the modification of an existing Individual MBS Resource.
operationId: ModifyIndivMBSResource
tags:
  - Individual MBS Resource (Document)
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
```



```

        $ref: '#/components/schemas/MBSResourcePatch'
responses:
  '200':
    description: >
      OK. Successful case. The targeted Individual MBS Resource resource is successfully
      modified and a representation of the updated resource is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MBSResource'
  '204':
    description: >
      No Content. Successful case. The targeted Individual MBS Resource resource is
      successfully modified and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: Request the deletion of an existing Individual MBS Resource.
  operationId: DeleteIndivMBSResource
  tags:
    - Individual MBS Resource (Document)
  responses:
    '204':
      description: >
        No Content. Successful case. The targeted Individual MBS Resource resource is
        successfully deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/mbs-resources/{mbsResId}/activate:
  parameters:
    - name: mbsResId
      in: path
      description: Represents the identifier of the Individual MBS Resource resource.
      required: true
      schema:
        type: string

  post:
    summary: Request the activation of an existing MBS Resource.
    operationId: ActivateMBSResource

```

```

tags:
- Individual MBS Resource (Document)
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/MbsResAct'
responses:
  '200':
    description: >
      OK. The activation request is successfully received and processed.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MbsResAct'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/mbs-resources/{mbsResId}/deactivate:
  parameters:
    - name: mbsResId
      in: path
      description: Represents the identifier of the Individual MBS Resource resource.
      required: true
      schema:
        type: string

  post:
    summary: Request the deactivation of an existing MBS Resource.
    operationId: DeactivateMBSResource
    tags:
    - Individual MBS Resource (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MbsResDeact'
    responses:
      '200':
        description: >
          OK. The deactivation request is successfully received and processed.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MbsResDeact'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/unicast-subscriptions:

```

post:
  summary: Creates a new Individual Unicast Subscription resource
  operationId: CreateUnicastSubscription
  tags:
    - Unicast Subscriptions (Collection)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/UnicastSubscription'
  responses:
    '201':
      description: Success
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/UnicastSubscription'
      headers:
        Location:
          description: >
            Contains the URI of the created individual unicast subscription resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    UserPlaneNotification:
      '{$request.body#/notifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/UserPlaneNotification'

```

```
    responses:
      '204':
        description: No Content, Notification was succesfull
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
/unicast-subscriptions/{uniSubId}:
  get:
    summary: "Reads an existing Individual Unicast Subscription"
    operationId: GetUnicastSubscription
    tags:
      - Individual Unicast Subscription (Document)
    parameters:
      - name: uniSubId
        in: path
        description: Unicast Subscription ID
        required: true
        schema:
          type: string
    responses:
      '200':
        description: OK. Resource representation is returned
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/UnicastSubscription'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  put:
    summary: Update Individual Unicast Subscription resource.
    operationId: UpdateUnicastSubscription
    tags:
      - Individual Unicast Subscription (Document)
    parameters:
```

```
- name: uniSubId
  in: path
  description: Unicast Subscription ID
  required: true
  schema:
    type: string
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/UnicastSubscription'
responses:
  '200':
    description: >
      Successful case. The "Individual Unicast Subscription" resource is
      successfully updated and a representation of the updated resource is
      returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/UnicastSubscription'
  '204':
    description: >
      Successful case. The "Individual Unicast Subscription" resource is
      successfully updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
patch:
  summary: Modify Individual Unicast Subscription resource.
  operationId: ModifyUnicastSubscription
  tags:
    - Individual Unicast Subscription (Document)
  parameters:
    - name: uniSubId
      in: path
      description: Unicast Subscription ID
      required: true
      schema:
        type: string
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/UnicastSubscriptionPatch'
  responses:
    '200':
      description: >
        Successful case. The "Individual Unicast Subscription" resource is
        successfully modified and a representation of the updated resource is returned
        in the response body.
      content:
```

```

    application/json:
      schema:
        $ref: '#/components/schemas/UnicastSubscription'
  '204':
    description: >
      Successful case. The "Individual Unicast Subscription" resource is
      successfully modified and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: "Delete an existing Individual Unicast Subscription"
  operationId: DeleteUnicastSubscription
  tags:
    - Individual Unicast Subscription (Document)
  parameters:
    - name: uniSubId
      in: path
      description: Unicast Subscription ID
      required: true
      schema:
        type: string
  responses:
    '204':
      description: No Content. Resource was succesfully deleted
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/tsc-stream-availability:
  get:
    summary: Discover the TSC stream availability information.
    operationId: GetTscStreamAvailability
    tags:
      - TSC stream availability discovery
    parameters:
      - name: stream-specs
        in: query

```

```

    description: >
      The MAC address(es) of the source DS-TT port(s) and the destination DS-TT port(s).
    required: true
    content:
      application/json:
        schema:
          type: array
          items:
            $ref: '#/components/schemas/StreamSpecification'
          minItems: 1
  responses:
    '200':
      description: OK.
      content:
        application/json:
          schema:
            type: array
            items:
              $ref: '#/components/schemas/TscStreamAvailability'
            minItems: 0
    '204':
      description: No Content.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
/tsc-streams:
  get:
    summary: Retrieval of TSC stream data.
    operationId: GetTscStream
    tags:
      - TSC stream retrieval
    parameters:
      - name: val-stream-ids
        in: query
        description: Retrieval of TSC Stream data, identified by the VAL Stream ID(s).
        required: false
        schema:
          type: array
          items:
            type: string
          minItems: 1
    responses:
      '200':
        description: OK (successful query of TSC stream resource)
        content:
          application/json:
            schema:
              type: array
              items:
                $ref: '#/components/schemas/TscStreamData'
              minItems: 1
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'

```

```

    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  /tsc-streams/{valStreamId}:
    get:
      summary: "Reads an existing Individual TSC stream data information"
      operationId: GetTscStreamData
      tags:
        - Individual TSC Stream Retrieval
      parameters:
        - name: valStreamId
          in: path
          description: The VAL Stream ID identifies the TSC stream.
          required: true
          schema:
            type: string
      responses:
        '200':
          description: OK. Resource representation is returned
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/TscStreamData'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    put:
      summary: Create a TSC stream identified by a VAL stream identifier.
      operationId: PutTscStream
      tags:
        - TSC stream creation
      description: Create an individual TSC stream identified by VAL Stream ID.
      parameters:
        - name: valStreamId
          in: path
          description: VAL stream identifier
          required: true
          schema:
            type: string
      requestBody:
        description: TSC stream creation request data from the service consumer to the NRM server.
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/TscStreamData'

```



```
responses:
  '201':
    description: Success
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/TscStreamData'
    headers:
      Location:
        description: Contains the URI of the created individual TSC stream resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
delete:
  summary: "Delete an existing Individual TSC stream"
  operationId: DeleteTscStream
  tags:
    - Individual TSC Stream Deletion
  parameters:
    - name: valStreamId
      in: path
      description: The VAL Stream ID identifies the TSC stream.
      required: true
      schema:
        type: string
  responses:
    '204':
      description: No Content. Resource was succesfully deleted
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/bdt-policy-configs:
  post:
    summary: Creates a new Individual BDT Policy Configuration
    operationId: CreateBDTPolicyConfig
    tags:
      - BDT Policy Configurations (Collection)
    requestBody:
```

```
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/BdtPolConfig'
  responses:
    '201':
      description: Success
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/BdtPolConfig'
      headers:
        Location:
          description: >
            Contains the URI of the created individual BDT Policy configuration resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    BdtNotification:
      '{$request.body#/notifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/BdtNotification'
          responses:
            '204':
              description: No Content, Notification was successful
            '307':
              $ref: 'TS29122_CommonData.yaml#/components/responses/307'
            '308':
              $ref: 'TS29122_CommonData.yaml#/components/responses/308'
            '400':
              $ref: 'TS29122_CommonData.yaml#/components/responses/400'
            '401':
              $ref: 'TS29122_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29122_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29122_CommonData.yaml#/components/responses/404'
            '411':
              $ref: 'TS29122_CommonData.yaml#/components/responses/411'
            '413':
              $ref: 'TS29122_CommonData.yaml#/components/responses/413'
            '415':
              $ref: 'TS29122_CommonData.yaml#/components/responses/415'
            '429':
              $ref: 'TS29122_CommonData.yaml#/components/responses/429'
            '500':
              $ref: 'TS29122_CommonData.yaml#/components/responses/500'
            '503':
              $ref: 'TS29122_CommonData.yaml#/components/responses/503'
```

```

    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/bdt-policy-configs/{bdtPolConfigId}:
  parameters:
    - name: bdtPolConfigId
      in: path
      description: Represents the identifier of the Individual BDT Policy Configuration.
      required: true
      schema:
        type: string

  get:
    summary: Reads an existing Individual BDT Policy Configuration
    operationId: GetBDTPolicyConfig
    tags:
      - Individual BDT Policy Configuration(Document)
    responses:
      '200':
        description: OK. Resource representation is returned
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/BdtPolConfig'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Request the update of an existing Individual BDT Policy Configuration.
    operationId: UpdateBDTPolicyConfig
    tags:
      - Individual BDT Policy Configuration(Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/BdtPolConfig'
    responses:
      '200':
        description: >
          OK. Successful case. The targeted Individual BDT Policy Configuration resource
          is successfully updated and a representation of the updated resource is returned
          in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/BdtPolConfig'
      '204':
        description: >
          No Content. Successful case. The targeted Individual BDT Policy Configuration
          resource is successfully updated and no content is returned in the response body.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'

```

```

'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

```

summary: Request the modification of an existing Individual BDT Policy Configuration.
operationId: ModifyBDTPolicyConfig
tags:
  - Individual BDT Policy Configuration(Document)
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/BdtPolConfigPatch'
responses:
  '200':
    description: >
      OK. Successful case. The targeted Individual BDT Policy Configuration resource
      is successfully modified and a representation of the updated resource is returned
      in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/BdtPolConfig'
  '204':
    description: >
      No Content. Successful case. The targeted Individual BDT Policy Configuration
      resource is successfully modified and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

```

summary: Delete an existing Individual BDT policy Configuration
operationId: DeleteBDTPolicyConfig
tags:
  - Individual BDT Policy Configuration (Document)

```

```
responses:
  '204':
    description: No Content. Resource was successfully deleted
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/request-rel-trans:
  post:
    summary: Enables a service consumer to request reliable transmission service.
    operationId: RelTransRequest
    tags:
      - Reliable Transmission Service Request
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: 'TS29122_CommonData.yaml#/components/schemas/RelTransReq'
    responses:
      '204':
        description: >
          No Content. The reliable transmission service request is successfully received and
          processed.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/unif-traff-subscriptions:
  post:
    summary: Creates a new Individual Unified Traffic Pattern Subscription.
    operationId: CreateUnifiedTrafficPatternSubsc
    tags:
      - Unified Traffic Pattern Subscriptions (Collection)
    requestBody:
      required: true
      content:
        application/json:
```

```

    schema:
      $ref: '#/components/schemas/UnfTrafficSubc'
  responses:
    '201':
      description: Success
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/UnfTrafficSubc'
      headers:
        Location:
          description: >
            Contains the URI of the created individual unified traffic pattern subscription
            resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  UnfTrafficUpdNotification:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/UnfTrafficUpdNotification'
  responses:
    '204':
      description: No Content, Notification was successful
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```
/unif-traff-subscriptions/{unfTrffSubId}:
  parameters:
    - name: unfTrffSubId
      in: path
      description: >
        Represents the identifier of the Individual Unified Traffic Pattern Subscription resource.
      required: true
      schema:
        type: string

  get:
    summary: Reads an existing Individual Unified Traffic Pattern Subscription.
    operationId: GetUnfTrffSubc
    tags:
      - Individual Unified Traffic Pattern Subscription (Document)
    responses:
      '200':
        description: OK. Resource representation is returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/UnfTrafficSubc'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Update an existing Individual Unified Traffic Pattern Subscription.
    operationId: UpdateUnfTrffSubc
    tags:
      - Individual Unified Traffic Pattern Subscription (Document)
    requestBody:
      description: Updated details of the Unified Traffic Pattern subscription.
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/UnfTrafficSubc'
    responses:
      '200':
        description: >
          The subscription is updated successfully, and the updated subscription
          information returned in the response.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/UnfTrafficSubc'
      '204':
        description: No Content. The subscription is updated successfully.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

summary: Modify an existing Individual Unified Traffic Pattern Subscription.
 operationId: ModifyUnfTrffSubc

tags:

- Individual Unified Traffic Pattern Subscription (Document)

requestBody:

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/UnfTrafficSubcPatch'

responses:

'200':

description: >

The individual Unified Traffic Pattern subscription is modified successfully, and the representation of the modified resource is returned.

content:

application/json:

schema:

\$ref: '#/components/schemas/UnfTrafficSubcPatch'

'204':

description: No Content. The subscription is modified successfully.

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:

summary: Delete an existing Individual Unified Traffic Pattern Subscription
 operationId: DeleteUnfTrffSubc

tags:

- Individual Unified Traffic Pattern Subscription (Document)

responses:

'204':

description: No Content. Resource was successfully deleted

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'


```
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

MulticastSubscription:

description: Represents a multicast subscription.

type: object

properties:

valGroupId:

type: string

annMode:

\$ref: '#/components/schemas/ServiceAnnouncementMode'

multiQosReq:

type: string

locArea:

\$ref: 'TS29122_GMDviaMBMSbyMB2.yaml#/components/schemas/MbmsLocArea'

duration:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'

tmgi:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'

localMbmsInfo:

\$ref: 'TS29486_VAE_FileDistribution.yaml#/components/schemas/LocalMbmsInfo'

localMbmsActInd:

type: boolean

notifUri:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

reqTestNotif:

type: boolean

wsNotifCfg:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/WebsocketNotifConfig'

suppFeat:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

upIpv4Addr:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'

upIpv6Addr:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'

upPortNum:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/Port'

radioFreqs:

type: array

items:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'

minItems: 1

required:

- valGroupId
- annMode
- multiQosReq
- notifUri

UnicastSubscription:

description: Represents a network resource adaptation subscription.

type: object

properties:

```
    values:
      type: array
      items:
        type: string
      minItems: 1
    valGroupId:
      type: string
    valTgtUe:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    bdtId:
      type: string
    uniQosReq:
      type: string
    duration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    reqTestNotif:
      type: boolean
    wsNotifCfg:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsocketNotifConfig'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - notifUri
  oneOf:
    - required: [values]
    - required: [valGroupId]
    - required: [valTgtUe]

UnicastSubscriptionPatch:
  description: >
    Represents the requested modifications to a network resource adaptation subscription.
  type: object
  properties:
    values:
      type: array
      items:
        type: string
      minItems: 1
      nullable: true
    valGroupId:
      type: string
      nullable: true
    valTgtUe:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUeRm'
    bdtId:
      type: string
    uniQosReq:
      type: string
    duration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

UserPlaneNotification:
  description: Represents a notification on User Plane events.
  type: object
  properties:
    notifId:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    eventNotifs:
      type: array
      items:
        $ref: '#/components/schemas/NrmEventNotification'
      minItems: 1
  required:
    - notifId
    - eventNotifs

NrmEventNotification:
  description: Represents a notification on an individual User Plane event.
  type: object
  properties:
    event:
      $ref: '#/components/schemas/NrmEvent'
    ts:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
```

```
deliveryMode:
  $ref: '#/components/schemas/DeliveryMode'
streamIds:
  type: array
  items:
    type: string
  minItems: 1
stopUniStreamIds:
  type: array
  items:
    type: string
  minItems: 1
mbsResServiceArea:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalMbsServiceArea'
valueIds:
  type: array
  items:
    type: string
  minItems: 1
required:
- event
- ts

TscStreamAvailability:
  description: >
    TSC stream availability information includes the stream specification and list of traffic
    specifications. This response shall include stream specification matching one of the query
    parameters provided in the request.
  type: object
  properties:
    streamSpec:
      $ref: '#/components/schemas/StreamSpecification'
    trafficSpecs:
      type: array
      items:
        $ref: '#/components/schemas/TrafficSpecification'
      minItems: 1
  required:
- streamSpec
- trafficSpecs

StreamSpecification:
  description: >
    Stream specification includes MAC addresses of the source and destination DS-TT ports.
  type: object
  properties:
    srcMacAddr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'
    dstMacAddr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'
  required:
- srcMacAddr
- dstMacAddr

TrafficSpecification:
  description: >
    The traffic classe supported by the DS-TTs and available end-to-end maximum latency value.
  type: object
  properties:
    trafficClass:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    e2eMaxLatency:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  required:
- trafficClass
- e2eMaxLatency

TscStreamData:
  description: TSC stream data information.
  type: object
  properties:
    streamSpec:
      $ref: '#/components/schemas/StreamSpecification'
    trafficSpecInfo:
      $ref: '#/components/schemas/TrafficSpecInformation'
  required:
- streamSpec
- trafficSpecInfo
```

TrafficSpecInformation:

description: >
The traffic classe supported by the DS-TTs and available end-to-end latency value and Priority Code Point (PCP) value.
type: object
properties:
 pcpValue:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
 maxFramInt:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
 maxFramSize:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
 maxIntFrames:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
 maxLatency:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
required:
 - pcpValue
 - maxFramInt
 - maxFramSize
 - maxIntFrames
 - maxLatency

MBSResourceReq:

description: Represents the parameters to request the creation of an MBS Resource.
type: object
properties:
 mbsResource:
 \$ref: '#/components/schemas/MBSResource'
 supFeat:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
 - mbsResource

MBSResource:

description: Represents an MBS Resource.
type: object
properties:
 valGroupId:
 type: string
 valUeIdsList:
 type: array
 items:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 minItems: 1
 servAnmtMode:
 \$ref: '#/components/schemas/ServiceAnnoucementMode'
 mbsResServInfo:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/MbsServiceInfo'
 mbsResServiceArea:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalMbsServiceArea'
 notifUri:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
 netSysInd:
 \$ref: '#/components/schemas/NetSysIndicator'
 localMbmsInfo:
 \$ref: 'TS29486_VAE_FileDistribution.yaml#/components/schemas/LocalMbmsInfo'
 localMbmsActInd:
 type: boolean
 mbsResRespInfo:
 \$ref: '#/components/schemas/MBSResourceRespInfo'
oneOf:
 - required: [valGroupId]
 - required: [valUeIdsList]
not:
 required: [localMbmsInfo, localMbmsActInd]
required:
 - servAnmtMode
 - mbsResServInfo
 - notifUri

MBSResourceRespInfo:

description: Represents NRM Server side information related to the MBS Resource.
type: object
properties:
 mbs5gSessionId:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSessionId'

```
mbmsBearerId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSessionId'
upIpv4Addr:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv4Addr'
upIpv6Addr:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv6Addr'
upPortNum:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Port'
mbs5GInfo:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSession'
epsMbmsInfo:
  $ref: '#/components/schemas/EpsMbmsInfo'
anyOf:
  - required: [upIpv4Addr]
  - required: [upIpv6Addr]

MBSResourceResp:
  description: Represents a response to an MBS Resource creation/modification request.
  type: object
  properties:
    mbsResource:
      $ref: '#/components/schemas/MBSResource'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - mbsResource

MBSResourcePatch:
  description: Represents the parameters to request the modification of an MBS Resource.
  type: object
  properties:
    mbsResServInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsServiceInfo'
    mbsResServiceArea:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalMbsServiceArea'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    localMbmsInfo:
      $ref: 'TS29486_VAE_FileDistribution.yaml#/components/schemas/LocalMbmsInfo'
    localMbmsActInd:
      type: boolean
    mbsResRespInfo:
      $ref: '#/components/schemas/MBSResourceRespInfo'
  anyOf:
    - required: [mbsResServInfo]
    - required: [mbsResServiceArea]
    - required: [localMbmsInfo]
  not:
    required: [localMbmsInfo, localMbmsActInd]

MbsResAct:
  description: Represents the parameters related to the activation of the MBS Resource.
  type: object
  properties:
    mbs5gSessionId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSessionId'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - mbs5gSessionId

MbsResDeact:
  description: Represents the parameters related to the deactivation of the MBS Resource.
  type: object
  properties:
    mbs5gSessionId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSessionId'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - mbs5gSessionId

BdtPolConfig:
  description: Represents the parameters related to the BDT Policy configuration.
  type: object
  properties:
    valServId:
```

```

    type: string
  valGroupId:
    type: string
  valueIds:
    type: array
    items:
      type: string
    minItems: 1
  dataValue:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/UsageThreshold'
  desiredTimeWindow:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  grantTimeWindow:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  desiredGeoArea:
    $ref: '#/components/schemas/GeoArea'
  expTime:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  policyGuidance:
    $ref: '#/components/schemas/PolicyGuidance'
  bdtPolRefId:
    type: string
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  oneOf:
    - required: [valGroupId]
    - required: [valueIds]
  required:
    - valServId
    - notifUri
    - dataValue
    - desiredTimeWindow
    - desiredGeoArea

BdtPolConfigPatch:
  description: >
    Represents the parameters to request modification of the BDT Policy configuration.
  type: object
  properties:
    dataValue:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/UsageThreshold'
    desiredTimeWindow:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    desiredGeoArea:
      $ref: '#/components/schemas/GeoArea'
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  PolicyGuidance:
    description: >
      Represents the list of Policy Guidance.
    type: object
    properties:
      policyType:
        $ref: '#/components/schemas/PolicyType'
      cost:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
  GeoArea:
    description: Represents a Geographical area.
    type: object
    properties:
      geographicAreas:
        type: array
        items:
          $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
        minItems: 1
      description: Represents a list of Geographical area.
    civicAddresses:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
      minItems: 1
      description: Represents a list of Civic address of an area.

BdtNotification:
  description: Represents a notification on update related to BDT Policy configuration resource.

```

```
type: object
properties:
  notifId:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  bdtConfigId:
    type: string
  grantTimeWindow:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  bdtPolicyRemoveInd:
    type: boolean
    default: false
required:
- notifId
- bdtConfigId

UnfTrafficSubc:
description: Represents the request parameters for Unified Traffic Pattern subscription.
type: object
properties:
  mgmtSubs:
    type: object
    additionalProperties:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/ManagementSubc'
    minProperties: 1
    description: >
      Contains contains the unified traffic pattern subscription(s).
      The key of the map is any unique string encoded value.
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
- mgmtSubs
- notifUri

UnfTrafficSubcPatch:
description: Represents the request parameters to update Unified Traffic Pattern subscription.
type: object
properties:
  mgmtSubs:
    type: object
    additionalProperties:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/ManagementSubc'
    minProperties: 1
    description: >
      Contains contains the unified traffic pattern subscription(s).
      The key of the map is any unique string encoded value.
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

ManagementSubc:
description: Represents the Unified Traffic Pattern subscription details.
type: object
properties:
  valServId:
    type: string
  valUeIds:
    type: array
    items:
      type: string
    minItems: 1
  traffPatInd:
    type: array
    items:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TrafficPatternIndication'
    minItems: 1
  traffPatConfig:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TrafficPatternConfig'
required:
- valServId
- valUeIds
- traffPatInd

TrafficPatternConfig:
description: Represents the traffic pattern configuration parameters.
type: object
properties:
  scheds:
```

```
    type: array
    items:
      $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'
    minItems: 1
  expTime:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  stationInd:
    type: boolean
    default: false

UnfTrafficUpdNotification:
  description: Represents a notification on update related to unified traffic pattern.
  type: object
  properties:
    valueIds:
      type: array
      items:
        type: string
      minItems: 1
    sched:
      $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'
    stationInd:
      type: boolean
      default: false
    cause:
      type: string
  required:
    - valueIds

RelTransReq:
  description: Represents the parameters to request reliable transmission service.
  type: object
  properties:
    requestorId:
      type: string
    appDescs:
      type: array
      items:
        $ref: '#/components/schemas/AppTraffDesc'
      minItems: 2
    valueId:
      type: string
    valAddrInfo:
      $ref: '#/components/schemas/ValUeAddrInfo'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - requestorId

AppTraffDesc:
  description: Represents the application traffic descriptor.
  type: object
  properties:
    connInfo:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
    transProtoc:
      $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/TransportProtocol'
  required:
    - connInfo

ValUeAddrInfo:
  description: Represents VAL UE address information.
  type: object
  properties:
    valueIpv4Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    valueIpv6Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
    port:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Port'
  oneOf:
    - required: [valueIpv4Addr]
    - required: [valueIpv6Addr]
```

Simple data types and Enumerations

EpsMbmsInfo:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'

ServiceAnnouncementMode:
anyOf:
- type: string
enum:
- NRM
- VAL
- type: string
description: >
This string provides forward-compatibility with future extensions to the enumeration but is not used to encode content defined in the present version of this API.
description: |
Indicates the service announcement mode.
Possible values are:
- NRM: Indicates that the NRM server performs the service announcement.
- VAL: Indicates that the service consumer performs the service announcement.

DeliveryMode:
anyOf:
- type: string
enum:
- UNICAST
- MULTICAST
- MBS_MULTICAST
- MBS_BROADCAST
- type: string
description: >
This string provides forward-compatibility with future extensions to the enumeration but is not used to encode content defined in the present version of this API.
description: |
Indicates the user plane delivery mode.
Possible values are:
- UNICAST: Indicates Unicast delivery.
- MULTICAST: Indicates EPS MBMS Multicast delivery.
- MBS_MULTICAST: Indicates 5GS MBS Multicast delivery.
- MBS_BROADCAST: Indicates 5GS MBS Broadcast delivery.

NrmEvent:
anyOf:
- type: string
enum:
- UP_DELIVERY_MODE
- type: string
description: >
This string provides forward-compatibility with future extensions to the enumeration but is not used to encode content defined in the present version of this API.
description: |
Indicates the NRM event.
Possible values are:
- UP_DELIVERY_MODE: User Plane delivery mode.

NetSysIndicator:
anyOf:
- type: string
enum:
- 5GS
- EPS
- 5GS_AND_EPS
- type: string
description: >
This string provides forward-compatibility with future extensions to the enumeration but is not used to encode content defined in the present version of this API.
description: |
Represents the network system indicator, i.e. 5GS, EPS or both.
Possible values are:
- 5GS: Indicates that the network system is 5GS.
- EPS: Indicates that the network system is EPS.
- 5GS_AND_EPS: Indicates that the network system is 5GS and EPS.

PolicyType:
anyOf:
- type: string
enum:
- LOWEST_COST

```

    - HIGH_THROUGHPUT_WITH_COST
  - type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration but is not used to encode
    content defined in the present version of this API.
  description: |
    Indicates the Policy types.
    Possible values are:
    - LOWEST_COST: Indicates that the policy guidance is to consider lowest cost.
    - HIGH_THROUGHPUT_WITH_COST: Indicates that the policy guidance is to consider highest
      throughput.

TrafficPatternIndication:
  anyOf:
  - type: string
    enum:
      - TRAFFIC_PATTERN_MANAGE
      - TRAFFIC_PATTERN_MONITOR
      - NETWORK_PARAM_COORDINATION
  - type: string
    description: >
      This string provides forward-compatibility with future extensions to the enumeration
      but is not used to encode content defined in the present version of this API.
  description: |
    Represents the unified traffic pattern indication requests.
    Possible values are:
    - TRAFFIC_PATTERN_MANAGE: Indicates management of the UE unified traffic pattern request.
    - TRAFFIC_PATTERN_MONITOR: Indicates monitoring of the UE unified traffic pattern.
    - NETWORK_PARAM_COORDINATION: Indicates network parameter coordination by NRM with 5GC.

```

A.6 SS_Events API

openapi: 3.0.0

```

info:
  title: SS_Events
  description: |
    API for SEAL Events management.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.3.0-alpha.5"

```

```

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

servers:
  - url: '{apiRoot}/ss-events/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

```

```

paths:
  /subscriptions:
    post:
      description: Creates a new individual SEAL Event Subscription.
      operationId: CreateSealEventSubsc
      tags:
        - SEAL Events Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SEALEventSubscription'
      callbacks:
        notificationDestination:

```

```

    '{$request.body#/notificationDestination}':
      post:
        requestBody: # contents of the callback message
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SEALEventNotification'
        responses:
          '204':
            description: No Content (successful notification)
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    responses:
      '201':
        description: SEAL Events subscription resource created successfully.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SEALEventSubscription'
        headers:
          Location:
            description: Contains the URI of the newly created resource.
            required: true
            schema:
              type: string
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  delete:
    description: Deletes an individual SEAL Event Subscription.
    operationId: DeleteIndSealEventSubsc
    tags:

```

```

- Individual SEAL Events Subscription (Document)
parameters:
- name: subscriptionId
  in: path
  description: Identifier of an individual Events Subscription
  required: true
  schema:
    type: string
responses:
'204':
  description: >
    The individual SEAL Events Subscription matching the subscriptionId is deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
patch:
description: Modify an existing SEAL Event Subscription.
operationId: ModifyIndSealEventSubsc
tags:
- Individual SEAL Events Subscription (Document)
parameters:
- name: subscriptionId
  in: path
  description: Identifier of an individual Events Subscription
  required: true
  schema:
    type: string
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/SEALEventSubscriptionPatch'
responses:
'200':
  description: >
    The definition SEAL event subscription is modified successfully and
    a representation of the updated service API is returned in the request body.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/SEALEventSubscription'
'204':
  description: No Content. The SEAL Event Subscription is modified successfully.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
put:
  description: Replace an existing SEAL event subscription.
  operationId: UpdateIndSealEventSubsc
  tags:
    - Individual SEAL Events Subscription (Document)
  parameters:
    - name: subscriptionId
      in: path
      description: Identifier of an individual Events Subscription
      required: true
      schema:
        type: string
  requestBody:
    description: Individual SEAL events subscription to be replaced.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/SEALEventSubscription'
  responses:
    '200':
      description: SEAL Event subscription updated successfully.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/SEALEventSubscription'
    '204':
      description: No Content. Individual SEAL event subscription was updated successfully.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    SEALEventSubscription:
      description: Represents an individual SEAL Event Subscription resource.
      type: object
      properties:

```

```
subscriberId:
  type: string
  description: String identifying the subscriber of the event.
eventSubs:
  type: array
  items:
    $ref: '#/components/schemas/EventSubscription'
  minItems: 1
  description: Subscribed events.
eventReq:
  $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
notificationDestination:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
requestTestNotification:
  type: boolean
  description: >
    Set to true by Subscriber to request the SEAL server to send a test notification.
    Set to false or omitted otherwise.
websocketNotifConfig:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsocketNotifConfig'
eventDetails:
  type: array
  items:
    $ref: '#/components/schemas/SEALEventDetail'
  minItems: 1
supFeat:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
- subscriberId
- eventSubs
- eventReq
- notificationDestination

SEALEventSubscriptionPatch:
  description: Represents the partial update of individual SEAL Event Subscription resource.
  type: object
  properties:
    eventSubs:
      type: array
      items:
        $ref: '#/components/schemas/EventSubscription'
      minItems: 1
      description: Subscribed events.
    eventReq:
      $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
    notificationDestination:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

SEALEventNotification:
  description: Represents notification information of a SEAL Event.
  type: object
  properties:
    subscriptionId:
      type: string
      description: Identifier of the subscription resource.
    eventDetails:
      type: array
      items:
        $ref: '#/components/schemas/SEALEventDetail'
      minItems: 1
      description: Detailed notifications of individual events.
  required:
- subscriptionId
- eventDetails

EventSubscription:
  description: Represents the subscription to a single SEAL event.
  type: object
  properties:
    eventId:
      $ref: '#/components/schemas/SEALEvent'
    valGroups:
      type: array
      items:
        $ref: '#/components/schemas/VALGroupFilter'
      minItems: 1
      description: >
        Each element of the array represents the VAL group identifier(s) of a VAL service
```

that the subscriber wants to know in the interested event.

identities:

- type: array
- items:
 - \$ref: '#/components/schemas/IdentityFilter'
- minItems: 1
- description: >
 - Each element of the array represents the VAL User / UE IDs of a VAL service that the event subscriber wants to know in the interested event.

monFltr:

- type: array
- items:
 - \$ref: '#/components/schemas/MonitorFilter'
- minItems: 1
- description: >
 - List of event monitoring details that the subscriber wishes to mmonitor the VAL UEs, VAL group and/or VAL service.

areaInt:

- type: array
- items:
 - \$ref: '#/components/schemas/MonitorLocationInterestFilter'
- minItems: 1
- description: >
 - Represents the list of VAL User / UE IDs and the area of interest information which the subscriber wishes to monitor the location deviation of VAL User / UEs.

locAreaMon:

- type: array
- items:
 - \$ref: '#/components/schemas/MonLocAreaInterestFltr'
- minItems: 1
- description: >
 - Each element represents the location area monitoring details to monitor the VA UEs moving in and out of the provided location area.

partialFailRep:

- \$ref: '#/components/schemas/PartialEventSubscFailRep'

satSfTrigger:

- type: array
- items:
 - \$ref: '#/components/schemas/SatSfTrigger'
- minItems: 1

required:

- eventId

SEALEventDetail:

- description: Represents the SEAL event details.
- type: object
- properties:
 - eventId:
 - \$ref: '#/components/schemas/SEALEvent'
 - lmInfos:
 - type: array
 - items:
 - \$ref: '#/components/schemas/LMInformation'
 - minItems: 1
 - valGroupDocuments:
 - type: array
 - items:
 - \$ref: 'TS29549_SS_GroupManagement.yaml#/components/schemas/VALGroupDocument'
 - minItems: 1
 - description: >
 - The VAL groups documents with modified membership and configuration information.
 - profileDocs:
 - type: array
 - items:
 - \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ProfileDoc'
 - minItems: 1
 - description: Updated profile information associated with VAL Users or VAL UEs.
 - msgFltrs:
 - type: array
 - items:
 - \$ref: '#/components/schemas/MessageFilter'
 - minItems: 1
 - description: >
 - The message filter information for various member VAL User or UEs of the VAL group.
 - monRep:
 - type: array
 - items:
 - \$ref: '#/components/schemas/MonitorEventsReport'

```
    minItems: 1
    description: The events reports with details of the events related to the VAL UE(s).
  locAdhr:
    type: array
    items:
      $ref: '#/components/schemas/LocationDevMonReport'
    minItems: 1
    description: >
      The location deviation information for the interested VAL User ID or UE IDs
      in a given location.
  tempGroupInfo:
    $ref: '#/components/schemas/TempGroupInfo'
  locAreaMonRep:
    type: array
    items:
      $ref: '#/components/schemas/LocationAreaMonReport'
    minItems: 1
    description: The location area monitoring of the given area of interest.
  valGroupIds:
    type: array
    items:
      type: string
    minItems: 1
    description: Contains the identifier(s) of the deleted VAL Group(s).
  satSfInfo:
    type: array
    items:
      $ref: '#/components/schemas/SatSfInfo'
    minItems: 1
  required:
    - eventId

VALGroupFilter:
  description: Represents a filter of VAL group identifiers belonging to a VAL service.
  type: object
  properties:
    valSvcId:
      type: string
      description: Identity of the VAL service
    valGrpIds:
      type: array
      items:
        type: string
      minItems: 1
      description: >
        VAL group identifiers that event subscriber wants to know in the interested event.
  required:
    - valGrpIds

IdentityFilter:
  description: Represents a filter of VAL User / UE identities belonging to a VAL service.
  type: object
  properties:
    valSvcId:
      type: string
      description: Identity of the VAL service
    valTgtUes:
      type: array
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
      description: >
        VAL User IDs or VAL UE IDs that the event subscriber wants to know
        in the interested event.
  suppLoc:
    type: boolean
    description: Set to true by Subscriber to request the supplementary location information.
  locQoS:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LocationQoS'
  velocityReq:
    type: boolean
    description: Indicates whether velocity of the location information is requested.
  locDataStatsReq:
    type: boolean
    description: Indicates whether the location data statistics is requested.
  dataStatisticsReq:
    $ref: '#/components/schemas/DataStatisticsReq'
```


LMInformation:
description: Represents the location information for a VAL User ID or a VAL UE ID.
type: object
properties:
 valTgtUe:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 locInfo:
 \$ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
 timeStamp:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
 valSvcId:
 type: string
 description: Identity of the VAL service
required:
 - locInfo
 - valTgtUe

MessageFilter:
description: Represents the message filters applicable to a VAL User ID or VAL UE ID.
type: object
properties:
 reqUe:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 tgtUe:
 type: array
 items:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 minItems: 1
 description: List of VAL User or UE IDs whose message to be sent.
 maxMsgs:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
 schedules:
 type: array
 items:
 \$ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'
 minItems: 1
 description: Time frame associated with total number of messages.
 msgTypes:
 type: array
 items:
 type: string
 minItems: 1
 description: List of message types to be sent to VAL UE.
required:
 - reqUe

MonitorFilter:
description: Represents the event monitoring filters applicable to a VAL User ID or VAL UE ID.
type: object
properties:
 idnts:
 type: array
 items:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 minItems: 1
 description: List of VAL User or UE IDs whose events monitoring is requested.
 valSvcId:
 type: string
 description: Identity of the VAL service.
 valGrpId:
 type: string
 description: Identity of the group of the target UEs.
 profId:
 type: string
 description: The monitoring profile ID identifying a list of monitoring, analytics events.
 valCnds:
 type: array
 items:
 \$ref: '##/components/schemas/ValidityConditions'
 minItems: 1
 description: The temporal,spatial conditions for the events to be considered valid.
 evntDets:
 type: array
 items:
 \$ref: '##/components/schemas/MonitorEvents'
 minItems: 1
 description: List of monitoring, analytics events to be monitored.

MonitorEvents:
description: List of event types to be monitored in the context of events monitoring service.
type: object
properties:
 cnEvnts:
 type: array
 items:
 \$ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/MonitoringType'
 minItems: 1
 description: List of monitoring events related to VAL UE.
 anlEvnts:
 type: array
 items:
 \$ref: 'TS29522_AnalyticsExposure.yaml#/components/schemas/AnalyticsEvent'
 minItems: 1
 description: List of analytics events related to VAL UE.

MonitorEventsReport:
description: List of monitoring and/or analytics events related to VAL UE.
type: object
properties:
 tgtUe:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 evnts:
 type: array
 items:
 \$ref: '#/components/schemas/MonitorEvents'
 minItems: 1
 description: List of monitoring and analytics events related to VAL UE.
required:
 - tgtUe
 - evnts

ValidityConditions:
description: List of monitoring and/or analytics events related to VAL UE.
type: object
properties:
 locArea:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
 tmWdws:
 type: array
 items:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
 minItems: 1
 description: Time window validity conditions.

MonitorLocationInterestFilter:
description: Represents the location monitoring filter information.
type: object
properties:
 tgtUes:
 type: array
 items:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 minItems: 1
 description: List of VAL Users or UE IDs for which location monitoring is requested.
 locInt:
 \$ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
 valSvcId:
 \$ref: 'TS29549_SS_VALServiceAreaConfiguration.yaml#/components/schemas/ValSvcAreaId'
 notInt:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
 dynamicLoc:
 \$ref: '#/components/schemas/ReferenceUEDetail'
 events:
 type: array
 items:
 \$ref: '#/components/schemas/LocDevNotification'
 minItems: 1
 geofCond:
 \$ref: '#/components/schemas/GeofencingConditions'
required:
 - tgtUes
 - notInt
oneOf:
 - required: [locInt]
 - required: [valSvcId]
 - required: [dynamicLoc]

```
LocationDevMonReport:
  description: Location deviation monitoring report.
  type: object
  properties:
    tgtUes:
      type: array
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
      description: List of VAL Users or UE IDs for which report is related to.
    locInfo:
      $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
    notifyType:
      $ref: '#/components/schemas/LocDevNotification'
  required:
    - tgtUes
    - locInfo
    - notifyType

TempGroupInfo:
  description: Represents the created temporary VAL group information.
  type: object
  properties:
    valGrpIds:
      type: array
      items:
        type: string
      minItems: 1
    tempValGrpId:
      type: string
    valSvcIds:
      type: array
      items:
        type: string
      minItems: 1
  required:
    - valGrpIds
    - tempValGrpId

MonLocAreaInterestFltr:
  description: >
    Filter information indicate the area of interest and triggering/geofencing events.
  type: object
  properties:
    locInfoCri:
      $ref: '#/components/schemas/LocationInfoCriteria'
    trigEvnts:
      type: array
      items:
        $ref: '#/components/schemas/MonLocTriggerEvent'
      minItems: 1
    valServiceId:
      type: string
  required:
    - locInfoCri

LocationInfoCriteria:
  description: >
    Geographic location and reference UE details, where the UEs moving in and out
    to be monitored.
  type: object
  properties:
    geoArea:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
    refUe:
      $ref: '#/components/schemas/ReferenceUEDetail'
    valSvcAreaId:
      $ref: 'TS29549_SS_VALServiceAreaConfiguration.yaml#/components/schemas/ValSvcAreaId'
  oneOf:
    - required: [geoArea]
    - required: [refUe]

ReferenceUEDetail:
  description: Reference UE details, where the UEs moving in and out to be monitored.
  type: object
  properties:
```

```

    valTgtUe:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    proxRange:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    proxRangeFrac:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
  required:
    - valTgtUe
    - proxRange

LocationAreaMonReport:
  description: Event report to notify the VAL UEs moving in or out from a given location.
  type: object
  properties:
    curPreUEs:
      type: array
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
      description: List of identities of all VAL UEs present in the given location area.
    moveInOutUEs:
      $ref: '#/components/schemas/MoveInOutUEDetails'
    trigEvt:
      $ref: '#/components/schemas/MonLocTriggerEvent'

MoveInOutUEDetails:
  description: List of UEs moved in and out.
  type: object
  properties:
    moveInUEs:
      type: array
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
      description: >
        List of identities of VAL UEs who moved in to given location area
        since previous notification.
    numUEsMovedIn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    timingUEsMovedIn:
      type: object
      additionalProperties:
        $ref: '#/components/schemas/MovTimingInfo'
      minProperties: 1
      description: >
        Contains the timing information of the VAL UE(s) that moved into the geofencing area
        since the previous notification.
        The key of the map shall be set to the value of the identifier of the VAL UE (among the
        ones provided within the moveInUEs attribute) to which the timing information provided
        within the map value is related.
    moveOutUEs:
      type: array
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
      description: >
        List of identities of VAL UEs who moved out of the given location area
        since previous notification.
    numUEsMovedOut:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    timingUEsMovedOut:
      type: object
      additionalProperties:
        $ref: '#/components/schemas/MovTimingInfo'
      minProperties: 1
      description: >
        Contains the timing information of the VAL UE(s) that moved out of the geofencing area
        since the previous notification.
        The key of the map shall be set to the value of the identifier of the VAL UE (among the
        ones provided within the "moveOutUEs" attribute) to which the timing information
        provided within the map value is related.

PartialEventSubscFailRep:
  description: Represents the partial failure report during the subscription creation or update.
  type: object
  properties:
    valTgtUes:
      type: array

```

```
    items:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    minItems: 1
    description: >
      List of VAL user(s) / VAL UE(s) whose identifier(s) is not found.
  valGrpIds:
    type: array
    items:
      type: string
    minItems: 1
    description: >
      List of VAL group(s) whose identifier(s) is not found.
  oneOf:
    - required: [valTgtUes]
    - required: [valGrpIds]

DataStatisticsReq:
  description: >
    Represents the required information when the target UE's location data is calculated.
  type: object
  properties:
    timeReqs:
      $ref: '#/components/schemas/TimeReqs'
    locReqs:
      type: array
      items:
        $ref: 'TS29549_SS_NetworkResourceAdaptation.yaml#/components/schemas/GeoArea'
      minItems: 1
  anyOf:
    - required: [timeReqs]
    - required: [locReqs]

TimeReqs:
  description: >
    Represents the time information when the target UE's location data is calculated.
  type: object
  properties:
    timeWindows:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
      minItems: 1
    timeSchedule:
      type: array
      items:
        $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'
      minItems: 1
  oneOf:
    - required: [timeWindows]
    - required: [timeSchedule]

GeofencingConditions:
  description: Represents the geofencing conditions.
  type: object
  properties:
    plmn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
    roamingInd:
      type: boolean
      description: Represents the roaming status.
    accessType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
    locInfo:
      $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
    schedules:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ScheduledCommunicationTime'
      minItems: 1
    refUECap:
      $ref: '#/components/schemas/RefUeCap'

MovTimingInfo:
  description: Represents the timing information of a VAL UE's movements.
  type: object
  properties:
    timestamp:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
```

```

    duration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  anyOf:
    - required: [timestamp]
    - required: [duration]

```

SatSfInfo:

```

description: Represents the event report of satellite SF information.
type: object
properties:
  satSfTrigger:
    $ref: '#/components/schemas/SatSfTrigger'
  tgtUe:
    $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
  ueSfMode:
    $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/UeStrAndFwdStatus'
  estTime:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  fLinkAvail:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  timeStamp:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  required:
    - satSfTrigger
    - tgtUe

```

RefUeCap:

```

description: >
  Represents the capabilities of the reference UE.
type: object
properties:
  refUECap:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
  required:
    - refUECap

```

Simple data types and Enumerations

SEALEvent:

```

anyOf:
  - type: string
    enum:
      - LM_LOCATION_INFO_CHANGE
      - GM_GROUP_INFO_CHANGE
      - CM_USER_PROFILE_CHANGE
      - GM_GROUP_CREATE
      - NRM_MONITOR_UE_USER_EVENTS
      - LM_LOCATION_DEVIATION_MONITOR
      - GM_TEMP_GROUP_FORMATION
      - LM_LOCATION_AREA_MONITOR
      - GM_GROUP_DELETION
      - NRM_SAT_SF_INFO
  - type: string
    description: >
      This string provides forward-compatibility with future
      extensions to the enumeration but is not used to encode
      content defined in the present version of this API.
description: |
  Represents the type of SEAL events that can be subscribed.
  Possible values are:
  - LM_LOCATION_INFO_CHANGE: Events related to the location information of VAL Users or
    VAL UEs from the Location Management Server.
  - GM_GROUP_INFO_CHANGE: Events related to the modification of VAL group membership
    and configuration information from the Group Management Server.
  - CM_USER_PROFILE_CHANGE: Events related to update of user profile information from
    the Configuration Management Server.
  - GM_GROUP_CREATE: Events related to creation of new VAL groups from the Group
    Mananagement Server.
  - NRM_MONITOR_UE_USER_EVENTS: Monitoring and analytic events related to VAL UEs,
    users or VAL group, from the Network Resource Management Server.
  - LM_LOCATION_DEVIATION_MONITOR: Events from Location Management server,
    related to the deviation of the VAL User(s) / UE(s) location from an area of interest.
  - GM_TEMP_GROUP_FORMATION: Events related to the formation of new temporary VAL groups
    from the Group Management Server.
  - LM_LOCATION_AREA_MONITOR: Events from Location Management server, related to the list
    of UEs moving in or moving out of the specific location.
  - GM_GROUP_DELETION: Events related to deletion of existing VAL Group(s) from the GM Server.
  - NRM_SAT_SF_INFO: Events related to satellite S&F information.

```

```

LocDevNotification:
  anyOf:
    - type: string
      enum:
        - NOTIFY_MISMATCH_LOCATION
        - NOTIFY_ABSENCE
        - NOTIFY_PRESENCE
        - NOTIFY_UNKNOWN
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
      description: |
        Possible values are:
        Enumeration of location deviation notification reports.
        - NOTIFY_MISMATCH_LOCATION: This value indicates that the location information of
          the VAL UE(s) from the SEAL LM client and the core network are not matching.
        - NOTIFY_ABSENCE: This value indicates that the current location information of
          the VAL UE(s) is deviating from the VAL server's area of interest.
        - NOTIFY_PRESENCE: This value indicates that the current location information of
          the VAL UE(s) is within the VAL server's area of interest.
        - NOTIFY_UNKNOWN: This value indicates that the LM server cannot determine
          whether the target VAL UE current location is within the VAL server's
          dynamic area of interest information or not.

MonLocTriggerEvent:
  anyOf:
    - type: string
      enum:
        - DISTANCE_TRAVELLED
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
      description: |
        Identifies the triggering event in the location area monitor filtering.
        Possible values are:
        - DISTANCE_TRAVELLED: This value indicates the trigger event for the location area
          monitoring based on the distance travelled by the reference UE.

SatsfTrigger:
  anyOf:
    - type: string
      enum:
        - UE_SF_MODE
        - EST_DELIVERY_TIME
        - FLINK_AVAIL_PERIOD
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
      description: |
        Identifies the triggering event in the location area monitor filtering.
        Possible values are:
        - UE_SF_MODE: Indicates that the triggering condition is the UE status in S&F mode.
        - EST_DELIVERY_TIME: Indicates that the triggering condition is the estimated S&F DL
          delivery time.
        - FLINK_AVAIL_PERIOD: Indicates that the triggering condition is the feeder link
          availability period.

```

A.7 SS_KeyInfoRetrieval API

openapi: 3.0.0

```

info:
  title: SS_KeyInfoRetrieval
  description: |
    API for SEAL Key Information Retrieval.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.3.0-alpha.1"

```

```
externalDocs:
  description: >
    3GPP TS 29.549 V19.1.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:
- {}
- oAuth2ClientCredentials: []

servers:
- url: '{apiRoot}/ss-kir/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:
  /key-records:
    get:
      description: Retrieve key management information specific to VAL service.
      operationId: RetrieveKeyMgmtInfo
      tags:
      - Key Records (Collection)
      parameters:
      - name: val-service-id
        in: query
        description: String identifying an individual VAL service
        required: true
        schema:
          type: string
      - name: val-tgt-ue
        in: query
        description: Identifying a VAL target.
        required: false
        content:
          application/json:
            schema:
              $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      responses:
        '200':
          description: The key management information of the VAL service, VAL User or VAL UE.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ValKeyInfo'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
```



```
schemas:
  ValKeyInfo:
    description: >
      Represents key management information associated with VAL server, VAL user or VAL UE.
    type: object
    properties:
      userUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      skmsId:
        type: string
        description: String identifying the key management server.
      valService:
        type: string
        description: Unique identifier of a VAL Service.
      valTgtUe:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      keyInfo:
        type: string
        description: Key management information specific to VAL service, VAL User or VAL UE.
    required:
      - userUri
      - valService
      - keyInfo
```

A.8 SS_LocationAreaInfoRetrieval API

openapi: 3.0.0

```
info:
  title: SS_LocationAreaInfoRetrieval
  description: |
    API for SEAL Location Area Info Retrieval.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.2.0-alpha.3"
```

```
externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/
```

```
security:
  - {}
  - oAuth2ClientCredentials: []
```

```
servers:
  - url: '{apiRoot}/ss-lair/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
```

```
paths:
  /location-retrievals:
    get:
      description: >
        Retrieve the UE(s) information in an application defined proximity range of a location.
      operationId: RetrieveUeLocInfo
      tags:
        - Location Information (Collection)
      parameters:
        - name: location-info
          in: query
          description: Location information around which the UE(s) information is requested.
          required: true
          content:
            application/json:
              schema:
                $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
        - name: val-svc-area-id
          in: query
          description: >
            The val service area identifier around which which the UE(s) information is requested.
```

```

    schema:
      $ref: 'TS29549_SS_VALServiceAreaConfiguration.yaml#/components/schemas/ValSvcAreaId'
  - name: range
    in: query
    description: >
      The range information over which the UE(s) information is required,
      expressed in meters.
    required: true
    schema:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
responses:
  '200':
    description: >
      The UE(s) information in an application defined proximity range of a location.
    content:
      application/json:
        schema:
          type: array
          items:
            $ref: 'TS29549_SS_Events.yaml#/components/schemas/LMInformation'
          minItems: 0
          description: >
            The UE(s) information in an application defined proximity range of a location.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

```

A.9 Void

A.10 SS_NetworkResourceMonitoring API

```

openapi: 3.0.0
info:
  title: SS_NetworkResourceMonitoring
  description: |
    API for SEAL Network Resource Monitoring.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.2.0-alpha.2"
externalDocs:
  description: >
    3GPP TS 29.549 V19.1.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/
security:

```

```

- {}
- oAuth2ClientCredentials: []
servers:
- url: '{apiRoot}/ss-nrm/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
paths:
  /subscriptions:
    post:
      summary: Create individual unicast monitoring subscription resource or obtain unicast QoS
      monitoring data for VAL UEs, VAL Group, or VAL Streams.
      operationId: SubscribeUnicastMonitoring
      tags:
        - Unicast Monitoring Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MonitoringSubscription'
      responses:
        '201':
          description: >
            The requested individual monitoring subscription resource is successfully created
            and a representation of the created resource is returned in the response body.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/MonitoringSubscription'
          headers:
            Location:
              description: Contains the URI of the newly created individual monitoring resource.
              required: true
              schema:
                type: string
        '200':
          description: The requested unicast QoS monitoring data is returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/MonitoringReport'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    callbacks:
      NotifyUnicastMonitoringData:
        '{$request.body#/notifUri}':
          post:
            summary: Notify on updates of the individual monitoring resource according to the requested
            reporting settings.
            requestBody:
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/MonitoringReport'
            responses:

```

```

    '204':
      description: The notification is successfully received.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  /subscriptions/{subscriptionId}:
    delete:
      summary: Remove an existing individual unicast monitoring subscription resource according to
the subscriptionId.
      operationId: UnsubscribeUnicastMonitoring
      tags:
        - Individual Unicast Monitoring Subscription (Document)
      parameters:
        - name: subscriptionId
          in: path
          description: >
            Represents the identifier of an individual unicast monitoring subscription resource.
          required: true
          schema:
            type: string
      responses:
        '204':
          description: >
            The Individual Unicast Monitoring Subscription resource matching the
            subscriptionId is deleted.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    get:
      summary: Read an existing individual unicast monitoring subscription resource according to the
subscriptionId.
      operationId: ReadUnicastMonitoringSubscription
      tags:
        - Individual Unicast Monitoring Subscription (Document)
      parameters:
        - name: subscriptionId
          in: path
          description: >

```

```

    Represents the identifier of an individual unicast monitoring subscription resource.
    required: true
    schema:
      type: string
  responses:
    '200':
      description: The requested individual unicast monitoring subscription returned.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MonitoringSubscription'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: >
    Update an individual unicast monitoring subscription identified by the subscriptionId.
  operationId: UpdateUnicastMonitoring
  tags:
    - Individual Unicast Monitoring Subscription (Document)
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Represents the identifier of an individual unicast monitoring subscription resource.
        required: true
      schema:
        type: string
  requestBody:
    description: Updated details of the unicast QoS monitoring subscription.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/MonitoringSubscription'
  responses:
    '200':
      description: >
        The subscription is updated successfully, and the updated subscription
        information returned in the response.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/MonitoringSubscription'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'

```

```
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

patch:

```
summary: >
  Modify an individual unicast monitoring subscription identified
  by the subscriptionId.
operationId: ModifyUnicastMonitoring
tags:
  - Individual Unicast Monitoring Subscription (Document)
parameters:
  - name: subscriptionId
    in: path
    description: >
      Represents the identifier of an individual unicast monitoring subscription resource.
    required: true
    schema:
      type: string
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/MonitoringSubscriptionPatch'
```

responses:

```
'200':
  description: >
    Individual individual unicast QoS monitoring subscription resource is modified
    successfully and representation of the modified individual unicast QoS monitoring
    subscription resource is returned.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/MonitoringSubscription'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

components:

```
securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}
```

schemas:

```
MonitoringReport:
```

```

description: Indicates the monitoring information for VAL UEs list, VAL Group, or VAL Stream.
type: object
properties:
  valueIds:
    type: array
    minItems: 1
    items:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    description: List of VAL UEs whose QoS monitoring data is requested.
  valGroupId:
    type: string
    description: The VAL Group Id which QoS monitoring data is requested.
  valStreamIds:
    type: array
    minItems: 1
    items:
      type: string
    description: List of VAL streams for which QoS monitoring data is requested.
  measData:
    $ref: '#/components/schemas/MeasurementData'
  termCause:
    $ref: '#/components/schemas/TerminationMode'
  failureRep:
    type: array
    items:
      $ref: '#/components/schemas/FailureReport'
    description: >
      The failure report indicating the VAL UE(s) or VAL Stream ID(s) whose measurement
      data is not obtained successfully.
  timestamp:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  monProfId:
    $ref: '#/components/schemas/MonProfId'
required:
  - measData
  - timestamp
oneOf:
  - required: [valueIds]
  - required: [valGroupId]
  - required: [valStreamIds]

MeasurementData:
description: Presents the aggregated measurement data.
type: object
properties:
  dlDelay:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  ulDelay:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  rtDelay:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  avgPlr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
  avgDataRate:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
  maxDataRate:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
  avrDlTrafficVol:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  avrUlTrafficVol:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
anyOf:
  - required: [dlDelay]
  - required: [ulDelay]
  - required: [rtDelay]
  - required: [avgPlr]
  - required: [avgDataRate]
  - required: [maxDataRate]
  - required: [avrDlTrafficVol]
  - required: [avrUlTrafficVol]

MeasurementPeriod:
description: >
  Indicates the measurement time period.
type: object
properties:
  measStartTime:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'

```

```
    measDuration:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  required:
    - measStartTime
    - measDuration

ReportingRequirements:
  description: Indicates the requested frequency of reporting.
  type: object
  properties:
    reportingMode:
      $ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/NotificationMethod'
    reportingPeriod:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    reportingThrs:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ReportingThreshold'
      minItems: 1
    immRep:
      type: boolean
    repTerminMode:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TerminationMode'
    expirationTimer:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    maxNumRep:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    termThr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MeasurementData'
    termThrMode:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ThresholdHandlingMode'
  required:
    - reportingMode

FailureReport:
  description: >
    Represents the failure report indicating the VAL UE(s) or VAL Stream ID(s)
    for which the NRM server failed to obtain the requested data.
  type: object
  properties:
    valueIds:
      type: array
      minItems: 1
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
        description: >
          List of VAL UE(s) whose measurement data is not obtained successfully.
    valStreamIds:
      type: array
      minItems: 1
      items:
        type: string
        description: >
          List of VAL stream ID(s) whose measurement data is not obtained successfully.
    failureReason:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/FailureReason'
    measDataType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MeasurementDataType'
  required:
    - measDataType

MeasurementRequirements:
  description: Indicates the measurement requirements.
  type: object
  properties:
    measDataTypes:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/MeasurementDataType'
      minItems: 1
      description: Indicates the required the QoS measurement data types.
    measAggrGranWnd:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AverWindow'
    measPeriod:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MeasurementPeriod'
  required:
    - measDataTypes
```



```

MonitoringSubscription:
  description: The unicast monitoring subscription request.
  type: object
  properties:
    valueIds:
      description: List of VAL UEs whose QoS monitoring data is requested.
      type: array
      minItems: 1
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    valGroupId:
      type: string
      description: The VAL Group Id which QoS monitoring data is requested.
    valStreamIds:
      type: array
      minItems: 1
      items:
        type: string
      description: List of VAL streams for which QoS monitoring data is requested.
    valServId:
      type: string
      description: Contains the VAL service identifier.
    monProfId:
      $ref: '#/components/schemas/MonProfId'
    measReqs:
      $ref: '#/components/schemas/MeasurementRequirements'
    monRep:
      $ref: '#/components/schemas/MonitoringReport'
    reportReqs:
      $ref: '#/components/schemas/ReportingRequirements'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    reqTestNotif:
      type: boolean
    wsNotifCfg:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsocketNotifConfig'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    oneOf:
      - required: [valueIds]
      - required: [valGroupId]
      - required: [valStreamIds]

ReportingThreshold:
  description: >
    Indicates the requested reporting termination threshold for the measurement index(es).
  type: object
  properties:
    measThrValues:
      $ref: '#/components/schemas/MeasurementData'
    thrDirection:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MatchingDirection'
  required:
    - measThrValues
    - thrDirection

MonitoringSubscriptionPatch:
  description: Represents the monitoring subscription modification request.
  type: object
  properties:
    measReqs:
      $ref: '#/components/schemas/MeasurementRequirements'
    reportReqs:
      $ref: '#/components/schemas/ReportingRequirements'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    monProfId:
      $ref: '#/components/schemas/MonProfId'

# Simple data types and Enumerations

MonProfId:
  description: Represents the monitoring profile identifier.
  type: string

MeasurementDataType:
  anyOf:
    - type: string

```

```
enum:
  - DL_DELAY
  - UL_DELAY
  - RT_DELAY
  - AVG_PLR
  - AVG_DATA_RATE
  - MAX_DATA_RATE
  - AVG_DL_TRAFFIC_VOLUME
  - AVG_UL_TRAFFIC_VOLUME
- type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration and is not used to encode
    content defined in the present version of this API.
description: |
  Indicates the requested measurement data type.
  Possible values are:
  - DL_DELAY: Downlink packet delay.
  - UL_DELAY: Uplink packet delay.
  - RT_DELAY: Round trip packet delay.
  - AVG_PLR: Average packet loss rate.
  - AVG_DATA_RATE: Average data rate.
  - MAX_DATA_RATE: Maximum data rate.
  - AVG_DL_TRAFFIC_VOLUME: Average downlink traffic volume.
  - AVG_UL_TRAFFIC_VOLUME: Average uplink traffic volume.

TerminationMode:
  anyOf:
  - type: string
    enum:
      - TIME_TRIGGERED
      - EVENT_TRIGGERED_NUM_REPORTS_REACHED
      - EVENT_TRIGGERED_MEAS_THR_REACHED
      - USER_TRIGGERED
  - type: string
    description: >
      This string provides forward-compatibility with future
      extensions to the enumeration and is not used to encode
      content defined in the present version of this API.
  description: |
    Indicates the termination mode.
    Possible values are:
    - TIME_TRIGGERED: Time-triggered termination mode.
    - EVENT_TRIGGERED_NUM_REPORTS_REACHED: Event-triggered termination number of reports
      reached mode.
    - EVENT_TRIGGERED_MEAS_THR_REACHED: The event-triggered termination measurement index
      threshold reached mode.
    - USER_TRIGGERED: User-triggered termination mode.

FailureReason:
  anyOf:
  - type: string
    enum:
      - USER_NOT_FOUND
      - STREAM_NOT_FOUND
      - DATA_NOT_AVAILABLE
      - OTHER_REASON
  - type: string
    description: >
      This string provides forward-compatibility with future
      extensions to the enumeration and is not used to encode
      content defined in the present version of this API.
  description: |
    Represents the failure reason.
    Possible values are:
    - USER_NOT_FOUND: The user is not found.
    - STREAM_NOT_FOUND: The stream is not found.
    - DATA_NOT_AVAILABLE: The requested data is not available.
    - OTHER_REASON: Other reason (unspecified).

ThresholdHandlingMode:
  anyOf:
  - type: string
    enum:
      - ALL_REACHED
      - ANY_REACHED
  - type: string
    description: >
```

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |

Indicates the multi-parameter threshold handling mode.

Possible values are:

- ALL_REACHED: The decision criterion is met when all the provided thresholds are reached.
- ANY_REACHED: The decision criterion is met when any of the provided threshold(s) is reached.

A.11 SS_VALServiceData API

openapi: 3.0.0

info:

title: SS_VALServiceData

version: 1.0.0

description: |

API for VAL Service Data.

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externalDocs:

description: >

3GPP TS 29.549 V18.6.0 Service Enabler Architecture Layer for Verticals (SEAL);

Application Programming Interface (API) specification; Stage 3.

url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/ss-vsd/v1'

variables:

apiRoot:

default: <https://example.com>

description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

/val-servdata:

get:

summary: Retrieve VAL service data.

operationId: RetrieveValServData

tags:

- VAL Service Data Sets (Collection)

parameters:

- name: val-tgt-ues

in: query

description: Identifying the list of the target VAL UE(s).

required: false

schema:

type: array

items:

type: string

minItems: 1

- name: val-tgt-users

in: query

description: Identifying the list of the target VAL user(s).

required: false

schema:

type: array

items:

type: string

minItems: 1

- name: val-service-ids

in: query

description: Identifies the list of the target VAL service(s).

required: false

schema:

type: array

items:

type: string

minItems: 1

- name: supp-feats

```

    in: query
    description: >
      Contains the list of supported features among the ones defined in clause 7.3.2.7..
    required: false
    schema:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  responses:
    '200':
      description: OK. The requested VAL Service Data shall be returned.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ValServDataResp'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

```

```

schemas:
  ValServDataResp:
    description: Represents the response to a VAL service data retrieval request.
    type: object
    properties:
      valServData:
        type: array
        items:
          $ref: '#/components/schemas/ValServiceData'
        minItems: 0
      suppFeats:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - valServData

  ValServiceData:
    description: >
      Represents the VAL service data.
    type: object
    properties:
      valTgtUe:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      valServIds:
        type: array
        items:
          type: string
          minItems: 1
          description: >
            List of the VAL services associated with the VAL user or a VAL UE defined
            in the "valTgtUe" attribute.
      valServSpecInfo:
        type: string
    required:

```

- valTgtUe
- valServIds

A.12 SS_VALServiceAreaConfiguration API

openapi: 3.0.0

info:

```

title: SS_VALServiceAreaConfiguration
description: |
  API for SEAL VAL Service Area Configuration Service.
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  All rights reserved.
version: "1.1.0-alpha.3"

```

externalDocs:

```

description: >
  3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
  Application Programming Interface (API) specification; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

```

security:

- {}
- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/ss-vsac/v1'
- variables:
 - apiRoot:
 - default: https://example.com
 - description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

```

/areas:
  get:
    summary: Obtain the VAL service area(s) according to the provided filtering criteria.
    operationId: ObtainValServiceAreas
    tags:
      - VAL Service Areas (Collection)
    parameters:
      - name: val-svc-area-ids
        in: query
        description: Represents the requested VAL service areas.
        required: false
        schema:
          type: array
          items:
            $ref: '#/components/schemas/ValSvcAreaId'
          minItems: 1
      - name: supp-feats
        in: query
        description: To filter irrelevant responses related to unsupported features.
        required: false
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    responses:
      '200':
        description: The requested VAL service areas information is returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ValServiceAreaData'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'

```

```
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

/areas/configure:

post:

summary: Configure VAL service area(s).

operationId: ConfigureValServiceAreas

tags:

- Configure

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/ValServiceAreaReq'

responses:

'200':

description: >

Successful case. The identifier(s) of the configured VAL service area(s) information are Returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/ValServiceAreaResp'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

/areas/update:

post:

summary: Update existing VAL service area(s).

operationId: UpdateValServiceAreas

tags:

- Update

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/ValServiceAreaReq'

responses:

'200':

description: >

Successful case. The identifier(s) of the updated VAL service area(s) information are returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/ValServiceAreaResp'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

```

'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/areas/delete:

```

post:
  summary: Delete existing VAL service area(s).
  operationId: DeleteValServiceAreas
  tags:
    - Delete
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ValServiceAreaReq'
  responses:
    '200':
      description: >
        Successful case. The identifier(s) of the deleted VAL service area(s) information are
        returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ValServiceAreaResp'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/subscriptions:

```

post:
  summary: Create individual VAL service area change event(s) subscription.
  operationId: SubscribeChangeEvents
  tags:
    - VAL Service Area Change Subscriptions (Collection)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ValServiceAreaSubsc'
  responses:
    '201':
      description: >
        The requested individual VAL service area change event(s) subscription
        resource is successfully created and a representation of the created

```

```

    resource is returned in the response body.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/ValServiceAreaSubsc'
  headers:
    Location:
      description: Contains the URI of the newly created resource.
      required: true
      schema:
        type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  NotifyValServiceAreaChange:
    '{$request.body#/notifUri}':
      post:
        summary: Notify on changes of the VAL service area(s) according to the requested
reporting settings.
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ValServiceAreaNotif'
  responses:
    '204':
      description: The notification is successfully received.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId

```



```
in: path
description: >
  Represents the identifier of an individual VAL service area change event(s)
  subscription resource.
required: true
schema:
  type: string

get:
  summary: Read an existing individual unicast monitoring subscription resource according to the
  subscriptionId.
  operationId: ReadValServiceAreaChange
  tags:
    - Individual VAL Service Area Change Subscription (Document)
  responses:
    '200':
      description: >
        The requested individual VAL service area change event(s) subscription is returned.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ValServiceAreaSubsc'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Update individual VAL service area change event(s) subscription.
  operationId: UpdateIndValServAreaChangeSubsc
  tags:
    - Individual VAL Service Area Change Subscription (Document)
  requestBody:
    description: Updated details of the unicast VAL service area change event(s) subscription.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ValServiceAreaSubsc'
  responses:
    '200':
      description: >
        The subscription is updated successfully, and the updated subscription
        information returned in the response.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ValServiceAreaSubsc'
    '204':
      description: No Content. The subscription is updated successfully.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
```

```

'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

summary: Modify the individual VAL service area change event(s) subscription.
 operationId: ModifyIndValServAreaChangeSubsc

tags:

- Individual VAL Service Area Change Subscription (Document)

requestBody:

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/ValServiceAreaSubscPatch'

responses:

'200':

description: >

The individual VAL service area change event(s) subscription is modified successfully, and the representation of the modified resource is returned.

content:

application/json:

schema:

\$ref: '#/components/schemas/ValServiceAreaSubsc'

'204':

description: No Content. The subscription is modified successfully.

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:

summary: Remove the existing individual VAL service area change event(s) subscription resource according to the subscriptionId.

operationId: UnsubscribeValServiceAreaChange

tags:

- Individual VAL Service Area Change Subscription (Document)

responses:

'204':

description: >

The individual VAL service area change event(s) subscription resource matching the subscriptionId is deleted.

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122_CommonData.yaml#/components/responses/308'

```
'400':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'  
'401':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'  
'403':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'  
'404':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'  
'429':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'  
'500':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'  
'503':  
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'  
default:  
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

components:

```
securitySchemes:  
  oAuth2ClientCredentials:  
    type: oauth2  
    flows:  
      clientCredentials:  
        tokenUrl: '{tokenUrl}'  
        scopes: {}
```

schemas:

```
ValServiceArea:  
  description: Represents the VAL service area.  
  type: object  
  properties:  
    valSvcAreaId:  
      $ref: '#/components/schemas/ValSvcAreaId'  
    locations:  
      type: array  
      description: Represents the locations associated with the VAL service area.  
      minItems: 1  
      items:  
        $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'  
  required:  
  - valSvcAreaId  
  - locations  
  
ValServiceAreaReq:  
  description: Represents the VAL service area configuration/update/delete request.  
  type: object  
  properties:  
    valSvcAreas:  
      type: array  
      description: Represents the VAL service area(s).  
      minItems: 1  
      items:  
        $ref: '#/components/schemas/ValServiceArea'  
    suppFeat:  
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'  
  required:  
  - valSvcAreas  
  
ValServiceAreaData:  
  description: Represents the VAL service area retrieval information.  
  type: object  
  properties:  
    valSvcAreas:  
      type: array  
      description: Represents the requested VAL service area(s).  
      minItems: 1  
      items:  
        $ref: '#/components/schemas/ValServiceArea'  
    suppFeat:  
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'  
  
ValServiceAreaResp:  
  description: Represents the VAL service area configuration/update/delete response.  
  type: object  
  properties:  
    valSvcAreaIds:  
      type: array  
      description: Represents the identifier(s) of the successfully handled VAL service area(s).
```

```
    minItems: 1
    items:
      $ref: '#/components/schemas/ValSvcAreaId'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - valSvcAreaIds

ValServiceAreaSubscPatch:
  description: Represents the VAL service area change event(s) modification request.
  type: object
  properties:
    events:
      type: array
      description: Represents the subscribed VAL service area change event(s).
      items:
        $ref: '#/components/schemas/ValServiceAreaEventType'
      minItems: 1
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    subscDur:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'

ValSvcAreaId:
  type: string
  description: >
    Represents the VAL Service Area identifier encoded as a string and generated
    either based on VAL Server ID or using the Universally Unique Identifier (UUID)
    version 4 as described in IETF RFC 9562.

ValServiceAreaSubsc:
  description: Represents the VAL service area change event(s) subscription.
  type: object
  properties:
    events:
      type: array
      description: Represents the subscribed VAL service area change event(s).
      minItems: 1
      items:
        $ref: '#/components/schemas/ValServiceAreaEventType'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    subscDur:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - events
    - notifUri

ValServiceAreaEventType:
  description: Represents the VAL service area change event type.
  type: object
  properties:
    event:
      $ref: '#/components/schemas/ValServiceAreaEvent'
    valSvcAreaIds:
      type: array
      description: Represents the VAL service area ID(s) associated with the event.
      minItems: 1
      items:
        $ref: '#/components/schemas/ValSvcAreaId'
  required:
    - event
    - valSvcAreaIds

ValServiceAreaNotif:
  description: Represents the VAL service area change event(s) notification.
  type: object
  properties:
    valSvcAreaConts:
      description: Represents the VAL service area change event(s) content.
      minItems: 1
      items:
        $ref: '#/components/schemas/ValServiceAreaEventInfo'
  required:
    - valSvcAreaConts
```

```
ValServiceAreaEventInfo:
  description: Represents the VAL service area change event(s) content.
  type: object
  properties:
    event:
      $ref: '#/components/schemas/ValServiceAreaEvent'
    valSvcAreas:
      type: array
      description: Represents the VAL service area(s) associated with the event.
      minItems: 1
      items:
        $ref: '#/components/schemas/ValServiceArea'
    valSvcAreaIds:
      type: array
      description: Represents the VAL service area(s) associated with the event.
      minItems: 1
      items:
        $ref: '#/components/schemas/ValSvcAreaId'
  required:
    - event
```

Simple data types and Enumerations

```
ValServiceAreaEvent:
  anyOf:
    - type: string
      enum:
        - UPDATE
        - DELETE
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration and is not used to encode
        content defined in the present version of this API.
  description: |
    Represents the VAL service area change event.
    Possible values are:
    - UPDATE: Indicates that the VAL service area change event is VAL service area update.
    - DELETE: Indicates that the VAL service area change event is VAL service area delete.
```

A.13 SS_IdmParameterProvisioning API

openapi: 3.0.0

info:

title: SS_IdmParameterProvisioning
version: 1.0.0
description: |
API for SEAL Identity management.
© 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
All rights reserved.

externalDocs:

description: >
3GPP TS 29.549 V18.6.0 Service Enabler Architecture Layer for Verticals (SEAL);
Application Programming Interface (API) specification; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:

- {}
- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/ss-ipp/v1'
variables:
apiRoot:
default: <https://example.com>
description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

/configurations:

post:

description: Provisions VAL Services configuration information.
operationId: CreateValServiceConf

tags:

- VAL Services Configurations (Collection)

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/VALServicesConfig'

responses:

'201':

description: VAL services configuration created successfully.

content:

application/json:

schema:

\$ref: '#/components/schemas/VALServicesConfig'

headers:

Location:

description: Contains the URI of the newly created resource.

required: true

schema:

type: string

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

get:
  description: Retrieves VAL services configuration satisfying filter criteria
  operationId: RetrieveValServiceConf
  tags:
    - VAL Services Configurations (Collection)
  parameters:
    - name: val-server-id
      in: query
      description: String identifying the VAL server.
      required: false
      schema:
        type: string
    - name: config-ids
      in: query
      description: Identifying the list of the val services configuration resources.
      required: false
      schema:
        type: array
        items:
          type: string
        minItems: 1
    - name: supp-feats
      in: query
      description: >
        Contains the list of supported features among the ones defined in clause 7.8.1.7.
      required: false
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  responses:
    '200':
      description: >
        OK. The requested VAL services configuration(s) matching the received query parameter(s)
        shall be returned.
        If there are no active VAL services configuration(s) matching the received query
        parameter(s), an empty array is returned.
      content:
        application/json:
          schema:
            type: array
            items:
              $ref: '#/components/schemas/VALServicesConfig'
            minItems: 0
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/configurations/{confId}:

```

get:
  description: Retrieves Individual VAL services configuration information.
  operationId: RetrieveIndValServicesConf
  tags:
    - Individual VAL Services Configuration (Document)
  parameters:
    - name: confId
      in: path
      description: String identifying an individual VAL services configuration resource.
      required: true
      schema:

```

```

    type: string
  responses:
    '200':
      description: The whole Individual VAL services configuration resource.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/VALServicesConfig'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  description: Updates an individual VAL services configuration resource.
  operationId: UpdateIndValServicesConf
  tags:
    - Individual VAL Services Configuration (Document)
  parameters:
    - name: confId
      in: path
      description: String identifying an individual VAL services configuration resource
      required: true
      schema:
        type: string
  requestBody:
    description: VAL services configuration to be updated in IM server.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/VALServicesConfig'
  responses:
    '200':
      description: VAL services configuration updated successfully.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/VALServicesConfig'
    '204':
      description: No Content
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':

```



```

    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

```

description: Modify an existing VAL services configuration.
operationId: ModifyIndValServicesConf
tags:
  - Individual VAL Services Configuration (Document)
parameters:
  - name: confId
    in: path
    description: Identifier of an individual VAL services configuration resource.
    required: true
    schema:
      type: string
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/VALServicesConfigPatch'
responses:
  '200':
    description: >
      The individual VAL services configuration resource is modified successfully and a
      representation of the updated VAL services configuration resource is returned in
      the request body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/VALServicesConfig'
  '204':
    description: No Content. The individual VAL services configuration is modified

```

successfully.

```

  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

```

description: Deletes a VAL Services Configuration.
operationId: DeleteIndValServicesConf
tags:
  - Individual VAL Services Configuration (Document)
parameters:
  - name: confId
    in: path
    description: String identifying an individual VAL Service Configuration resource.
    required: true
    schema:
      type: string

```

```
responses:
  '204':
    description: The individual VAL services configuration matching confId was deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
```

```
schemas:
  VALServicesConfig:
    description: Represents a VAL services configuration.
    type: object
    properties:
      valSvcConf:
        type: array
        items:
          $ref: '#/components/schemas/VALServiceParams'
        minItems: 1
        description: The list of the provisioned VAL services configuration parameters.
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - valSvcConf
```

```
VALServiceParams:
  description: Represents VAL services configuration information.
  type: object
  properties:
    valServiceId:
      type: string
      description: The identifier of the VAL service.
    idList:
      type: array
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
      description: The list of VAL User IDs or VAL UE IDs.
  required:
    - valServiceId
    - idList
```

```
VALServicesConfigPatch:
  description: >
    Represents of the requested modifications to a VAL services configuration.
  type: object
  properties:
    valSvcConf:
      type: array
      description: The list of the provisioned VAL services configuration parameters.
      items:
        $ref: '#/components/schemas/VALServiceParams'
      minItems: 1
```

A.14 SS_KMParametersProvisioning API

openapi: 3.0.0

info:

title: SEAL KM Server Key Management Parameters Provisioning Service
 version: "1.0.0"
 description: |
 SEAL KM Server Key Management Parameters Provisioning Service.
 © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
 All rights reserved.

externalDocs:

description: >
 3GPP TS 29.549 V18.6.0 Service Enabler Architecture Layer for Verticals (SEAL);
 Application Programming Interface (API) specification; Stage 3.
 url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:

- {}
- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/ss-kpp/v1'

variables:
 apiRoot:
 default: <https://example.com>
 description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

/request:

post:

summary: Enables a service consumer to request key parameters provisioning to the SEAL KM

Server..

operationId: Request

tags:

- Key Management Parameters Provisioning Request

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/VALKeyPpReq'

responses:

'200':

description: >

OK. The requested key management parameters are successfully received, processed and provisioned.

content:

application/json:

schema:

\$ref: '#/components/schemas/VALKeyPpResp'

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

```

    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

schemas:
  VALKeyPpReq:
    description: Represents the key management parameters to be provisioned.
    type: object
    properties:
      skmcUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      valServiceId:
        type: string
      valTgtUe:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      payloadId:
        type: string
      payload:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - skmcUri
      - valServiceId
  VALKeyPpResp:
    description: Represents the response to a key management parameters provisioning request.
    type: object
    properties:
      skmcUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      valServiceId:
        type: string
      valTgtUe:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      payloadId:
        type: string
      skmsId:
        type: string
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - skmcUri
      - valServiceId

```

A.15 SS_ADAE_VALPerformanceAnalytics API

openapi: 3.0.0

```

info:
  title: SS_ADAE_VALPerformanceAnalytics
  description: |
    API for ADAE VAL performance analytics service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.1.0-alpha.3"

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:
  - {}

```

```

- OAuth2ClientCredentials: []

servers:
- url: '{apiRoot}/ss-adae-pa/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:
  /application-performance:
    post:
      description: Creates a new individual VAL performance event subscription.
      operationId: CreateIndValPerfEventSubsc
      tags:
        - VAL performance event subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AppPerfSub'
      callbacks:
        paNotification:
          '{$request.body#/notifUri}':
            post:
              requestBody: # contents of the callback message
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/AppPerfNotif'
      responses:
        '204':
          description: No Content (successful notification)
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    responses:
      '201':
        description: VAL performance event subscription resource created successfully.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AppPerfSub'
        headers:
          Location:
            description: Contains the URI of the newly created resource.
            required: true
            schema:
              type: string
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'

```

```

'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/application-performance/{appPerfId}:

get:

description: Retrieves an individual VAL performance event subscription.

operationId: ReadIndValPerfEventSubsc

tags:

- Individual VAL performance event subscription (Document)

parameters:

- name: appPerfId

in: path

description: Identifier of an individual VAL performance event subscription.

required: true

schema:

type: string

responses:

'200':

description: >

The individual VAL performance subscription matching the appPerfId is retrieved.

content:

application/json:

schema:

\$ref: '#/components/schemas/AppPerfSub'

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'406':

\$ref: 'TS29122_CommonData.yaml#/components/responses/406'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:

description: Deletes an individual VAL performance event subscription.

operationId: DeleteIndValPerfEventSubsc

tags:

- Individual VAL performance event subscription (Document)

parameters:

- name: appPerfId

in: path

description: Identifier of an individual VAL performance event subscription.

required: true

schema:

type: string

responses:

'204':

description: >

The individual VAL performance subscription matching the appPerfId is deleted.

```

'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

AppPerfSub:

description: Represents an individual VAL performance event subscription resource.

type: object

properties:

notifUri:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

analyticsType:

\$ref: '#/components/schemas/AnalyticsType'

analyticsId:

\$ref: '#/components/schemas/AnalyticsIdVpa'

valServiceId:

type: string

valUeIds:

type: array

items:

\$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'

minItems: 1

description: >

One or more VAL UE IDs whose analytics or data collection are subject to subscription.

valServerId:

type: string

description: Identity of the VAL server

dataProdProfile:

\$ref: '#/components/schemas/ProdProfileInfo'

clientAppData:

\$ref: '#/components/schemas/ClientApplicationData'

confLevel:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

area:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'

repThrs:

type: array

items:

\$ref: '#/components/schemas/PerfThreshold'

minItems: 1

timeValidity:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'

repReq:

\$ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'

expReq:

\$ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'

suppFeat:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- notifUri
- analyticsType
- valServiceId

```
AppPerfNotif:
  description: Represents notification of the VAL performance event.
  type: object
  properties:
    analyticsOutput:
      $ref: '../components/schemas/AnalyticsOutput'
    output:
      type: string
      description: Provided output for analytics.
    valServerId:
      type: string
      description: VAL Server identifier.
    valueIds:
      type: array
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
      description: List of VAL UE identifiers.
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    confLevel:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    timeHorizon:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  required:
    - valServerId
  oneOf:
    - required: [output]
    - required: [analyticsOutput]

ProdProfileInfo:
  description: Represents capability of the data producer.
  type: object
  properties:
    prodId:
      type: string
      description: Identity of the data producer.
    prodType:
      $ref: '../components/schemas/ProducerType'
    dataType:
      $ref: '../components/schemas/ProducerData'
    prodRole:
      $ref: '../components/schemas/ProducerRole'
    origProdIds:
      type: array
      items:
        type: string
      minItems: 1
      description: >
        Identifies the identity of the original data producers.
    dataFresh:
      type: integer
      description: Duration of elapsed time in seconds.
    producerCap:
      $ref: '../components/schemas/ProducerCap'
  required:
    - prodId
    - prodType
    - dataType

ProducerCap:
  description: Represents capability of the data producer.
  type: object
  properties:
    durationTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    anonymization:
      type: boolean
      description: >
        Set to true if anonymization is supported. Set to false or omitted otherwise.
    dataRate:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
    schedule:
      $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'

AnalyticsType:
  description: Represents type of requested analytics.
```



```
type: object
properties:
  category:
    $ref: '#/components/schemas/AnalyticsCategory'
required:
  - category

PerfData:
description: Represents the performance data.
type: object
properties:
  rtt:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  avgDataRate:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
  maxDataRate:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
  jitter:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  qoeMos:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
  qoeStalEvent:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  qoeStalRatio:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
  qosProfileLoad:
    type: integer
    minimum: -100
    maximum: 100
  valTrafLoad:
    type: integer
    minimum: -100
    maximum: 100
  valSesPerfChange:
    type: integer
    minimum: -100
    maximum: 100
anyOf:
  - required: [rtt]
  - required: [avgDataRate]
  - required: [maxDataRate]
  - required: [jitter]
  - required: [qoeMos]
  - required: [qoeStalEvent]
  - required: [qoeStalRatio]
  - required: [qosProfileLoad]
  - required: [valTrafLoad]
  - required: [valSesPerfChange]

PerfThreshold:
description: >
  Represents the performance threshold.
type: object
properties:
  value:
    $ref: '#/components/schemas/PerfData'
  thrDirect:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MatchingDirection'
required:
  - value
  - thrDirect

ClientApplicationData:
description: >
  Represents the ADAE client application data.
type: object
properties:
  ueRoute:
    $ref: 'TS29257_UAE_ChangeUSSManagement.yaml#/components/schemas/UasRoute'
  sesSched:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ScheduledCommunicationTime'
    minItems: 1
anyOf:
  - required: [ueRoute]
  - required: [sesSched]
```

```
AnalyticsOutput:
  description: >
    Represents the VAL performance analytics output.
  type: object
  properties:
    analyticsId:
      $ref: '#/components/schemas/AnalyticsIdVpa'
    valServ:
      $ref: '#/components/schemas/PerfData'
    valSess:
      $ref: '#/components/schemas/PerfData'
  required:
    - analyticsId
```

Simple data types and Enumerations

```
AnalyticsCategory:
  anyOf:
    - type: string
      enum:
        - PREDICTIVE
        - STATISTICS
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
      description: |
        Represents the type of the analytics.
        Possible values are:
        - PREDICTIVE: The event for the analytics is for predictive analytics.
        - STATISTICS: The event for analytics is for statistics analytics.
```

```
ProducerType:
  anyOf:
    - type: string
      enum:
        - ADAE_CLIENT
        - A_DCCF
        - VAL_SERVER
        - SEAL_SERVER
        - SEAL_CLIENT
        - EES
        - EAS
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
      description: |
        Represents the type of the data producer.
        Possible values are:
        - ADAE_CLIENT: The data producer is ADAE client.
        - A_DCCF: The data producer is A-DCCF.
        - VAL_SERVER: The data producer is VAL server.
        - SEAL_SERVER: The data producer is SEAL server.
        - SEAL_CLIENT: The data producer is SEAL client.
        - EES: The data producer is EES.
        - EAS: The data producer is EAS.
```

```
ProducerData:
  anyOf:
    - type: string
      enum:
        - PERFORMANCE_INDICATOR
        - REPRODUCER_USAGE_DATA
        - SERVER_LOAD_DATA
        - APPLICATION_PERFORMANCE
        - EDGE_LOAD
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
      description: |
        Represents the data type of the data producer.
        Possible values are:
        - PERFORMANCE_INDICATOR: The data type of the data producer is
```

- performance indicator.
- REPRODUCER_USAGE_DATA: The data type of the data producer is reproducer usage data.
- SERVER_LOAD_DATA: The data type of the data producer is server load data.
- APPLICATION_PERFORMANCE: The data type of the data producer is application performance.
- EDGE_LOAD: The data type of the data producer is edge load.

ProducerRole:

anyOf:

- type: string

enum:

- GENERATING_ENTITY
- ORIGINAL_PRODUCER
- RESPOSITORY

- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration but is not used to encode content defined in the present version of this API.

description: |

Represents the role of the data producer.

Possible values are:

- GENERATING_ENTITY: The role of the data producer is generating entity.
- ORIGINAL_PRODUCER: The role of the data producer is original producer.
- RESPOSITORY: The role of the data producer is repository.

AnalyticsIdVpa:

anyOf:

- type: string

enum:

- VAL_SERVER_PERF
- VAL_SESSION_PERF

- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration but is not used to encode content defined in the present version of this API.

description: |

Represents the analytics identifier for VAL performance analytics.

Possible values are:

- VAL_SERVER_PERF: Indicates that requested analytics is VAL server performance analytics.
- VAL_SESSION_PERF: Indicates that requested analytics is VAL session performance analytics.

A.16 SS_ADAE_SlicePerformanceAnalytics API

openapi: 3.0.0

info:

title: SS_ADAE_SlicePerformanceAnalytics

description: |

API for ADAE slice-specific application performance analytics service.

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version: "1.1.0-alpha.2"

externalDocs:

description: >

3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);

Application Programming Interface (API) specification; Stage 3.

url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/ss-adae-sspa/v1'

variables:

apiRoot:

default: https://example.com
 description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

/slice-specific-application-performance:

post:

description: >
 Creates a new individual slice-specific application performance event subscription.
 operationId: SliceAppPerfSubs
 tags:
 - Slice-specific application performance event subscriptions (Collection)
 requestBody:
 required: true
 content:
 application/json:
 schema:
 \$ref: '#/components/schemas/SliceAppPerfSub'

callbacks:

sspaNotification:

'{\$request.body#/notifUri}':

post:

requestBody: # contents of the callback message
 required: true
 content:
 application/json:
 schema:
 \$ref: '#/components/schemas/SliceAppPerfNotif'

responses:

'204':
 description: No Content (successful notification)
 '307':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/307'
 '308':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/308'
 '400':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/400'
 '401':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/401'
 '403':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/403'
 '404':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/404'
 '411':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/411'
 '413':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/413'
 '415':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/415'
 '429':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/429'
 '500':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/500'
 '503':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/503'
 default:
 \$ref: 'TS29122_CommonData.yaml#/components/responses/default'

responses:

'201':
 description: Slice-specific performance event subscription resource created successfully.
 content:
 application/json:
 schema:
 \$ref: '#/components/schemas/SliceAppPerfSub'
 headers:
 Location:
 description: Contains the URI of the newly created resource.
 required: true
 schema:
 type: string
 '400':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/400'
 '401':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/401'
 '403':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/403'
 '404':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/404'
 '411':

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/slice-specific-application-performance/{ssAppPerfId}:

get:

```

  description: >
    Retrieves an individual slice-specific application performance event subscription.
  operationId: ReadIndSliceAppPerfEventSubsc
  tags:
    - Individual slice-specific application performance event subscription (Document)
  parameters:
    - name: ssAppPerfId
      in: path
      description: >
        Identifier of an individual slice-specific application performance event subscription.
      required: true
      schema:
        type: string
  responses:
    '200':
      description: >
        The individual slice-specific application performance
        subscription matching the ssAppPerfId is retrieved.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/SliceAppPerfSub'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

```

  description: Deletes an individual slice-specific application performance event subscription.
  operationId: DeleteIndSliceAppPerfEventSubsc
  tags:
    - Individual slice-specific application performance event subscription (Document)
  parameters:
    - name: ssAppPerfId
      in: path
      description: >
        Identifier of an individual slice-specific application performance event subscription.
      required: true
      schema:
        type: string
  responses:
    '204':
      description: >
        The individual slice-specific application performance subscription matching
        the ssAppPerfId is deleted.

```

```

'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

securitySchemes:

oAuth2ClientCredentials:

```
type: oauth2
```

flows:

clientCredentials:

```
tokenUrl: '{tokenUrl}'
```

```
scopes: {}
```

schemas:

SliceAppPerfSub:

```
description: >
```

Represents an individual slice-specific application performance event subscription resource.

```
type: object
```

properties:

notifUri:

```
$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
```

analyticsType:

```
$ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
```

sliceId:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
```

dnn:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
```

valueIds:

```
type: array
```

items:

```
$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
```

```
minItems: 1
```

```
description: >
```

One or more VAL UE IDs whose analytics are subject to subscription.

valServerId:

```
type: string
```

```
description: >
```

Identity of the VAL server if the consumer is different than the VAL server of interest.

valServiceId:

```
type: string
```

confLevel:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
```

area:

```
$ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
```

timeValidity:

```
$ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
```

timeHorizon:

```
$ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
```

repReq:

```
$ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
```

suppFeat:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
```

required:

- analyticsType
- notifUri
- sliceId

SliceAppPerfNotif:

description: Represents notification of the slice-specific application performance event.

```
type: object
```

properties:

```

    analyticsOutput:
      type: array
      items:
        $ref: '#/components/schemas/SliceAppPerfAnalytics'
      minItems: 1
    output:
      type: string
      description: Output data.
    confLevel:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    timeHorizon:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  oneOf:
    - required: [output]
    - required: [analyticsOutput]

SliceAppPerfAnalytics:
  description: >
    Represents the analytics output for slice performance analytics.
  type: object
  properties:
    valServerId:
      type: string
    valServiceId:
      type: string
    sliceId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    minRtt:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    avgRtt:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    maxRtt:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    minLat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    avgLat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    maxLat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
  allOf:
    - anyOf:
        - required: [valServerId]
        - required: [valServiceId]
        - required: [sliceId]
    - anyOf:
        - required: [minRtt]
        - required: [avgRtt]
        - required: [maxRtt]
        - required: [minLat]
        - required: [avgLat]
        - required: [maxLat]

```

A.17 SS_ADAE_Ue2UePerformanceAnalytics API

openapi: 3.0.0

```

info:
  title: SS_ADAE_Ue2UePerformanceAnalytics
  description: |
    API for ADAE UE-to-UE Performance Analytics Service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.1.0-alpha.3"

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:
  - {}

```

```

- oAuth2ClientCredentials: []

servers:
- url: '{apiRoot}/ss-adae-uupa/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:
  /ue2ue-session-performance:
    post:
      summary: Create an individual UE-to-UE session performance analytics event subscription.
      operationId: SubscribeUe2UePerfAnalytics
      tags:
        - UE-to-UE Performance Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/U2UPerfSub'
      responses:
        '201':
          description: >
            Subscription to the UE-to-UE session performance analytics is created.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/U2UPerfSub'
          headers:
            Location:
              description: Contains the URI of the newly created individual resource.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
      callbacks:
        NotifyU2USessionEvent:
          '{$request.body#/notifUri}':
            post:
              summary: Notify the UE-to-UE session performance analytics.
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/U2UPerfNotif'
              responses:
                '204':
                  description: The notification is successfully received.
                '307':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
                '308':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
                '400':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/400'

```



```

    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/ue2ue-session-performance/{u2uPerfId}:

get:

summary: Read the individual UE-to-UE session performance analytics event subscription.
 operationId: ReadU2UPerfSubscription

tags:

- Individual UE-to-UE Performance Subscription (Document)

parameters:

- name: u2uPerfId
 in: path
 description: >
 Represents the identifier of an individual UE-to-UE session performance analytics subscription.
 required: true
 schema:
 type: string

responses:

```

    '200':
      description: >
        The requested individual UE-to-UE session performance event subscription is returned.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/U2UPerfSub'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

summary: Remove the individual UE-to-UE session performance analytics event subscription.
 operationId: RemoveU2UPerfSubscription

tags:

- Individual UE-to-UE Performance Subscription (Document)

parameters:

- name: u2uPerfId
 in: path
 description: >
 Represents the identifier of an individual UE-to-UE session performance analytics subscription.
 required: true
 schema:
 type: string

responses:

```

'204':
  description: >
    The individual UE-to-UE session performance event subscription matching
    the u2uPerfId is deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

schemas:

```

U2UPerfSub:
  description: >
    Represents the UE-to-UE session performance analytics subscription.
  type: object
  properties:
    analyticsType:
      $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
    valueIds:
      type: array
      description: >
        Represent the list of VAL UEs, whose UE-to-UE session analytics are subscribed to.
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
    valServiceId:
      description: Represents the VAL service for which the subscription applies.
      type: string
    confLevel:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    repReq:
      $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
    reportingInds:
      type: array
      description: Indicates the list of the requested analytics.
      items:
        $ref: '#/components/schemas/U2UAnalytics'
      minItems: 1
    reportingThrs:
      type: array
      description: >
        Identifies reporting threshold corresponding to the application QoS index(es).
      items:
        $ref: '#/components/schemas/U2UThreshold'
      minItems: 1
    reportingGrn:
      $ref: '#/components/schemas/U2UReportingGranularity'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    timeInterval:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    suppFeat:

```

```
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - analyticsType
    - valueIds
    - notifUri

U2UPerfNotif:
  description: >
    Represents the threshold for UE-to-UE session performance analytics.
  type: object
  properties:
    analyticsOutput:
      type: array
      description: >
        Represents the exposure level requirements for the analytics to be exposed.
      items:
        $ref: '#/components/schemas/U2UAnalyticsData'
      minItems: 1
    confLevel:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  required:
    - analyticsOutput

U2UThreshold:
  description: >
    Represents the threshold for UE-to-UE session performance analytics.
  type: object
  properties:
    value:
      $ref: '#/components/schemas/U2UAnalyticsData'
    thrDirect:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MatchingDirection'
  required:
    - value
    - thrDirect

U2UAnalyticsData:
  description: >
    Represents the UE-to-UE analytics data.
  type: object
  properties:
    values:
      $ref: '#/components/schemas/U2UPair'
    avgLatency:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    avgPer:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketErrRate'
    avgDataRate:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
    jitter:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'

U2UPair:
  description: >
    Represents the UE-to-UE pair.
  type: object
  properties:
    valueA:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    valueB:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
  required:
    - valueA
    - valueB
```

Simple data types and Enumerations

```
U2UAnalytics:
  anyOf:
    - type: string
      enum:
        - AVG_LATENCY
        - AVG_PER
        - AVG_DATA_RATE
        - JITTER
    - type: string
      description: >
        This string provides forward-compatibility with future
```

```

        extensions to the enumeration and is not used to encode
        content defined in the present version of this API.
    description: |
        Represents the UE-to-UE analytics types.
        Possible values are:
        - AVG_LATENCY: The indication for requesting the average latency analytics.
        - AVG_PER: The indication for requesting the average packet error rate analytics.
        - AVG_DATA_RATE: The indication for requesting the average data rate analytics.
        - JITTER: The indication for requesting the jitter analytics.

    U2UReportingGranularity:
        anyOf:
        - type: string
          enum:
            - GROUP
            - INDIVIDUAL
        - type: string
          description: >
            This string provides forward-compatibility with future
            extensions to the enumeration and is not used to encode
            content defined in the present version of this API.
    description: |
        Represents the UE-to-UE reporting granularity.
        Possible values are:
        - GROUP: The indication for requesting the analytics for all
          VAL UE-to-UE application sessions.
        - INDIVIDUAL: The indication for requesting the analytics for individual
          VAL UE-to-UE application sessions.

```

A.18 SS_ADAE_LocationAccuracyAnalytics API

openapi: 3.0.0

```

info:
  title: SS_ADAE_LocationAccuracyAnalytics
  description: |
    API for ADAE location accuracy performance analytics service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.1.0-alpha.2"

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/ss-adae-laa/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:
  /location-accuracy:
    post:
      description: >
        Creates a new individual location accuracy performance event subscription.
      operationId: LocAccurSubs
      tags:
        - Location accuracy performance event subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocAccurSub'
      callbacks:
        laaNotification:
          '{$request.body#/notifUri}':

```

```

    post:
      requestBody: # contents of the callback message
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocAccurNotif'
      responses:
        '204':
          description: No Content (successful notification)
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  responses:
    '201':
      description: Location accuracy subscription resource created successfully.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/LocAccurSub'
      headers:
        Location:
          description: Contains the URI of the newly created resource.
          required: true
          schema:
            type: string
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/location-accuracy/{locAccId}:
  get:
    description: Retrieves an individual location accuracy performance event subscription.
    operationId: ReadIndLocAccurPerfEventSubsc
    tags:
      - Individual location accuracy performance event subscription (Document)

```

```

parameters:
- name: locAccId
  in: path
  description: >
    Identifier of an individual location accuracy performance event subscription.
  required: true
  schema:
    type: string
responses:
'200':
  description: >
    The individual location accuracy subscription matching the locAccId is retrieved.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/LocAccurSub'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
delete:
  description: Deletes an individual location accuracy performance event subscription.
  operationId: DeleteIndLocAccurPerfEventSubsc
  tags:
    - Individual location accuracy performance event subscription (Document)
parameters:
- name: locAccId
  in: path
  description: >
    Identifier of an individual location accuracy performance event subscription.
  required: true
  schema:
    type: string
responses:
'204':
  description: >
    The individual location accuracy performance subscription matching the locAccId
    is deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

```
securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

schemas:
  LocAccurSub:
    description: >
      Represents an individual location accuracy performance event subscription resource.
    type: object
    properties:
      notifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      analyticsId:
        $ref: '#/components/schemas/LocAccurAnalytics'
      analyticsType:
        $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
      valueIds:
        type: array
        items:
          $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
        minItems: 1
        description: >
          One or more VAL UE IDs whose analytics are subject to subscription.
      accuracy:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/Accuracy'
      valServiceId:
        type: string
        description: >
          Identifier of the VAL service for which location accuracy analytics is requested.
      confLevel:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      area:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
      timeValidity:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
      ueMobs:
        type: array
        items:
          $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/UeMobility'
        minItems: 1
        description: Mobility and route information of the target VAL UEs.
      repReq:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - analyticsType
      - valueIds
      - accuracy
      - notifUri

  LocAccurNotif:
    description: Represents notification of the location accuracy performance event.
    type: object
    properties:
      analyticsOutput:
        $ref: '#/components/schemas/LocAccurAnalyticsOutput'
      output:
        type: string
        description: Event output data.
      confLevel:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    oneOf:
      - required: [analyticsOutput]
      - required: [output]

  LocAccurAnalyticsOutput:
    description: >
      Represents the location accuracy analytics output.
    type: object
    properties:
      analyticsId:
        $ref: '#/components/schemas/LocAccurAnalytics'
      valueIds:
```

```

    type: array
    items:
      type: string
    minItems: 1
  valServId:
    type: string
  predictions:
    type: array
    items:
      $ref: '#/components/schemas/LocAccurPrediction'
    minItems: 1
  sustainAnalytics:
    $ref: '#/components/schemas/LocAccurSustain'
  required:
    - analyticsId

LocAccurPrediction:
  description: >
    Represents the location accuracy prediction analytics output.
  type: object
  properties:
    accurChange:
      $ref: '#/components/schemas/LocAccurChange'
    areas:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
      minItems: 1
    timeWnd:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    confLevel:
      type: integer
      minimum: 0
      maximum: 100
  required:
    - accurChange

LocAccurSustain:
  description: >
    Represents the location accuracy sustainability analytics output.
  type: object
  properties:
    areas:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
      minItems: 1
    timeWnd:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    confLevel:
      type: integer
      minimum: 0
      maximum: 100

```

Simple data types and Enumerations

```

LocAccurAnalytics:
  anyOf:
    - type: string
    enum:
      - LOCATION_ACCURACY_PREDICTION
      - LOCATION_ACCURACY_SUSTAINABILITY
    - type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration and is not used to encode
    content defined in the present version of this API.
  description: |
    Represents the analytics identifier for location accuracy analytics.
    Possible values are:
    - LOCATION_ACCURACY_PREDICTION: Indicates that the requested analytics is location
      accuracy prediction.
    - LOCATION_ACCURACY_SUSTAINABILITY: Indicates that the requested analytics is
      location accuracy sustainability.

LocAccurChange:
  anyOf:
    - type: string

```



```

enum:
  - DOWNGRADE
  - UPGRADE
- type: string
description: >
  This string provides forward-compatibility with future
  extensions to the enumeration and is not used to encode
  content defined in the present version of this API.
description: |
  Represents the type of location accuracy change.
  Possible values are:
  - DOWNGRADE: Indicates the downgrade of the location accuracy.
  - UPGRADE: Indicates the upgrade of the location accuracy.

```

A.19 SS_ADAE_ServiceApiAnalytics API

openapi: 3.0.0

```

info:
  title: SS_ADAE_ServiceApiAnalytics
  description: |
    API for ADAE service API analytics service.
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    All rights reserved.
  version: "1.1.0-alpha.1"

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:
  - {}
  - OAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/ss-adae-sa/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:
  /service-api:
    post:
      description: >
        Creates a new individual service API event subscription.
      operationId: SrvApiSubs
      tags:
        - Service API event subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SrvApiSub'
      callbacks:
        saaNotification:
          '{$request.body#/notifUri}':
            post:
              requestBody: # contents of the callback message
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/SrvApiNotif'
      responses:
        '204':
          description: No Content (successful notification)
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
responses:
  '201':
    description: Service API event subscription resource created successfully.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/SrvApiSub'
    headers:
      Location:
        description: Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/service-api/{srvApiId}:
  get:
    description: Retrieves an individual service API event subscription.
    operationId: ReadIndSrvApiEventSubsc
    tags:
      - Individual service API event subscription (Document)
    parameters:
      - name: srvApiId
        in: path
        description: >
          Identifier of an individual service API event subscription.
        required: true
        schema:
          type: string
    responses:
      '200':
        description: >
          The individual service API event subscription matching the srvApiId is retrieved.
        content:
          application/json:
            schema:

```

```

      $ref: '#/components/schemas/SrvApiSub'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
delete:
  description: Deletes an individual service API event subscription.
  operationId: DeleteIndSrvApiEventSubsc
  tags:
    - Individual service API event subscription (Document)
  parameters:
    - name: srvApiId
      in: path
      description: >
        Identifier of an individual service API event subscription.
      required: true
      schema:
        type: string
  responses:
    '204':
      description: >
        The individual service API subscription matching the srvApiId is deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    SrvApiSub:
      description: Represents an individual service API event subscription.
      type: object
      properties:
        notifUri:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        analyticsType:

```

```

    $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
  eventCriteria:
    type: string
    description: Criteria matching service API analytics event.
  serviceApiName:
    type: string
    description: Service API name.
  serviceApiType:
    type: string
    description: Service API type.
  area:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  timeValidity:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  timeHorizon:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  repReq:
    $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - analyticsType
    - notifUri
    - eventCriteria
  oneOf:
    - required: [serviceApiName]
    - required: [serviceApiType]

SrvApiNotif:
  description: Represents notification of the service API event.
  type: object
  properties:
    requestorId:
      type: string
      description: Identifier of the requestor of the analytics.
    output:
      type: string
      description: Output for analytics.
  area:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  confLevel:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
  required:
    - requestorId
    - output

```

A.20 SS_ADAE_SliceUsagePatternAnalytics API

openapi: 3.0.0

```

info:
  title: SS_ADAE_SliceUsagePatternAnalytics
  description: |
    API for ADAE Slice Usage Pattern Analytics.
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    All rights reserved.
  version: "1.1.0-alpha.1"

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/ss-adae-sup/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

```

```

paths:
  /slice-usage-pattern:
    post:
      description: Creates a new Individual slice usage pattern subscription.
      operationId: CreateSliceUsageSub
      tags:
        - Slice Usage Pattern Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SUPSub'
      responses:
        '201':
          description: Slice Usage Pattern subscription resource created successfully.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SUPSub'
          headers:
            Location:
              description: Contains the URI of the newly created resource.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
      callbacks:
        SUPNotification:
          '{$request.body#/notifUri}':
            post:
              requestBody: # contents of the callback message
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/SUPNotif'
            responses:
              '204':
                description: No Content (successful notification)
              '307':
                $ref: 'TS29122_CommonData.yaml#/components/responses/307'
              '308':
                $ref: 'TS29122_CommonData.yaml#/components/responses/308'
              '400':
                $ref: 'TS29122_CommonData.yaml#/components/responses/400'
              '401':
                $ref: 'TS29122_CommonData.yaml#/components/responses/401'
              '403':
                $ref: 'TS29122_CommonData.yaml#/components/responses/403'
              '404':
                $ref: 'TS29122_CommonData.yaml#/components/responses/404'
              '411':
                $ref: 'TS29122_CommonData.yaml#/components/responses/411'
              '413':
                $ref: 'TS29122_CommonData.yaml#/components/responses/413'
              '415':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/slice-usage-pattern/{subscriptionId}:
  get:
    description: Retrieves an individual Slice Usage Pattern Subscription.
    operationId: ReadSUPSub
    tags:
      - Individual slice usage pattern subscription (Document)
    parameters:
      - name: subscriptionId
        in: path
        description: Identifier of an individual Events Subscription
        required: true
        schema:
          type: string
    responses:
      '200':
        description: The individual slice usage pattern subscription.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SUPSub'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  delete:
    description: Deletes an individual Slice Usage Pattern Subscription.
    operationId: DeleteSUPSub
    tags:
      - Individual slice usage pattern subscription (Document)
    parameters:
      - name: subscriptionId
        in: path
        description: Identifier of an individual Events Subscription
        required: true
        schema:
          type: string
    responses:
      '204':
        description: >
          The individual Slice Usage Pattern Subscription matching the subscriptionId is deleted.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'

```

```

'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

securitySchemes:

```

oAuth2ClientCredentials:
  type: oauth2
  flows:
    clientCredentials:
      tokenUrl: '{tokenUrl}'
      scopes: {}

```

schemas:

SUPSub:

```

description: Represents an individual Slice Usage Pattern Subscription.
type: object
properties:
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  analyticsType:
    $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
  sliceId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  dnn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
  valUeIds:
    type: array
    items:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    minItems: 1
    description: List of identities of one or more VAL UEs.
  valServerId:
    type: string
    description: VAL server identifier.
  confLevel:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
  area:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  timeValidity:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  historicTimeInt:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  repReq:
    $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
  immNotif:
    $ref: '#/components/schemas/SUPNotif'
  dataId:
    type: string
    description: Identity of the slice usage statistics data which is to be collected.
  valServiceId:
    type: string
    description: VAL service identifier.
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - notifUri
  - analyticsType
  - sliceId

```

SUPNotif:

```

description: Represents notification information of a Slice Usage Pattern Event.
type: object
properties:
  output:
    type: string
    description: Implementation-specific string representing the slice usage analytics.
  confLevel:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
required:
  - output

```

A.21 SS_ADAE_EdgeLoadAnalytics API

openapi: 3.0.0

info:

```
title: SS_ADAE_EdgeLoadAnalytics
description: |
  API for ADAE Edge Load Analytics.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
version: "1.1.0-alpha.2"
```

externalDocs:

```
description: >
  3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
  Application Programming Interface (API) specification; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/
```

security:

```
- {}
- OAuth2ClientCredentials: []
```

servers:

```
- url: '{apiRoot}/ss-adae-el/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
```

paths:

```
/edge-load:
  post:
    description: Creates a new individual Edge Load Event Subscription.
    operationId: EdgeSub
    tags:
      - Edge Load Events Subscriptions (Collection)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/EdgeSub'
    callbacks:
      notifUri:
        '{$request.body#/notifUri}':
          post:
            requestBody: # contents of the callback message
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/EdgeNotif'
    responses:
      '204':
        description: No Content (successful notification)
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
```



```

    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
responses:
  '201':
    description: Edge Load Events subscription resource created successfully.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/EdgeSub'
    headers:
      Location:
        description: Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/edge-load/{edgeLdId}:
  get:
    description: Retrieves an individual Edge Load Event Subscription.
    operationId: RetrieveIndEdgeLdEventSubsc
    tags:
      - Individual Edge Load Events Subscription (Document)
    parameters:
      - name: edgeLdId
        in: path
        description: Identifier of an individual Events Subscription.
        required: true
        schema:
          type: string
    responses:
      '200':
        description: The individual edge load subscription.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EdgeSub'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'

```

```

    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  delete:
    description: Deletes an individual Edge Load Event Subscription.
    operationId: DeleteIndEdgeLdEventSubsc
    tags:
      - Individual Edge Load Events Subscription (Document)
    parameters:
      - name: edgeLdId
        in: path
        description: Identifier of an individual Events Subscription
        required: true
        schema:
          type: string
    responses:
      '204':
        description: >
          The individual Edge Load Events Subscription matching the edgeLdId is deleted.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

schemas:
  EdgeSub:
    description: Represents an individual Edge Load Subscription resource.
    type: object
    properties:
      analyticsId:
        $ref: '#/components/schemas/AnalyticsIdEl'
      analyticsType:
        $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
      destinationEasInfo:
        type: string
        description: String representing the information for the destination EAS.
      destinationEesId:
        type: string
        description: String identifying the the destination EES.
      dnai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
      dnn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      dataProdProfile:
        $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/ProdProfileInfo'
      confLevel:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      area:

```

```

    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  report:
    $ref: '#/components/schemas/EdgeNotif'
  reportReq:
    $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  timeInterval:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - analyticsType
    - notifUri
  anyOf:
    - required: [destinationEasInfo]
    - required: [destinationEesId]
    - oneOf:
        - required: [dnai]
        - required: [dnn]

EdgeNotif:
  description: Represents notification information of an Edge Load Event.
  type: object
  properties:
    output:
      $ref: '#/components/schemas/AnalyticsOutputEl'
    analyticsOutput:
      type: string
      description: String representing the edge load analytics.
    confLevel:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    oneOf:
      - required: [output]
      - required: [analyticsOutput]

AnalyticsOutputEl:
  description: Represents the edge load analytics output.
  type: object
  properties:
    analyticsId:
      $ref: '#/components/schemas/AnalyticsIdEl'
    platAnalytics:
      $ref: '#/components/schemas/EdgePlatformAnalytics'
    eesAnalytics:
      $ref: '#/components/schemas/EesAnalytics'
    easAnalytics:
      $ref: '#/components/schemas/EasAnalytics'
  required:
    - analyticsId

EdgePlatformAnalytics:
  description: Represents the edge platform analytics data.
  type: object
  properties:
    easConn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    eesConn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    confLevel:
      type: integer
      minimum: 0
      maximum: 100
    timeWnd:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    anyOf:
      - required: [easConn]
      - required: [eesConn]

EesAnalytics:
  description: Represents the EES analytics data.
  type: object
  properties:
    eesUnavail:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ScheduledCommunicationTime'
      minItems: 1

```

```

    eesUnavailPer:
      type: integer
      minimum: 0
      maximum: 100
    confLevel:
      type: integer
      minimum: 0
      maximum: 100
    timeWnd:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  anyOf:
    - required: [eesUnavail]
    - required: [eesUnavailPer]

EasAnalytics:
  description: Represents the EAS analytics data.
  type: object
  properties:
    easUnavail:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ScheduledCommunicationTime'
      minItems: 1
    easUnavailPer:
      type: integer
      minimum: 0
      maximum: 100
    confLevel:
      type: integer
      minimum: 0
      maximum: 100
    timeWnd:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  anyOf:
    - required: [easUnavail]
    - required: [easUnavailPer]

```

Simple data types and Enumerations

```

AnalyticsIdEl:
  anyOf:
    - type: string
      enum:
        - EDGE_PLATFORM
        - EES
        - EAS
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
      description: |
        Represents the analytics identifier for the edge load analytics.
        Possible values are:
        - EDGE_PLATFORM: Indicates that the analytics identifier is edge platform analytics.
        - EES: Indicates that the analytics identifier is EES analytics.
        - EAS: Indicates that the analytics identifier is EAS analytics.

```

A.22 SS_AADRF_DataManagement API

openapi: 3.0.0

```

info:
  title: SS_AADRF_DataManagement
  description: |
    API for A-ADRF Data Management Service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.1.0-alpha.2"

```

```

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/ss-aadr-f-datamanagement/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:
  /subscriptions:
    post:
      summary: Create Individual A-ADRF Data Management Subscription.
      operationId: CreateAADRFEventSubscription
      tags:
        - A-ADRF Data Management Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DataManageSub'
      responses:
        '201':
          description: >
            The requested Individual A-ADRF Data Management Subscription is successfully created and
            a representation of the created resource is returned in the response body.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DataManageSub'
          headers:
            Location:
              description: Contains the URI of the newly created resource.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
      callbacks:
        myNotification:
          '{$request.body#/notifUri}':
            post:
              summary: Notify on the requested data.
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/DataManageNotification'
              responses:
                '204':
                  description: The notification is successfully received.
                '307':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/307'

```

```
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Represents the Individual A-ADRF Data Management Subscription resource.
      required: true
      schema:
        type: string

  delete:
    summary: Remove the Individual A-ADRF Data Management Subscription.
    operationId: UnsubscribeAADRFEventSubscription
    tags:
      - Individual A-ADRF Data Management Subscription (Document).
    responses:
      '204':
        description: >
          The individual A-ADRF Data Management Subscription resource matching the subscriptionId
          is deleted.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/store:
  post:
    summary: Enables a service consumer to request data storage.
    operationId: StoreData
    tags:
      - Data Storage Service
    requestBody:
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DataStoreReq'
      required: true
```

```
responses:
  '200':
    description: >
      Successful case. The data storage request is successfully received and processed.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DataStoreResp'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
```

```
schemas:
  DataManageSub:
    description: Represents the event subscriptions.
    type: object
    properties:
      eventSubscriptions:
        type: array
        items:
          $ref: '#/components/schemas/EventSubscription'
        minItems: 1
        description: Subscribed events.
      notifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      notifCorrId:
        type: string
        description: Notification correlation identifier.
      supportedFeatures:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - eventSubscriptions
      - notifUri
```

```
EventSubscription:
  description: Represents the event subscription.
  type: object
  properties:
    event:
      $ref: '#/components/schemas/AadrEvent'
    dataCollectReq:
      type: string
    dataProducerIds:
      type: array
      items:
        type: string
      minItems: 1
      description: The list of Data Producer IDs.
```

```
values:
  type: array
  items:
    $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
  minItems: 1
  description: The target VAL UE(s) identifiers.
valServerId:
  type: string
  description: The target VAL server ID.
valServiceId:
  type: string
  description: The VAL service ID.
profileCriteria:
  type: string
validConds:
  $ref: 'TS29549_SS_Events.yaml#/components/schemas/ValidityConditions'
snssais:
  type: array
  items:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  minItems: 1
  description: Identification(s) of network slice(s) to which the subscription applies.
edgeReq:
  $ref: '#/components/schemas/EdgeReq'
apiLogReq:
  $ref: '#/components/schemas/ApiLogReq'
s2sAnaReq:
  $ref: '#/components/schemas/S2SAnalyticsReq'
ueRatAnaReq:
  $ref: '#/components/schemas/UERatAnalyticsReq'
required:
  - event

EdgeReq:
  description: Represents the EDGE data request requirement.
  type: object
  properties:
    dnais:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
      minItems: 1
      description: Identifiers the DN Access Identifier.
    dnns:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      minItems: 1
      description: Identifiers the DN Access Identifier.
    destEasId:
      type: string
      description: Identifier for the destination EAS.
    destEesId:
      type: string
      description: Identifier for the destination EES.
  anyOf:
    - required: [dnais]
    - required: [dnns]
    - required: [destEasId]
    - required: [destEesId]

ApiLogReq:
  description: Represents the API log request requirement.
  type: object
  properties:
    apiRequestorInfo:
      type: string
    apiId:
      type: string
      description: String identifying the API invoked.
    apiName:
      type: string
      description: Name of the API which was invoked.
    apiVersion:
      type: string
      description: Version of the API which was invoked.
    inputParameters:
      type: string
```



```
    description: List of input parameters.
  result:
    type: string
    description: For HTTP protocol, it contains HTTP status code of the invocation.
  apiInvokerId:
    type: string
    description: Identity of the API invoker which invoked the service API.
  exposureLvl:
    $ref: '#/components/schemas/ExposureLevel'
  apiAggreInfo:
    type: string
  required:
    - apiRequestorInfo

S2SAnalyticsReq:
  description: >
    Represents the Server to Server analytics data request requirement.
  type: object
  properties:
    serverInfoList:
      type: array
      items:
        $ref: 'TS29549_SS_ADAE_ServerToServerPerformanceAnalytics.yaml#/components/schemas/ServerInfo'
    minItems: 1
    timeVal:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  required:
    - serverInfoList

UERatAnalyticsReq:
  description: Represents the UE RAT connectivity analytics requirements.
  type: object
  properties:
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    timeVal:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    valUeAddrInfo:
      type: array
      items:
        $ref: 'TS29549_SS_NetworkResourceAdaptation.yaml#/components/schemas/ValUeAddrInfo'
    minItems: 1
  required:
    - valUeAddrInfo

DataManageNotification:
  description: Represents the notification to the consumer.
  type: object
  properties:
    event:
      $ref: '#/components/schemas/AadrEvent'
    notifCorrId:
      type: string
      description: Notification correlation identifier.
    valServerId:
      type: string
      description: The target VAL server ID.
    valServiceId:
      type: string
      description: The VAL service ID.
    valUeIds:
      type: array
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
      description: The target VAL UE(s) identifiers.
    locAccuracy:
      type: string
    validConds:
      $ref: 'TS29549_SS_Events.yaml#/components/schemas/ValidityConditions'
    apiLogs:
      type: array
      items:
        $ref: '#/components/schemas/ApiLogInfo'
      minItems: 1
      description: The API logs information.
    rttDeviation:
```

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
  snssais:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    minItems: 1
    description: Identification(s) of network slice(s) to which the subscription applies.
  edgeInfo:
    $ref: '#/components/schemas/EdgeInfo'
  s2SAnaResp:
    $ref: '#/components/schemas/S2SAnalyticsInfo'
  ueRatAnaInfo:
    $ref: '#/components/schemas/UERatAnalyticsInfo'
  required:
    - event

```

```

ApiLogInfo:
  description: Represents the API log data.
  type: object
  properties:
    apiId:
      type: string
      description: String identifying the API invoked.
    apiName:
      type: string
      description: Name of the API which was invoked.
    failNum:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    apiAvailableInd:
      type: boolean
      description: Indicates the API availability.
    apiVerChgNum:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    apiLocChg:
      type: boolean
      description: Indicates the API location changes for the target API.
    apiThrottlingEvents:
      type: string
    invokeNum:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    apiVersion:
      type: string
      description: Version of the API which was invoked.
  required:
    - apiId

```

```

EdgeInfo:
  description: Represents the EDGE related data.
  type: object
  properties:
    edgeReq:
      $ref: '#/components/schemas/EdgeReq'
    output:
      type: string

```

```

S2SAnalyticsInfo:
  description: >
    Represents the Server to Server analytics data information.
  type: object
  properties:
    dataOutput:
      $ref:
'TS29549_SS_ADAE_ServerToServerPerformanceAnalytics.yaml#/components/schemas/S2SPerfAnalyticsData'
    serverInfoList:
      type: array
      items:
        $ref:
'TS29549_SS_ADAE_ServerToServerPerformanceAnalytics.yaml#/components/schemas/ServerInfo'
      minItems: 1
  required:
    - dataOutput
    - serverInfoList

```

```

UERatAnalyticsInfo:
  description: Represents the UE RAT Connectivity Analytics data information.
  type: object
  properties:
    analyticsOut:

```

```
    type: array
    items:
      $ref:
'TS29549_SS_ADAE_UeRatConnectivityAnalytics.yaml#/components/schemas/UeRatAnalyticsOutput'
    minItems: 1
  required:
  - analyticsOut

DataStoreReq:
  description: Represents the data storage request.
  type: object
  properties:
    subDataStore:
      $ref: '#/components/schemas/DataStoreSub'
    dirStorage:
      $ref: '#/components/schemas/Data'
    storeHandl:
      $ref: '#/components/schemas/StorageHandlingInfo'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  oneOf:
  - required: [subDataStore]
  - required: [dirStorage]

DataStoreSub:
  description: Represents the requirements for subscription based data storage.
  type: object
  properties:
    dataProdId:
      type: string
    analyticsId:
      type: string
    analyticsType:
      $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
    analyticsMode:
      $ref: '#/components/schemas/AnalyticsMode'
    profiles:
      type: array
      items:
        $ref: '#/components/schemas/DataProducerProfile'
      minItems: 1
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    duration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'

Data:
  description: Represent the data for storage at A-ADRF.
  type: object
  properties:
    dataType:
      $ref: '#/components/schemas/DataType'
    content:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
    timestamp:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    analyticsId:
      $ref: '#/components/schemas/AdaeAnalyticsId'
    analyticsType:
      $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
    dataSource:
      $ref: '#/components/schemas/DataSourceInfo'
  required:
  - dataType
  - content
  - timestamp
  - analyticsId
  - analyticsType
  - dataSource

DataProducerProfile:
  description: Represents the data producer profile.
  type: object
  properties:
    profile:
      type: string
  oneOf:
  - required: [profile]
```

DataSourceInfo:
description: Represents the data source information.
type: object
properties:
 source:
 type: string
oneOf:
 - required: [source]

StorageHandlingInfo:
description: Represent the storage handling information.
type: object
properties:
 lifetime:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
 delNotifUri:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
anyOf:
 - required: [lifetime]
 - required: [delNotifUri]

DataStoreResp:
description: Represents the data storage response.
type: object
properties:
 storeHandl:
 \$ref: '#/components/schemas/StorageHandlingInfo'
 suppFeat:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
 - storeHandl

AnalyticsMode:
description: Represents the analytics mode.
type: object
properties:
 mode:
 \$ref: '#/components/schemas/Mode'
 isMlEnab:
 type: boolean
required:
 - mode

Simple data types and Enumerations

AdrfEvent:
anyOf:
 - type: string
 enum:
 - HISTORICAL_SERVICEAPI
 - NETWORK_SLICE
 - EDGE_DATA
 - LOCATION_ACCURACY
 - SERVER_TO_SERVER_ANALYTICS
 - UE_RAT_ANALYTICS
 - type: string
 description: >
 This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.
description: |
 Indicates the subscribed events.
 Possible values are:
 - HISTORICAL_SERVICEAPI: The event for historical service API logs.
 - NETWORK_SLICE: The event for the network slice data.
 - EDGE_DATA: The event for the EDGE related data.
 - LOCATION_ACCURACY: The event for the location accuracy data.
 - SERVER_TO_SERVER_ANALYTICS: The event for the Server to Server analytics data.
 - UE_RAT_ANALYTICS: The event for the UE RAT Connectivity analytics data.

ExposureLevel:
anyOf:
 - type: string
 enum:
 - READ
 - WRITE
 - DELETE
 - type: string
 description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |

Indicates the exposure level.

Possible values are:

- READ: The exposure level for the logs to be exposed is read.
- WRITE: The exposure level for the logs to be exposed is write.
- DELETE: The exposure level for the logs to be exposed is delete.

DataType:

anyOf:

- type: string

enum:

- DATA
- ANALYTICS
- DELETE

- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |

Represents the type of data.

Mode:

anyOf:

- type: string

enum:

- ONLINE
- OFFLINE

- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |

Represents the supported modes of analytics.

AdaeAnalyticsId:

anyOf:

- type: string

enum:

- VAL_SERVER_PERF
- VAL_SESSION_PERF
- SLICE_PERFORMANCE_ANALYTICS
- UE_TO_UE_PERFORMANCE_ANALYTICS
- LOCATION_ACCURACY_PREDICTION
- LOCATION_ACCURACY_SUSTAINABILITY
- SERVICE_API_ANALYTICS
- SLICE_USAGE_PATTERN_ANALYTICS
- EDGE_LOAD_ANALYTICS
- GROUP_ROUTE
- GROUP_MEMBER_DEVIATION
- TARGET_WITH_OTHER_UES
- ANY_UES_IN_LOC
- APP_MEMBER_CAPABILITY_ANALYTICS
- UE_RAT_CONNECTIVITY_ANALYTICS
- SERVER_TO_SERVER_PERFORMANCE

- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |

Indicates the subscribed events.

Possible values are:

- VAL_SERVER_PERF: Indicates that requested analytics is VAL server performance analytics.
- VAL_SESSION_PERF: Indicates that requested analytics is VAL session performance analytics.
- SLICE_PERFORMANCE_ANALYTICS: Indicates that requested analytics is slice performance

analytics.

- UE_TO_UE_PERFORMANCE_ANALYTICS: Indicates that requested analytics is UE-to-UE performance

analytics.

- LOCATION_ACCURACY_PREDICTION: Indicates that the requested analytics is location accuracy

prediction.

- LOCATION_ACCURACY_SUSTAINABILITY: Indicates that the requested analytics is location

accuracy sustainability.

- SERVICE_API_ANALYTICS: Indicates that the requested analytics is service API analytics.

- SLICE_USAGE_PATTERN_ANALYTICS: Indicated that the requested analytics is slice usage

pattern analytics.

- EDGE_LOAD_ANALYTICS: Indicated that the requested analytics is edge load analytics.

- GROUP_ROUTE: Indicates that the requested analytics is UE group route analytics.

- GROUP_MEMBER_DEVIATION: Indicates that the requested analytics is UE group member deviation analytics.
- TARGET_WITH_OTHER_UES: Indicates that the requested analytics is collision detection between the sets of target and other VAL UEs within a location.
- ANY_UES_IN_LOC: Indicates that the requested analytics is collision detection between any VAL UEs within given location.
- APP_MEMBER_CAPABILITY_ANALYTICS: Indicates that the identifier of the Application layer AIML member capability analytics event.
- UE_RAT_CONNECTIVITY_ANALYTICS: Indicates that the requested analytics is UE RAT connectivity analytics event.
- SERVER_TO_SERVER_PERFORMANCE: Indicates that the requested analytics is Server-to-Server Performance Analytics.

A.23 SS_ADAE_LocationRelatedUeGroupAnalytics API

openapi: 3.0.0

info:

title: SS_ADAE_LocationRelatedUeGroupAnalytics
version: 1.0.0-alpha.3
description: |
API for ADAE Location-Related UE Group Analytics service.
© 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
All rights reserved.

externalDocs:

description: >
3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
Application Programming Interface (API) specification; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:

- {}
- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/ss-adae-lruga/v1'
variables:
apiRoot:
default: <https://example.com>
description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

/subscriptions:
post:
summary: Create an "Individual Location-Related UE Group Analytics Subscription" resource.
operationId: SubscribeLocRelUeAnalytics
tags:
- Location Related UE Group Subscriptions (Collection)
requestBody:
required: true
content:
application/json:
schema:
\$ref: '#/components/schemas/LocRelUeGroupSub'
responses:
'201':
description: >
The "Individual Location-Related UE Group Analytics Subscription" resource is created.
content:
application/json:
schema:
\$ref: '#/components/schemas/LocRelUeGroupSub'
headers:
Location:
description: Contains the URI of the newly created individual resource.
required: true
schema:
type: string
'400':
\$ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
\$ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

```

'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  NotifyLocRelUeEvent:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/LocRelUeGroupNotif'
        responses:
          '204':
            description: The notification is successfully received.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Represents the identifier of an Individual Location-Related UE
        Group Analytics Subscription.
      required: true
      schema:
        type: string
  get:
    summary: Read the "Individual Location-Related UE Group Analytics Subscription" resource.
    operationId: ReadLocRelUeGroupSubscription
    tags:
      - Individual Location-Related UE Group Analytics Subscription (Document)
  responses:
    '200':
      description: >
        The requested "Individual Location-Related UE Group Analytics Subscription"
        resource is returned.
      content:

```

```

    application/json:
      schema:
        $ref: '#/components/schemas/LocRelUeGroupSub'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  description: >
    Update the "Individual Location-Related UE Group Analytics Subscription" resource.
  operationId: UpdateLocRelUeGroupSubscription
  tags:
    - Individual Location-Related UE Group Analytics Subscription (Document)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/LocRelUeGroupSub'
  responses:
    '200':
      description: >
        OK. The Individual Location-Related UE Group Analytics Subscription resource
        is successfully updated, and representation of updated resource is
        returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/LocRelUeGroupSub'
    '204':
      description: >
        No Content. The Individual Location-Related UE Group Analytics Subscription resource is
        successfully updated and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  description: >
    Modify the "Individual Location-Related UE Group Analytics Subscription" resource.

```



```

operationId: ModifyLocRelUeGroupSubscription
tags:
  - Individual Location-Related UE Group Analytics Subscription (Document)
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/LocRelUeGroupSubPatch'
responses:
  '200':
    description: >
      OK. The Individual Location-Related UE Group Analytics Subscription resource is
      successfully modified, and representation of the modified resource is returned
      in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/LocRelUeGroupSub'
  '204':
    description: >
      No Content. The Individual Location-Related UE Group Analytics Subscription resource is
      Successfully modified and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: Remove the "Individual Location-Related UE Group Analytics Subscription" resource.
  operationId: RemoveLocRelUeGroupSubscription
  tags:
    - Individual Location-Related UE Group Analytics Subscription (Document)
  responses:
    '204':
      description: >
        The "Individual Location-Related UE Group Analytics Subscription" resource
        matching the subscriptionId is deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':

```

```
$ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

components:

```
securitySchemes:
  OAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}
```

schemas:

```
LocRelUeGroupSub:
  description: >
    Represents the location-related UE group analytics subscription.
  type: object
  properties:
    analyticsType:
      $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
    analyticsId:
      $ref: '#/components/schemas/AnalyticsIdLocGrp'
    analyticsFilt:
      $ref: '#/components/schemas/LocRelUeGroupFilter'
    confLevel:
      type: integer
      minimum: 0
      maximum: 100
    repReq:
      $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    timeInterval:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - analyticsType
    - notifUri
```

LocRelUeGroupSubPatch:

```
description: >
  Represents the location-related UE group analytics subscription modification request.
type: object
properties:
  analyticsFilt:
    $ref: '#/components/schemas/LocRelUeGroupFilter'
  confLevel:
    type: integer
    minimum: 0
    maximum: 100
  repReq:
    $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  timeInterval:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
```

LocRelUeGroupNotif:

```
description: >
  Represents the location-related UE group analytics notification.
type: object
properties:
  analyticsOutput:
    $ref: '#/components/schemas/LocRelUeGroupAnalytics'
  timeValid:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
  confLevel:
    type: integer
    minimum: 0
    maximum: 100
  required:
    - analyticsOutput
```

LocRelUeGroupFilter:

```
description: >
  Represent the the location-related UE group analytics filtering information.
```

```
type: object
properties:
  groupId:
    type: string
  valTrgUes:
    type: array
    items:
      type: string
    minItems: 1
  area:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  profiles:
    type: array
    items:
      $ref: 'TS29558_Eecs_ECSServiceProvisioning.yaml#/components/schemas/AppGrpProfile'
    minItems: 1
  deviation:
    type: array
    items:
      $ref: '#/components/schemas/LocDeviationCriteria'
    minItems: 1

LocDeviationCriterion:
  description: >
    Represents the threshold for the location-related UE group analytics deviation.
  type: object
  properties:
    value:
      $ref: '#/components/schemas/LocDeviationTypeData'
    thrDirect:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MatchingDirection'
  required:
    - value
    - thrDirect

LocDeviationTypeData:
  description: >
    Represents the location-related UE group analytics deviation data.
  type: object
  properties:
    speed:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
    distance:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
    direction:
      $ref: 'TS29549_SS_ADAE_CollisionDetectionAnalytics.yaml#/components/schemas/Direction'
  oneOf:
    - required: [speed]
    - required: [distance]
    - required: [direction]

LocDeviationCriteria:
  description: >
    Represents the location-related UE group analytics deviation criteria.
  type: object
  properties:
    target:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    criteria:
      type: array
      items:
        $ref: '#/components/schemas/LocDeviationCriterion'
      minItems: 1
  required:
    - criteria
    - target

LocRelUeGroupAnalytics:
  description: >
    Represents the location-related UE group analytics output.
  type: object
  properties:
    analyticsId:
      $ref: '#/components/schemas/AnalyticsIdLocGrp'
    ueGroupRoute:
      type: array
      items:
        $ref: '#/components/schemas/UeGroupRouteAnalytics'
```

```
      minItems: 1
    ueGrMemDev:
      type: array
      items:
        $ref: '#/components/schemas/UeGroupMemberDevAnalytics'
      minItems: 1
    required:
      - analyticsId

UeGroupRouteAnalytics:
  description: >
    Represents the location-related UE group analytics output.
  type: object
  properties:
    easIds:
      type: array
      items:
        type: string
      minItems: 1
    routeId:
      type: string
    valUes:
      type: array
      items:
        type: string
      minItems: 1
    required:
      - routeId
      - valUes

UeGroupMemberDevAnalytics:
  description: >
    Represents the group member deviation analytics output.
  type: object
  properties:
    groupId:
      type: string
    refUe:
      type: string
    devUes:
      type: array
      items:
        $ref: '#/components/schemas/Deviation'
      minItems: 1
    required:
      - groupId
      - devUes

Deviation:
  description: >
    Represents the deviation in VAL UE movement.
  type: object
  properties:
    target:
      type: string
    criteria:
      type: array
      items:
        $ref: '#/components/schemas/LocDeviationCriterion'
      minItems: 1
    duration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    required:
      - criteria
      - target

# Simple data types and Enumerations

AnalyticsIdLocGrp:
  anyOf:
    - type: string
    enum:
      - GROUP_ROUTE
      - GROUP_MEMBER_DEVIATION
    - type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration and is not used to encode
```

content defined in the present version of this API.
 description: |
 Represents the analytic IDs for location related UE group analytics.
 Possible values are:
 - GROUP_ROUTE: Indicates that the requested analytics is UE group route analytics.
 - GROUP_MEMBER_DEVIATION: Indicates that the requested analytics
 is UE group member deviation analytics.

A.24 SS_ADAE_CollisionDetectionAnalytics API

openapi: 3.0.0

info:

title: SS_ADAE_CollisionDetectionAnalytics
 version: 1.0.0-alpha.3
 description: |
 API for ADAE Collision Detection Analytics service.
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 All rights reserved.

externalDocs:

description: >
 3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
 Application Programming Interface (API) specification; Stage 3.
 url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:

- {}
 - OAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/ss-adae-cda/v1'
 variables:
 apiRoot:
 default: <https://example.com>
 description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

/subscriptions:
 post:
 summary: Create an "Individual Collision Detection Analytics Subscription" resource.
 operationId: SubscribeCollisionDetectionAnalytics
 tags:
 - Location Related UE Group Subscriptions (Collection)
 requestBody:
 required: true
 content:
 application/json:
 schema:
 \$ref: '#/components/schemas/CollisionDetectionSub'
 responses:
 '201':
 description: >
 Subscription to the collision detection analytics is created.
 content:
 application/json:
 schema:
 \$ref: '#/components/schemas/CollisionDetectionSub'
 headers:
 Location:
 description: Contains the URI of the newly created individual resource.
 required: true
 schema:
 type: string
 '400':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/400'
 '401':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/401'
 '403':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/403'
 '404':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/404'
 '411':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/411'
 '413':

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  NotifyCollisionDetectionEvent:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/CollisionDetectionNotif'
  responses:
    '204':
      description: The notification is successfully received.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Represents the identifier of an Individual Collision Detection Analytics Subscription.
      required: true
      schema:
        type: string
  get:
    summary: Read the "Individual Collision Detection Analytics Subscription" resource.
    operationId: ReadCollisionDetectionSubscription
    tags:
      - Individual Collision Detection Analytics Subscription (Document)
    responses:
      '200':
        description: >
          The requested "Individual Collision Detection Analytics Subscription"
          resource is returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/CollisionDetectionSub'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'

```

```

    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  description: Update the "Individual Collision Detection Analytics Subscription" resource.
  operationId: UpdateCollisionDetectionSubscription
  tags:
    - Individual Collision Detection Analytics Subscription (Document)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/CollisionDetectionSub'
  responses:
    '200':
      description: >
        OK. The Individual Collision Detection Analytics Subscription resource
        is successfully updated, and representation of updated resource is
        returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/CollisionDetectionSub'
    '204':
      description: >
        No Content. The Individual Collision Detection Analytics Subscription resource is
        successfully updated and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  description: Modify the "Individual Collision Detection Analytics Subscription" resource.
  operationId: ModifyCollisionDetectionSubscription
  tags:
    - Individual Collision Detection Analytics Subscription (Document)
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/CollisionDetectionSubPatch'

```

```
responses:
  '200':
    description: >
      OK. The Individual Collision Detection Analytics Subscription resource is
      successfully modified, and representation of the modified resource is returned
      in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/CollisionDetectionSub'
  '204':
    description: >
      No Content. The Individual Collision Detection Analytics Subscription resource is
      successfully modified and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
delete:
  summary: Remove the "Individual Collision Detection Analytics Subscription" resource.
  operationId: RemoveCollisionDetectionSubscription
  tags:
```

```
  - Individual Collision Detection Analytics Subscription (Document)
```

```
responses:
  '204':
    description: >
      The "Individual Collision Detection Analytics Subscription" resource
      matching the subscriptionId is deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
```



```

    tokenUrl: '{tokenUrl}'
    scopes: {}

schemas:
  CollisionDetectionSub:
    description: >
      Represents the collision detection analytics subscription.
    type: object
    properties:
      analyticsType:
        $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
      analyticsId:
        $ref: '#/components/schemas/AnalyticsIdCda'
      analyticsFilt:
        $ref: '#/components/schemas/CollisionDetectionFilter'
      colDetCriteria:
        $ref: '#/components/schemas/CollisionDetectionCriteria'

      confLevel:
        type: integer
        minimum: 0
        maximum: 100
      repReq:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      notifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      timeInterval:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - analyticsType
      - notifUri

  CollisionDetectionSubPatch:
    description: >
      Represents the collision detection analytics subscription modification request.
    type: object
    properties:
      analyticsFilt:
        $ref: '#/components/schemas/CollisionDetectionFilter'
      colDetCriteria:
        $ref: '#/components/schemas/CollisionDetectionCriteria'
      confLevel:
        type: integer
        minimum: 0
        maximum: 100
      repReq:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      notifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      timeInterval:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'

  CollisionDetectionNotif:
    description: >
      Represents the collision detection analytics notification.
    type: object
    properties:
      analyticsId:
        $ref: '#/components/schemas/AnalyticsIdCda'
      targetOther:
        type: array
        items:
          $ref: '#/components/schemas/TargetOtherUesAnalytics'
        minItems: 1
      anyInLoc:
        type: array
        items:
          $ref: '#/components/schemas/TargetToAnyUeLocAnalytics'
        minItems: 1
    required:
      - analyticsId

  CollisionDetectionFilter:
    description: >
      Represent the the collision detection analytics filtering information.

```

```
    type: object
    properties:
      trgToOther:
        $ref: '#/components/schemas/TargetOtherUesFilter'
      targetToAnyUeLoc:
        $ref: '#/components/schemas/TargetToAnyUeLocFilter'
    oneOf:
      - required: [trgToOther]
      - required: [targetToAnyUeLoc]

CollisionDetectionCriteria:
  description: >
    Represents the collision detection criteria.
  type: object
  properties:
    distance:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
  oneOf:
    - required: [distance]

TargetOtherUesFilter:
  description: >
    Represent the analytics filter between any VAL UEs within the given location.
  type: object
  properties:
    trgValServerId:
      type: string
    targetUes:
      type: array
      items:
        type: string
      minItems: 1
    otherUes:
      type: array
      items:
        type: string
      minItems: 1
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  required:
    - targetUes

TargetToAnyUeLocFilter:
  description: >
    Represent the analytics filter between sets of target and other UEs within a location.
  type: object
  properties:
    trgValServerId:
      type: string
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  required:
    - area

TargetOtherUesAnalytics:
  description: >
    Represents the output for collision detection analytics between the sets
    of target and other VAL UEs.
  type: object
  properties:
    targetUe:
      type: string
    otherUe:
      type: string
    colTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    location:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    targetUeVel:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
    otherUeVel:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
    targetUeDir:
      $ref: '#/components/schemas/Direction'
    otherUeDir:
      $ref: '#/components/schemas/Direction'
    confLevel:
      type: integer
```

```

    minimum: 0
    maximum: 100
  required:
    - targetUe
    - otherUe
    - colTime
    - location

```

TargetToAnyUeLocAnalytics:

```

description: >
  Represents the output for collision detection analytics between
  any VAL UEs within given location.
type: object
properties:
  ues:
    type: array
    items:
      type: string
    minItems: 2
    maxItems: 2
  colTime:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  location:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  confLevel:
    type: integer
    minimum: 0
    maximum: 100
  required:
    - ues
    - colTime
    - location

```

Direction:

```

description: Represents the direction.
type: object
properties:
  azimuthDirection:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/Angle'
  elevationDirection:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/Angle'
  required:
    - azimuthDirection
    - elevationDirection

```

Simple data types and Enumerations

AnalyticsIdCda:

```

anyOf:
  - type: string
  enum:
    - TARGET_WITH_OTHER_UES
    - ANY_UES_IN_LOC
  - type: string
description: >
  This string provides forward-compatibility with future
  extensions to the enumeration and is not used to encode
  content defined in the present version of this API.
description: |
  Represents the analytic IDs for Collision Detection Analytics.
  Possible values are:
  - TARGET_WITH_OTHER_UES: Indicates that the requested analytics is collision
    detection between the sets of target and other VAL UEs within a location.
  - ANY_UES_IN_LOC: Indicates that the requested analytics is collision detection
    between any VAL UEs within given location.

```

A.25 SS_LocationHistoryInfoEvent API

openapi: 3.0.0

info:

```

title: LM Server Location Tracing Configuration Management Service
version: 1.0.0-alpha.3
description: |
  LM Server Location Tracing Configuration Management Service.

```

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```
externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

servers:
  - url: '{apiRoot}/ss-lhie/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549.

security:
  - {}
  - oauth2ClientCredentials: []

paths:
  /configurations:
    post:
      summary: Request the creation of a Location Tracing Configuration.
      operationId: CreateLocTracingConfig
      tags:
        - Location Tracing Configurations (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocTracingConfig'
      responses:
        '201':
          description: >
            Created. The Location Tracing Configuration is successfully created and
            a representation of the created Individual Location Tracing Configuration
            resource shall be returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/LocTracingConfig'
          headers:
            Location:
              description: >
                Contains the URI of the created Individual Location Tracing Configuration resource.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  /configurations/{configId}:
    parameters:
      - name: configId
        in: path
```

```
description: >
  Represents the identifier of the Individual Location Tracing Configuration resource.
required: true
schema:
  type: string

get:
summary: Retrieve an existing Individual Location Tracing Configuration resource.
operationId: GetIndLocTracingConfig
tags:
  - Individual Location Tracing Configuration (Document)
responses:
  '200':
    description: >
      OK. The requested Individual Location Tracing Configuration resource shall be returned.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/LocTracingConfig'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
summary: Request the update of an existing Individual Location Tracing Configuration resource.
operationId: UpdateIndLocTracingConfig
tags:
  - Individual Location Tracing Configuration (Document)
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/LocTracingConfig'
responses:
  '200':
    description: >
      OK. The Individual Location Tracing Configuration resource is successfully updated and a
      representation of the updated resource shall be returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/LocTracingConfig'
  '204':
    description: >
      No Content. The Individual Location Tracing Configuration resource is successfully
      updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
```

```

    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  patch:
    summary: Request the modification of an existing Individual Location Tracing Configuration
resource.
    operationId: ModifyIndLocTracingConfig
    tags:
      - Individual Location Tracing Configuration (Document)
    requestBody:
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/LocTracingConfigPatch'
    responses:
      '200':
        description: >
          OK. The Individual Location Tracing Configuration resource is successfully modified and
          a representation of the updated resource shall be returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocTracingConfig'
      '204':
        description: >
          No Content. The Individual Location Tracing Configuration resource is successfully
          modified and no content is returned in the response body.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  delete:
    summary: Request the deletion of an existing Individual Location Tracing Configuration
resource.
    operationId: DeleteIndLocTracingConfig
    tags:
      - Individual Location Tracing Configuration (Document)
    responses:
      '204':
        description: >
          No Content. The Individual Location Tracing Configuration resource is successfully
          deleted.

```

```

'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

/reports:

```

get:
  summary: Retrieve Location History Report(s).
  operationId: GetHistTransQualMeasReports
  tags:
    - Location History Reports (Collection)
  parameters:
    - name: target-id
      in: query
      required: true
      content:
        application/json:
          schema:
            $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    - name: val-service-id
      in: query
      required: false
      schema:
        type: string
    - name: req-loc-history
      in: query
      required: false
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/ReqLocHistory'
    - name: supp-feat
      in: query
      required: false
      content:
        application/json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

```

responses:

```

'200':
  description: >
    OK. The requested Location History Report(s), if any, shall be returned.
  content:
    application/json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/LocHistoryReports'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'

```

```
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
```

```
schemas:
```

```
#
# STRUCTURED DATA TYPES
#
```

```
LocTracingConfig:
  description: >
    Represents a Location Tracing Configuration.
  type: object
  properties:
    target:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    valServiceId:
      type: string
    locArea:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    locQoS:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LocationQoS'
    triggerConds:
      $ref: 'TS29549_SS_LocationReporting.yaml#/components/schemas/TriggeringCriteria'
    duration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    posMethod:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/PositioningMethod'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - target
```

```
LocTracingConfigPatch:
  description: >
    Represents the parameters to request the modification of a Location Tracing Configuration.
  type: object
  properties:
    locArea:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    locQoS:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LocationQoS'
    triggerConds:
      $ref: 'TS29549_SS_LocationReporting.yaml#/components/schemas/TriggeringCriteria'
    duration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    posMethod:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/PositioningMethod'
```

```
ReqLocHistory:
  description: >
    Represents the requested location history filtering information.
  type: object
  properties:
    locArea:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    time:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    duration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  anyOf:
    - required: [locArea]
    - required: [time]
    - required: [duration]
```



```

LocHistoryReports:
  description: >
    Represents Location History Report(s).
  type: object
  properties:
    reports:
      type: array
      items:
        $ref: '#/components/schemas/LocHistoryReport'
      minItems: 0
      description: >
        Contains the Location History Report(s).
        If there are no Location History Report(s) fulfilling the request, this attribute shall
        contain an empty array.
    supFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - reports

LocHistoryReport:
  description: >
    Represents a Location History Report.
  type: object
  properties:
    targets:
      type: array
      items:
        $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
      minItems: 1
    locData:
      type: object
      additionalProperties:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
      minProperties: 1
      description: >
        Contains the location history information report.
        The key of the map shall be set to the identifier of the VAL UE/user (among the ones
        provided within the targets attribute) to which the provided location history
        information provided within the map value is related.
    timestamp:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  required:
    - locData
  oneOf:
    - required: [valUEs]
    - required: [valUsers]

```

SIMPLE DATA TYPES

#

#

ENUMERATIONS

#

Data types describing alternative data types or combinations of data types

#

A.26 SS_ConfirmLocation API

openapi: 3.0.0

```

info:
  title: LM Server Location Confirmation Service Management Service
  version: 1.0.0-alpha.1
  description: |
    LM Server Location Confirmation Service Management Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

externalDocs:

```
description: >
  3GPP TS 29.549 V19.1.0 Service Enabler Architecture Layer for Verticals (SEAL);
  Application Programming Interface (API) specification; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/
```

```
servers:
- url: '{apiRoot}/ss-cl/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549.
```

```
security:
- {}
- oAuth2ClientCredentials: []
```

```
paths:
  /subscriptions:
    post:
      summary: Request the creation of a Location Confirmation Service Subscription.
      operationId: CreateLocConfirmSubsc
      tags:
        - Location Confirmation Service Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocConfirmSubsc'
      responses:
        '201':
          description: >
            Created. The Location Confirmation Service Subscription is successfully created and a
            representation of the created Individual Location Confirmation Service Subscription
            resource shall be returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/LocConfirmSubsc'
          headers:
            Location:
              description: >
                Contains the URI of the created Individual Location Confirmation Service
                Subscription resource.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    callbacks:
      LocConfirmUsageNotif:
        '{$request.body#/notifUri}':
          post:
            requestBody:
              required: true
              content:
                application/json:
                  schema:
```

```

        $ref: '#/components/schemas/LocConfirmUsageNotif'
responses:
  '204':
    description: >
      No Content. The Location Confirmation Service Usage Notification is successfully
      received and acknowledged.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscription/{subscId}:
  parameters:
    - name: subscId
      in: path
      description: >
        Represents the identifier of the Individual Location Confirmation Service Subscription
        resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual Location Confirmation Service Subscription resource.
    operationId: GetIndLocConfirmSubsc
    tags:
      - Individual Location Confirmation Service Subscription (Document)
    responses:
      '200':
        description: >
          OK. The requested Individual Location Confirmation Service Subscription resource shall
          be returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocConfirmSubsc'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

summary: Request the update of an existing Individual Location Confirmation Service Subscription resource.

operationId: UpdateIndLocConfirmSubsc

tags:

- Individual Location Confirmation Service Subscription (Document)

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/LocConfirmSubsc'

responses:

'200':

description: >

OK. The Individual Location Confirmation Service Subscription resource is successfully updated and a representation of the updated resource shall be returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/LocConfirmSubsc'

'204':

description: >

No Content. The Individual Location Confirmation Service Subscription resource is successfully updated and no content is returned in the response body.

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:

summary: Request the modification of an existing Individual Location Confirmation Service Subscription resource.

operationId: ModifyIndLocConfirmSubsc

tags:

- Individual Location Confirmation Service Subscription (Document)

requestBody:

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/LocConfirmSubscPatch'

responses:

'200':

description: >

OK. The Individual Location Confirmation Service Subscription resource is successfully modified and a representation of the updated resource shall be returned in the response body.

content:

application/json:

schema:

```
    $ref: '#/components/schemas/LocConfirmSubsc'
  '204':
    description: >
      No Content. The Individual Location Confirmation Service Subscription resource is
      successfully modified and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

delete:

summary: Request the deletion of an existing Individual Location Confirmation Service Subscription resource.

operationId: DeleteIndLocConfirmSubsc

tags:

- Individual Location Confirmation Service Subscription (Document)

responses:

```
  '204':
    description: >
      No Content. The Individual Location Confirmation Service Subscription resource is
      successfully deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

components:**securitySchemes:**

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

#

STRUCTURED DATA TYPES

#

```
LocConfirmSubsc:
  description: >
    Represents a Location Confirmation Service Subscription.
  type: object
  properties:
    appIds:
      type: array
      items:
        type: string
      minItems: 1
    valServiceIds:
      type: array
      items:
        type: string
      minItems: 1
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  oneOf:
    - required: [appIds]
    - required: [valServiceIds]

LocConfirmSubscPatch:
  description: >
    Represents the parameters to request the modification of a Location Confirmation Service
    Subscription.
  type: object
  properties:
    appIds:
      type: array
      items:
        type: string
      minItems: 1
    valServiceIds:
      type: array
      items:
        type: string
      minItems: 1

LocConfirmUsageNotif:
  description: >
    Represents a Location Confirmation Service Usage Notification.
  type: object
  properties:
    reports:
      type: array
      items:
        $ref: '#/components/schemas/LocConfirmUsageReport'
      minItems: 0
    timestamp:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  required:
    - reports

LocConfirmUsageReport:
  description: >
    Represents a Location Confirmation Service Usage Notification.
  type: object
  properties:
    appId:
      type: string
    valServiceId:
      type: string
    valUeId:
      type: string
    timestamp:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  required:
    - valUeId
  oneOf:
    - required: [appId]
    - required: [valServiceId]
```

SIMPLE DATA TYPES

#

```
#  
# ENUMERATIONS  
#
```

```
# Data types describing alternative data types or combinations of data types  
#
```

A.27 SS_SLPositioningManagement API

openapi: 3.0.0

info:

```
  title: SS_SLPositioningManagement  
  version: 1.0.0-alpha.3  
  description: |  
    API for SEAL SL Positioning management Service.  
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  
    All rights reserved.
```

externalDocs:

```
  description: >  
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);  
    Application Programming Interface (API) specification; Stage 3.  
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/
```

servers:

```
  - url: '{apiRoot}/ss-slp/v1'  
    variables:  
      apiRoot:  
        default: https://example.com  
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
```

security:

```
  - {}  
  - OAuth2ClientCredentials: []
```

paths:

```
  /subscriptions:  
    post:  
      summary: Create individual SL Positioning Management subscription.  
      operationId: SubscribeSlPositionMgmt  
      tags:  
        - SL Positioning Management Subscriptions (Collection)  
      requestBody:  
        required: true  
        content:  
          application/json:  
            schema:  
              $ref: '#/components/schemas/SlPositionMgmtSubsc'  
      responses:  
        '201':  
          description: >  
            The requested individual SL Positioning Management subscription  
            resource is successfully created and a representation of the created  
            resource is returned in the response body.  
          content:  
            application/json:  
              schema:  
                $ref: '#/components/schemas/SlPositionMgmtSubsc'  
          headers:  
            Location:  
              description: Contains the URI of the newly created resource.  
              required: true  
              schema:  
                type: string  
        '400':  
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'  
        '401':  
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'  
        '403':  
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'  
        '404':  
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'  
        '411':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  SlPositionMgmtNotif:
    '{$request.body#/notifUri}':
      post:
        summary: Notify on changes of the SL Positioning Management according to the
          requested reporting settings.
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SlPositionMgmtNotif'
        responses:
          '204':
            description: The notification is successfully received.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  get:
    summary: Read an existing individual SL Positioning Management subscription resource
      according to the subscriptionId.
    operationId: ReadSlPositioningMgmtSubscription
    tags:
      - Individual SL Positioning Management Subscription (Document)
    parameters:
      - name: subscriptionId
        in: path
        description: >
          Represents the identifier of an individual SL Positioning Management
          subscription resource.
        required: true
        schema:
          type: string
    responses:
      '200':
        description: The requested individual SL Positioning Management subscription returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SlPositionMgmtSubsc'

```



```

    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: >
    Update an individual SL Positioning Management subscription identified by the
    subscriptionId.
  operationId: UpdateSlPositionMgmt
  tags:
    - Individual Unicast SL Positioning Management Subscription (Document)
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Represents the identifier of an individual unicast monitoring subscription resource.
      required: true
      schema:
        type: string
  requestBody:
    description: Updated details of the unicast QoS monitoring subscription.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/SlPositionMgmtSubsc'
  responses:
    '200':
      description: >
        The subscription is updated successfully, and the updated subscription
        information returned in the response.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/SlPositionMgmtSubsc'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:

```

```
summary: >
  Modify an individual SL Positioning Management subscription identified
  by the subscriptionId.
operationId: ModifySlPositionMgmt
tags:
  - Individual SL Positioning Management Subscription (Document)
parameters:
  - name: subscriptionId
    in: path
    description: >
      Represents the identifier of an individual SL Positioning Management
      subscription resource.
    required: true
    schema:
      type: string
requestBody:
  required: true
  content:
    application/merge-patch+json:
      schema:
        $ref: '#/components/schemas/SlPositionMgmtSubscPatch'
responses:
  '200':
    description: >
      Individual individual SL Position Management resource is modified
      successfully and representation of the modified individual SL Positioning Management
      resource
      subscription resource is returned.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/SlPositionMgmtSubscPatch'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
summary: Remove an existing individual SL Positioning Management resource according to
  the subscriptionId.
operationId: UnsubscribeSlPositionMgmt
tags:
  - Individual SL Positioning Management Subscription (Document)
parameters:
  - name: subscriptionId
    in: path
    description: >
      Represents the identifier of an individual SL Positioning Management
      subscription resource.
    required: true
    schema:
      type: string
responses:
  '204':
    description: >
      The Individual SL Positioning Management Subscription resource matching the
```

```
    subscriptionId is deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

/request-srp:

post:

summary: Enables a service consumer to request SR positioning information.

operationId: RequestSRPosInfo

tags:

- SR Positioning Information Request

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/SrPosInfoReq'

responses:

'200':

description: >

OK. The Positioning Information Request is successfully received and processed, and the requested SR based positioning information is returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/SrPosInfoResp'

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

SLPositionMgmtSubsc:
description: Indicate the SL Positioning Management subscription.
type: object
properties:
 valSvcId:
 type: string
 description: Identity of the VAL service
 tgtUes:
 type: array
 items:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 minItems: 1
 description: List of VAL Users or UE IDs for which SL location management is requested.
 valServArea:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
 slPosMgmtParams:
 \$ref: '##/components/schemas/SlPosMgmtParam'
 valUeSel:
 type: array
 items:
 \$ref: '##/components/schemas/ValUeSel'
 minItems: 1
 notifUri:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
 suppFeat:
 \$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
 - notifUri
 - valSvcId

SLPositionMgmtSubscPatch:
description: Indicate the SL Positioning Management subscription update.
type: object
properties:
 tgtUes:
 type: array
 items:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 minItems: 1
 description: List of VAL Users or UE IDs for which SL location management is requested.
 valServArea:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
 slPosMgmtParams:
 \$ref: '##/components/schemas/SlPosMgmtParam'
 valUeSel:
 type: array
 items:
 \$ref: '##/components/schemas/ValUeSel'
 minItems: 1
 notifUri:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

SLPositionMgmtNotif:
description: SL Positioning Management notification.
type: object
properties:
 subscId:
 type: string
 description: Subscription Identifier
 refUes:
 type: array
 items:
 \$ref: '##/components/schemas/ValUeInfo'
 minItems: 1
 description: List of VAL UE(s) identified as Reference UE(s).
 tgtUes:
 type: array
 items:
 \$ref: '##/components/schemas/ValUeInfo'
 minItems: 1
 description: List of VAL UE(s) identified as Target UE(s).
 slPosMgmtParamResp:
 description: A map(list of key-value pairs) where the key is the ID of Reference UE.
 type: object
 additionalProperties:
 description: A map(list of key-value pairs) where the key is the ID of Target UE.

```
      type: object
      additionalProperties:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/RangeDirection'
      minProperties: 1
    minProperties: 1
  required:
    - subscId

ValueInfo:
  description: Indicate the Val UE Information.
  type: object
  properties:
    valueId:
      type: string
      description: Identity of the VAL UE ID.
    valueAddr:
      $ref: 'TS29549_SS_NetworkResourceAdaptation.yaml#/components/schemas/ValueAddrInfo'
SrPosInfoReq:
  description: >
    Represents the SR Positioning Information Request.
  type: object
  properties:
    valSvcId:
      type: string
    ueList:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/SrUeList'
    srPosFltr:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/SrPosFilter'
      minItems: 1
    locQoS:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LocationQoS'
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  required:
    - ueList
    - srPosFltr

SrPosInfoResp:
  description: >
    Represents the SR Positioning Information Response.
  type: object
  properties:
    srPosInfo:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/SrPosInfo'
      minItems: 1
  required:
    - srPosInfo

SrUeList:
  description: >
    Contains the list of UE identities of Short-Range based positioning.
  type: object
  properties:
    clientUes:
      type: array
      items:
        type: string
      minItems: 1
    tgtUes:
      type: array
      items:
        type: string
      minItems: 1
    refUes:
      type: array
      items:
        type: string
      minItems: 1
  required:
    - tgtUes
    - refUes

SrPosInfo:
  description: >
```

Contains the Short-Range based positioning information.

```

type: object
properties:
  refUe:
    type: string
  tgtUe:
    type: string
  relativeLocation2D:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/2DRelativeLocation'
  relativeLocation3D:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/3DRelativeLocation'
  relativeVelocity:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/RelativeVelocityWithUncertainty'
  distanceDirection:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/RangeDirection'
required:
  - refUe
  - tgtUe
anyOf:
  - required: [ relativeLocation2D ]
  - required: [ relativeLocation3D ]
  - required: [ relativeVelocity ]
  - required: [ distanceDirection ]

```

```

SLPosMgmtParam:
  description: Represents the SL Positioning parameter.
  type: object
  properties:
    reqMetric:
      $ref: '#/components/schemas/SLPosMgmtMetric'
  required:
    - reqMetric

```

Simple data types and Enumerations

```

SLPosMgmtMetric:
  anyOf:
    - type: string
    enum:
      - DISTANCE
      - DIRECTION
      - DISTANCE_DIRECTION
    - type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration but is not used to encode
    content defined in the present version of this API.
  description: |
    Possible values are:
    Enumeration of SL Positioning management metric.
    - DISTANCE: This value indicates that the SL Positioning Management metric
      is distance.
    - DIRECTION: This value indicates that the SL Positioning Management metric
      is direction.
    - DISTANCE_DIRECTION: This value indicates that the SL Positioning Management
      metric is both distance and direction .

```

```

ValueSel:
  anyOf:
    - type: string
    enum:
      - REF_UE
      - TARGET_UE
    - type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration but is not used to encode
    content defined in the present version of this API.
  description: |
    Possible values are:
    Enumeration of VAL UE(s) selection criteria for SL Positioning management.
    - REF_UE: Indicates the selection criteria of UE role is reference UE.
    - TARGET_UE: Indicates the selection criteria of UE role is target UE.

```

```

SrPosFilter:
  anyOf:
    - type: string
    enum:

```

- RANGE
- DIRECTION
- RELATIVE_POS
- RELATIVE_VEL
- type: string
- description: >

This string provides forward-compatibility with future extensions to the enumeration but is not used to encode content defined in the present version of this API.
- description: |

Possible values are:
 Enumeration of requested SR based positioning information filters.

 - RANGE: Indicates that the range is requested.
 - DIRECTION: Indicates that the direction is requested.
 - RELATIVE_POS: Indicates that the relative position is requested.
 - RELATIVE_VEL: Indicates that the relative velocity is requested.

A.28 SS_ADAE_AIMLMemberCapabilityAnalytics API

openapi: 3.0.0

info:

title: SS_ADAE_AIMLMemberCapabilityAnalytics
 description: |
 API for ADAE AIML member capability analytics analytics service.
 © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
 All rights reserved.
 version: "1.0.0-alpha.3"

externalDocs:

description: >
 3GPP TS 29.549 v19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
 Application Programming Interface (API) specification; Stage 3.
 url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:

- {}
- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/ss-adae-aimlmca/v1'
- variables:
 - apiRoot:
 - default: <https://example.com>
 - description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

/application-aimlmcas:
 post:
 summary: Request the creation of AIML Member Capability Analytics Subscription.
 operationId: CreateIndAimlmcaSubsc
 tags:
 - AIML Member Capability Analytics Subscriptions (Collection)
 requestBody:
 required: true
 content:
 application/json:
 schema:
 \$ref: '#/components/schemas/AppAimlMemCapSub'
 callbacks:
 paNotification:
 '{\$request.body#/notifUri}':
 post:
 requestBody: # contents of the callback message
 required: true
 content:
 application/json:
 schema:
 \$ref: '#/components/schemas/AppAimlMemCapNotif'
 responses:
 '204':
 description: No Content (successful notification)
 '307':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/307'
 '308':

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
responses:
  '201':
    description: The AIML Member Capability Analytics Subscription is successfully
      created and a representation of the created Individual AIML Member Capability Analytics
      Subscription resource shall be returned.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/AppAimlMemCapSub'
    headers:
      Location:
        description: Contains the URI of the newly created resource.
        required: true
        schema:
          type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/application-aimlmcas/{appAimlmcaId}:
  parameters:
    - name: appAimlmcaId
      in: path
      description: >
        Represents the identifier of an Individual AIML Member Capability Analytics Subscription
        resource.
      required: true
      schema:
        type: string

get:
  summary: Retrieves an existing Individual AIML Member Capability Analytics Subscription.
  operationId: ReadIndAimlmcaSubsc
  tags:
    - Individual AIML Member Capability Analytics Subscription (Document)
  responses:

```



```

    '200':
      description: >
        The requested Individual AIML Member Capability Analytics subscription matching the
        appAimlmcaId shall be returned.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AppAimlMemCapSub'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Request the update of an existing Individual AIML Member Capability Analytics
    Subscription resource.
    operationId: UpdateIndAimlmcaSubsc
    tags:
      - Individual AIML Member Capability Analytics Subscription (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AppAimlMemCapSub'
    responses:
      '200':
        description: >
          OK. The Individual AIML Member Capability Analytics Subscription resource is
          successfully updated and a representation of the updated resource shall be returned in
          the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AppAimlMemCapSub'
      '204':
        description: >
          No Content. The Individual AIML Member Capability Analytics Subscription resource
          is successfully updated and no content is returned in the response body.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: Request the modification of an existing Individual AIME Member Capability Analytics
Subscription resource.
  operationId: ModifyIndAimeMcaSubsc
  tags:
    - Individual AIME Member Capability Analytics Subscription (Document)
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/AppAimeMemCapSubPatch'
  responses:
    '200':
      description: >
        OK. The Individual AIME Member Capability Analytics Subscription resource is
        successfully modified and a representation of the updated resource shall be returned in
        the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AppAimeMemCapSub'
    '204':
      description: >
        No Content. The Individual AIME Member Capability Analytics Subscription resource
        is successfully modified and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: Request the deletion of an existing Individual AIME Member Capability Analytics
Subscription resource.
  operationId: DeleteIndAimeMcaSubsc
  tags:
    - Individual AIME Member Capability Analytics Subscription (Document)
  parameters:
    - name: appAimeMcaId
      in: path
      description: Identifier of an Individual AIME member Capability Analytics Subscription.
      required: true
      schema:
        type: string
  responses:
    '204':
      description: >
        The Individual AIME Member Capability Analytics Subscription matching the appAimeMcaId
        is deleted.
    '307':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

AppAimlMemCapSub:

description: Represents an individual AIML member capability analytics event subscription resource.

type: object

properties:

notifUri:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

analyticsId:

\$ref: '#/components/schemas/AppAimlMemCapAnalytics'

analyticsType:

\$ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'

analyticsSub:

\$ref: '#/components/schemas/AppAimlMemCapAnalyticsSub'

confLevel:

type: integer

minimum: 0

maximum: 100

timeValidity:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'

repReq:

\$ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'

suppFeat:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- notifUri
- analyticsId
- analyticsType
- analyticsSub

AppAimlMemCapNotif:

description: Represents notification of the AIML member capability analytics event.

type: object

properties:

analyticsOutput:

\$ref: '#/components/schemas/AppAimlMemCapAnalyticsOutput'

confLevel:

type: integer

minimum: 0

maximum: 100

required:

- analyticsOutput

AppAimlMemCapSubPatch:

description: Represents the requested modification to a Individual AIML member capability analytics subscription resource.

type: object

properties:

```

analyticsSub:
  $ref: '#/components/schemas/AppAimlMemCapAnalyticsSub'
notifUri:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
confLevel:
  type: integer
  minimum: 0
  maximum: 100
timeValidity:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
repReq:
  $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'

```

AppAimlMemCapAnalyticsSub:

description: Represents the information related to the analytics subscription.

type: object

properties:

```

ueIds:
  type: array
  items:
    type: string
  minItems: 1
  description: >
    One or more VAL UE IDs whose analytics or data collection are subject to subscription.
aimlMemberIds:
  type: array
  items:
    $ref: '#/components/schemas/AimlMemberId'
  minItems: 1
  description: >
    One or more AIML members whose analytics or data collection are subject to subscription.
aimlMemCapAttribute:
  $ref: '#/components/schemas/AppAimlMemCapAttributes'
area:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
required:
  - aimlMemCapAttribute
oneOf:
  - required: [ueIds]
  - required: [aimlMemberIds]

```

AppAimlMemCapAnalyticsOutput:

description: Represents analytics output information in the notification.

type: object

properties:

```

analyticsId:
  $ref: '#/components/schemas/AppAimlMemCapAnalytics'
analyticsOutput:
  type: array
  items:
    $ref: '#/components/schemas/AnalyticsOutput'
  minItems: 1
  description: >
    Contains a list of identities of one or more VAL UEs or AIML members, the data
    collection related to, in the case of the notification is on the AIML member capability
    data collection.
required:
  - analyticsId

```

AnalyticsOutput:

description: Represents analytics output information in the notification.

type: object

properties:

```

ueId:
  type: string
aimlMemberId:
  items:
    $ref: '#/components/schemas/AimlMemberId'
timeValidity:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
aimlMemAvails:
  type: array
  items:
    $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'
  minItems: 1
aimlMemCap:
  $ref: '#/components/schemas/AimlMemCapability'
required:

```

```

- aimlMemAvails
oneOf:
- required: [ueId]
- required: [aimlMemberId]

```

```

AimlMemCapability:
description: Represents AIML member capability information in the notification.
type: object
properties:
  maxAimlMemConn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  minAimlMemConn:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

```

```

# SIMPLE DATA TYPES
#

```

```

AimlMemberId:
description: Represents unique identifier of a AIMLE Member.
type: string

```

```

#
# ENUMERATIONS
#

```

```

AppAimlMemCapAnalytics:
  anyOf:
    - type: string
      enum:
        - APP_MEMBER_CAPABILITY
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
      description: |
        Represents Connection Status Events.
        Possible values are:
        - APP_MEMBER_CAPABILITY_ANALYTICS: Indicates that the identifier of the Application layer
AIML member capability analytics event.

```

```

AppAimlMemCapAttributes:
  anyOf:
    - type: string
      enum:
        - COMMUNICATION_CAPABILITY
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
      description: |
        Represents Connection Status Events.
        Possible values are:
        - COMMUNICATION_CAPABILITY: Indicates that the requested attribute to be analyzed is
        communication capability.

```

A.29 SS_ADCCF_DataCollection API

openapi: 3.0.0

```

info:
  title: SS_ADCCF_DataCollection API
  version: 1.0.0-alpha.2
  description: |
    API for A-DCCF Data Collection service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

```

```

security:
- {}
- oAuth2ClientCredentials: []

servers:
- url: '{apiRoot}/ss-adccf-dc/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:
  /subscriptions:
    post:
      summary: Create an "Individual Data Collection Subscription" resource.
      operationId: SubscribeDataCollection
      tags:
        - Data Collection Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DataCollectionSub'
      responses:
        '201':
          description: >
            The "Individual Data Collection Subscription" resource is created.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DataCollectionSub'
          headers:
            Location:
              description: Contains the URI of the newly created individual resource.
              required: true
              schema:
                type: string
        '200':
          description: The requested data collection response is returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DataCollectionResp'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
      callbacks:
        DataCollectionNotif:
          '{$request.body#/notifUri}':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/DataCollectionNotif'
            responses:

```

```

    '204':
      description: The notification is successfully received.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Represents the identifier of an Individual Location-Related UE
        Group Analytics Subscription.
      required: true
      schema:
        type: string

  get:
    summary: Read the "Individual Data Collection Subscription" resource.
    operationId: ReadDataCollectionSubscription
    tags:
      - Individual Data Collection Subscription (Document)
    responses:
      '200':
        description: >
          The requested "Individual Data Collection Subscription"
          resource is returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DataCollectionSub'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: >
      Update the "Individual Data Collection Subscription" resource.
    operationId: UpdateDataCollectionSubscription
    tags:

```

```

- Individual Data Collection Subscription (Document)
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/DataCollectionSub'
responses:
  '200':
    description: >
      Successful case. The "Individual Data Collection Subscription"
      resource is successfully updated, and a representation of the
      updated resource is returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DataCollectionSub'
  '204':
    description: >
      No Content. The "Individual Data Collection Subscription" resource is
      successfully updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: Modify the "Individual Data Collection Subscription" resource.
  operationId: ModifyDataCollectionSubscription
  tags:
    - Individual Data Collection Subscription (Document)
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/DataCollectionSubPatch'
  responses:
    '200':
      description: >
        Successful case. The "Individual Data Collection Subscription"
        resource is successfully modified and a representation of the updated
        resource is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DataCollectionSub'
    '204':
      description: >
        No Content. The "Individual Data Collection Subscription" resource is
        successfully modified and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':

```



```

    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

summary: Remove the "Individual Data Collection Subscription" resource.
 operationId: RemoveDataCollectionSubscription

tags:

- Individual Data Collection Subscription (Document)

responses:

```

  '204':
    description: >
      The "Individual Data Collection Subscription" resource
      matching the subscriptionId is deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

securitySchemes:

```

  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

schemas:

```

  DataCollectionSub:
    description: >
      Represents the Data Collection Subscription.
    type: object
    properties:
      dataColEvnId:
        type: string
      dataColReq:
        $ref: '#/components/schemas/DataCollectionReq'
      repReq:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      analyticsId:
        type: string
      dataProdIds:
        type: array

```

```
    items:
      type: string
    minItems: 1
  profiles:
    type: array
    items:
      $ref: 'TS29549_SS_AADRF_DataManagement.yaml#/components/schemas/DataProducerProfile'
    minItems: 1
  area:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  duration:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  procReq:
    $ref: '#/components/schemas/ProcessingReq'
  storageReqs:
    $ref: '#/components/schemas/StorageRequirements'
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  imReport:
    $ref: '#/components/schemas/DataCollectionNotif'
  required:
    - dataColEvnId
    - dataColReq
    - notifUri

DataCollectionSubPatch:
  description: >
    Represents the requested modifications to a Data Collection Subscription.
  type: object
  properties:
    dataColReq:
      $ref: '#/components/schemas/DataCollectionReq'
    repReq:
      $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
    dataProdIds:
      type: array
      items:
        type: string
      minItems: 1
    profiles:
      type: array
      items:
        $ref: 'TS29549_SS_AADRF_DataManagement.yaml#/components/schemas/DataProducerProfile'
      minItems: 1
    duration:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

DataCollectionResp:
  description: >
    Represents the data collection response.
  type: object
  properties:
    reports:
      type: array
      items:
        $ref: '#/components/schemas/DataCollectionNotif'
      minItems: 1
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - reports

DataCollectionNotif:
  description: >
    Represents the Data Collection Notification.
  type: object
  properties:
    dataColEvnId:
      type: string
    analyticsId:
      type: string
    analyticsType:
      $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
    dataType:
```

```
    $ref: '#/components/schemas/AdccfDataType'
  dataOutput:
    type: string
  procReq:
    $ref: '#/components/schemas/ProcessingReq'
  storageReqs:
    type: array
    items:
      type: string
    minItems: 1
  required:
    - dataColEvnId
    - dataOutput

DataCollectionReq:
  description: >
    Represents the data collection requirements.
  type: object
  properties:
    dataFormat:
      $ref: 'TS29222_CAPIF_Publish_Service_API.yaml#/components/schemas/DataFormat'
    repFreq:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    abstraction:
      type: integer
      minimum: 0
      maximum: 100
    accuracy:
      type: integer
      minimum: 0
      maximum: 100
  required:
    - dataFormat
    - repFreq
    - abstraction
    - accuracy

ProcessingReq:
  description: >
    Represents the data processing requirements.
  type: object
  properties:
    req:
      type: string
  anyOf:
    - required: [req]

AdccfDataType:
  description: >
    Represents A-DCCD data type.
  type: object
  properties:
    type:
      $ref: '#/components/schemas/DataType'
    gran:
      $ref: '#/components/schemas/GranularityType'
  oneOf:
    - required: [type]
    - required: [gran]

DataOutput:
  description: >
    Represents the A-DCCF data output.
  type: object
  properties:
    dataOutput:
      type: string
  required:
    - dataOutput

StorageRequirements:
  description: >
    Represents the data storage requirements.
  type: object
  properties:
    storageReqs:
      type: array
      items:
```

```

    type: string
    minItems: 1
    required:
      - storageReqs

```

Simple data types and Enumerations

```

DataType:
  anyOf:
    - type: string
      enum:
        - UE_DATA
        - NETWORK_DATA
        - APP_DATA
        - EDGE_DATA
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration and is not used to encode
        content defined in the present version of this API.
  description: |
    Represents the data type.
    Possible values are:
    - UE_DATA: Indicates that the data sample related to the UE data.
    - NETWORK_DATA: Indicates that the data sample related to the network data.
    - APP_DATA: Indicates that the data sample related to the application data.
    - EDGE_DATA: Indicates that the data sample related to the edge data.

GranularityType:
  anyOf:
    - type: string
      enum:
        - REAL_TIME
        - NON_REAL_TIME
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration and is not used to encode
        content defined in the present version of this API.
  description: |
    Represents the granularity type.
    Possible values are:
    - REAL_TIME: Indicates that the data granularity is real time.
    - NON_REAL_TIME: Indicates that the data granularity is non-real time.

```

A.30 SS_ADAE_ServerToServerPerformanceAnalytics API

openapi: 3.0.0

```

info:
  title: SS_ADAE_ServerToServerPerformanceAnalytics
  version: 1.0.0-alpha.2
  description: |
    API for ADAE Server to Server Performance Analytics service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:
  - {}
  - OAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/ss-adae-sspa/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

```

```
paths:
  /subscriptions:
    post:
      summary: Create an "Individual Server to Server Performance Analytics Subscription" resource.
      operationId: SubscribeServer2ServerPerformanceAnalytics
      tags:
        - Server to Server Performance Analytics Subscription (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/S2SPerfSubsc'
      responses:
        '201':
          description: >
            Subscription to the Server to Server Performance analytics is created.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/S2SPerfSubsc'
          headers:
            Location:
              description: Contains the URI of the newly created individual resource.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
      callbacks:
        NotifyServerToServerPerformance:
          '{$request.body#/notifUri}':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/S2SPerfNotif'
              responses:
                '204':
                  description: The notification is successfully received.
                '307':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
                '308':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
                '400':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
                '401':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
                '403':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
                '404':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
                '411':
                  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
                '413':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Represents the identifier of an Individual Server to Server Performance Analytics
        Subscription.
      required: true
      schema:
        type: string
  get:
    summary: Read the "Individual Server to Server Performance Analytics Subscription" resource.
    operationId: ReadIndServer2ServerPerformanceSubscription
    tags:
      - Individual Server to Server Performance Analytics Subscription (Document)
    responses:
      '200':
        description: >
          The requested "Individual Server to Server Performance Analytics Subscription"
          resource is returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/S2SPerfSubsc'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  put:
    description: >
      Update the "Individual Server to Server Performance Analytics Subscription" resource.
    operationId: UpdateIndServer2ServerPerformanceSubscription
    tags:
      - Individual Server to Server Performance Analytics Subscription (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/S2SPerfSubsc'
    responses:
      '200':
        description: >
          OK. The Individual Server to Server Performance Analytics Subscription resource
          is successfully updated, and representation of updated resource is returned in
          the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/S2SPerfSubsc'
      '204':

```

```

    description: >
      No Content. The Individual Server to Server Performance Analytics Subscription resource
      is successfully updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

```

  description: >
    Modify the "Individual Server to Server Performance Analytics Subscription" resource.
  operationId: ModifyIndServer2ServerPerformanceSubscription
  tags:
    - Individual Server to Server Performance Analytics Subscription (Document)
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/S2SPerfSubscPatch'
  responses:
    '200':
      description: >
        OK. The Individual Server to Server Performance Analytics Subscription resource is
        successfully modified, and representation of the modified resource is returned
        in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/S2SPerfSubsc'
    '204':
      description: >
        No Content. The Individual Server to Server Performance Analytics Subscription resource
        is successfully modified and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'

```

```

'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

summary: Delete the "Individual Server to Server Performance Analytics Subscription" resource.
 operationId: DeleteIndServer2ServerPerformanceSubscription

tags:

- Individual Server to Server Performance Analytics Subscription (Document)

responses:

```

'204':
  description: >
    The "Individual Server to Server Performance Analytics Subscription" resource
    matching the subscriptionId is deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

securitySchemes:

```

oAuth2ClientCredentials:
  type: oauth2
  flows:
    clientCredentials:
      tokenUrl: '{tokenUrl}'
      scopes: {}

```

schemas:

```

S2SPerfSubsc:
  description: >
    Represents the Server to Server Performance analytics subscription.
  type: object
  properties:
    analyticsIds:
      type: array
      items:
        $ref: '#/components/schemas/AnalyticsIdSspa'
      minItems: 1
    analyticsType:
      $ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'
    serverInfoList:
      type: array
      items:
        $ref: '#/components/schemas/ServerInfo'
      minItems: 1
    valServId:
      type: string
    repReq:
      $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    confLevel:
      type: integer
      minimum: 0
      maximum: 100
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    serverIdList:
      type: array
      items:

```



```
    type: string
    minItems: 1
  serverIpAddList:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
    minItems: 1
  timeVal:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  supFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - analyticsType
    - notifUri
    - serverInfoList

S2SPerfSubscPatch:
  description: >
    Represents the Server to Server Performance analytics subscription modification request.
  type: object
  properties:
    serverInfoList:
      type: array
      items:
        $ref: '##/components/schemas/ServerInfo'
      minItems: 1
    valServId:
      type: string
    repReq:
      $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    confLevel:
      type: integer
      minimum: 0
      maximum: 100
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    timeVal:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'

S2SPerfNotif:
  description: >
    Represents the Server to Server Performance analytics notification.
  type: object
  properties:
    analyticsIds:
      type: array
      items:
        $ref: '##/components/schemas/AnalyticsIdSspa'
      minItems: 1
    analyticsOutput:
      type: array
      items:
        $ref: '##/components/schemas/S2SPerfAnalyticsData'
      minItems: 1
    confLevel:
      type: integer
      minimum: 0
      maximum: 100
  required:
    - analyticsOutput

S2SPerfAnalyticsData:
  description: >
    Represent the Server to Server Performance analytics data.
  type: object
  properties:
    performChgInd:
      type: boolean
      description: >
        Indicates whether a server-to-server session performance has changed. When present, it
        shall be set as follows:
        - true: the performance has changed.
        - false: the performance is not changed.
        - Default value when omitted is "false".
    timHorizOverInd:
      type: boolean
```

```

    description: >
      Indicates whether a server-to-server session performance sustainability has over a given
      time horizon. When present, it shall be set as follows:
      - true: the performance sustainability has over the given time horizon.
      - false: the performance sustainability has not over the given time horizon.
      - Default value when omitted is "false".
  areaOverInd:
    type: boolean
    description: >
      Indicates whether a server-to-server session performance sustainability has over a given
      area. When present, it shall be set as follows:
      - true: the performance sustainability has over the given area.
      - false: the performance sustainability has not over the given area.
      - Default value when omitted is "false".
  qosMeasureRslt:
    description: >
      Represents the QoS measurement result for the Server to Server Performance between any
      VAL UEs within the given area.
      $ref: 'TS29549_SS_Ue2UePerformanceAnalytics.yaml#/components/schemas/U2UAnalyticsData'
  anyOf:
    - required: [performChgInd]
    - required: [timHorizOverInd]
    - required: [areaOverInd]
    - required: [qosMeasureRslt]

ServerInfo:
  description: >
    Represents the Server Information.
  type: object
  properties:
    serverId:
      type: string
    serverIpAddList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
      minItems: 1
  anyOf:
    - required: [serverId]
    - required: [serverIpAddList]

```

Simple data types and Enumerations

```

AnalyticsIdSspa:
  anyOf:
    - type: string
      enum:
        - SERVER_TO_SERVER_PERFORMANCE
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration and is not used to encode
        content defined in the present version of this API.
  description: |
    Represents the analytic IDs for Server to Server Performance Analytics.
    Possible values are:
    - SERVER_TO_SERVER_PERFORMANCE: Indicates that the requested analytics is Server to Server
      Performance analytics.

```

A.31 SS_ADAE_UeRatConnectivityAnalytics API

openapi: 3.0.0

info:

```

title: SS_ADAE_UeRatConnectivityAnalytics
version: 1.0.0-alpha.2
description: |
  API for ADAE UE RAT Connectivity Analytics service.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.

```

externalDocs:

```

description: >
  3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);

```

Application Programming Interface (API) specification; Stage 3.
 url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:

- {}
- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/ss-adae-uerat/v1'
- variables:
 - apiRoot:
 - default: <https://example.com>
 - description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

/subscriptions:

post:

summary: Create a new UE RAT Connectivity Analytics Subscription.
 operationId: CreateUeRatConnAnalyticsSubsc

tags:

- UE RAT Connectivity Analytics Subscriptions (Collection)

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/UeRatConnectivitySub'

responses:

'201':

description: >

Created. The UE RAT Connectivity Analytics Subscription is successfully created and a representation of the created Individual UE RAT Connectivity Analytics Subscription resource shall be returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/UeRatConnectivitySub'

headers:

Location:

description: Contains the URI of the newly created resource.

required: true

schema:

type: string

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

callbacks:

UeRatConnAnalyticsNotif:

'\${request.body#/notifUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/UeRatConnectivityNotif'

responses:

'204':

description: >

No Content. The UE RAT Connectivity Analytics Notification is successfully received and acknowledged.

```
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

/subscriptions/{subscriptionId}:

parameters:

```
- name: subscriptionId
  in: path
  description: >
    Represents the identifier of the UE RAT Connectivity Analytics Subscription.
  required: true
  schema:
    type: string
```

get:

summary: Retrieve an existing Individual UE RAT Connectivity Analytics Subscription resource.
operationId: GetIndUeRatConnAnalyticsSubsc

tags:

```
- Individual UE RAT Connectivity Analytics Subscription (Document)
```

responses:

```
'200':
  description: >
    OK. The requested Individual UE RAT Connectivity Analytics Subscription
    resource is returned.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/UeRatConnectivitySub'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'406':
  $ref: 'TS29122_CommonData.yaml#/components/responses/406'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

put:

summary: Request the update of an existing Individual UE RAT Connectivity Analytics Subscription resource.
operationId: UpdateIndUeRatConnAnalyticsSubsc
tags:
- Individual UE RAT Connectivity Analytics Subscription (Document)
requestBody:
 required: true
 content:
 application/json:
 schema:
 \$ref: '#/components/schemas/UeRatConnectivitySub'
responses:
 '200':
 description: >
 OK. The Individual UE RAT Connectivity Analytics Subscription resource is successfully updated and a representation of the updated resource shall be returned in the response body.
 content:
 application/json:
 schema:
 \$ref: '#/components/schemas/UeRatConnectivitySub'
 '204':
 description: >
 No Content. The Individual UE RAT Connectivity Analytics Subscription resource is successfully updated and no content is returned in the response body.
 '307':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/307'
 '308':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/308'
 '400':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/400'
 '401':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/401'
 '403':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/403'
 '404':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/404'
 '411':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/411'
 '413':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/413'
 '415':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/415'
 '429':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/429'
 '500':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/500'
 '503':
 \$ref: 'TS29122_CommonData.yaml#/components/responses/503'
 default:
 \$ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
summary: Request the modification of an existing Individual UE RAT Connectivity Analytics Subscription resource.
operationId: ModifyIndUeRatConnAnalyticsSubsc
tags:
- Individual UE RAT Connectivity Analytics Subscription (Document)
requestBody:
 required: true
 content:
 application/merge-patch+json:
 schema:
 \$ref: '#/components/schemas/UeRatConnectivitySubPatch'
responses:
 '200':
 description: >
 OK. The Individual UE RAT Connectivity Analytics Subscription resource is successfully modified and a representation of the updated resource shall be returned in the response body.
 content:
 application/json:
 schema:
 \$ref: '#/components/schemas/UeRatConnectivitySub'
 '204':
 description: >
 No Content. The Individual UE RAT Connectivity Analytics Subscription resource is successfully modified and no content is returned in the response body.

```

'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

summary: Request the deletion of an existing Individual UE RAT Connectivity Analytics Subscription resource.

operationId: RemoveUeRatConnectivityAnalytics

tags:

- Individual UE RAT Connectivity Analytics Subscription (Document)

responses:

```

'204':
  description: >
    The Individual UE RAT Connectivity Analytics Subscription resource
    is successfully deleted.
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

Structured Data Types

UeRatConnectivitySub:

description: >

Represents the UE RAT Connectivity Analytics subscription.

type: object

properties:

analyticsSubs:

```
    type: array
    items:
      $ref: '#/components/schemas/UeRatAnalyticsSub'
    minItems: 1
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  reports:
    type: array
    items:
      $ref: '#/components/schemas/UeRatAnalyticsOutput'
    minItems: 1
  reportingReqs:
    $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
  timeInterval:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - analyticsSubs
    - notifUri

UeRatConnectivitySubPatch:
  description: >
    Represents the requested modifications to a UE RAT Connectivity Analytics subscription.
  type: object
  properties:
    analyticsSubs:
      type: array
      items:
        $ref: '#/components/schemas/UeRatAnalyticsSub'
      minItems: 1
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    reportingReqs:
      $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
    timeInterval:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'

UeRatConnectivityNotif:
  description: >
    Represents the UE RAT Connectivity Analytics Notification.
  type: object
  properties:
    subscriptionId:
      type: string
    analyticsOut:
      type: array
      items:
        $ref: '#/components/schemas/UeRatAnalyticsOutput'
      minItems: 1
  required:
    - subscriptionId
    - analyticsOut

UeRatAnalyticsOutput:
  description: >
    Represents the UE RAT Connectivity Analytics output information.
  type: object
  properties:
    analyticsIds:
      type: array
      items:
        $ref: '#/components/schemas/AnalyticsIdUeRat'
      minItems: 1
    areaApp:
      $ref: '#/components/schemas/AreaPrediction'
    timeApp:
      $ref: '#/components/schemas/TimeWindowPrediction'
    valueIds:
      type: array
      items:
        type: string
      minItems: 1
    valSvcId:
      type: string
  required:
    - analyticsIds
  anyOf:
```

- required: [areaApp]
- required: [timeApp]

UeRatAnalyticsSub:

description: >

Represents the UE RAT Connectivity Analytics Subscription related information.

type: object

properties:

analyticsIds:

type: array

items:

\$ref: '#/components/schemas/AnalyticsIdUeRat'

minItems: 1

analyticsType:

\$ref: 'TS29549_SS_ADAE_VALPerformanceAnalytics.yaml#/components/schemas/AnalyticsType'

valUeIds:

type: array

items:

type: string

minItems: 1

valGroupId:

type: string

ueMobs:

type: object

additionalProperties:

\$ref: 'TS29520_NnwdaF_EventsSubscription.yaml#/components/schemas/UeMobility'

minProperties: 1

description: >

Contains the mobility and route information of the target VAL UEs.

The key of the map shall be set to the value of the identifier of the VAL UE

(among the ones provided within the valUeIds attribute or the members of the VAL group

identified by the valGroupId attribute) to which the mobility and route information

provided within the map value is related.

valSvcId:

type: string

description: Identity of the VAL service

confLevel:

type: integer

minimum: 0

maximum: 100

area:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'

required:

- analyticsIds
- analyticsType

oneOf:

- required: [valUeIds]
- required: [valGroupId]

AreaPrediction:

description: >

Represents the RAT type changes for a given way point.

type: object

properties:

satRatType:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'

area:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'

timePer:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'

confLevel:

type: integer

minimum: 0

maximum: 100

required:

- satRatType
- area

TimeWindowPrediction:

description: >

Represents the time periods for predictions.

type: object

properties:

satRatType:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'

timePer:

\$ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'

confLevel:


```

    type: integer
    minimum: 0
    maximum: 100
  required:
  - satRatType
  - timePer

```

Simple data types and Enumerations

```

AnalyticsIdUeRat:
  anyOf:
  - type: string
    enum:
    - UE_RAT_CONNECTIVITY_ANALYTICS
  - type: string
    description: >
      This string provides forward-compatibility with future extensions to the enumeration
      and is not used to encode content defined in the present version of this API.
  description: |
    Represents the analytics ID for UE RAT connectivity.
  - UE_RAT_CONNECTIVITY_ANALYTICS: Indicates that the analytics ID for UE RAT Connectivity is
    UE RAT Connectivity Analytics.

```

A.32 SS_ASCAIInfoRetrieval API

openapi: 3.0.0

```

info:
  title: SS_ASCAIInfoRetrieval
  version: 1.0.0-alpha.1
  description: |
    API for Application Satellite Coverage Availability Information retrieval.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

```

```

security:
  - {}
  - oAuth2ClientCredentials: []

```

```

servers:
  - url: '{apiRoot}/ss-ascaiinfo/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

```

```

paths:
  /request-ascai-info:
    post:
      description: >
        Enables a service consumer to request Application Satellite Coverage Availability
        Information.
      operationId: RequestASCAIInfo
      tags:
      - Application Satellite Coverage Availability Information Request
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AscaiInfoReq'
      responses:
        '200':
          description: >
            OK. The requested Application Satellite Coverage Availability Information is returned
            in the response body.
          content:
            application/json:
              schema:

```

```

    $ref: '#/components/schemas/AscaiInfoResp'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

securitySchemes:

```

  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

schemas:

```

#
# STRUCTURED DATA TYPES
#

```

AscaiInfoReq:

```

  description: >
    Represents the Application Satellite Coverage Availability Information request data.
  type: object
  properties:
    ascaiReqs:
      type: array
      items:
        $ref: '#/components/schemas/AscaiInfoReqUe'
      minItems: 1
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - ascaiReqs

```

AscaiInfoReqUe:

```

  description: >
    Represents the Application Satellite Coverage Availability Information request data
    per target VAL UE/user.
  type: object
  properties:
    valTgtUe:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    valSvcId:
      type: string
    satId:
      type: string
    locInfo:
      $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
  required:
    - valTgtUe

```

AscaiInfoResp:

```

  description: >
    Represents the response to Application Satellite Coverage Availability Information request.
  type: object
  properties:
    ascaiInfoData:
      type: array

```

```

    items:
      $ref: '#/components/schemas/AscaiInfoData'
    minItems: 0
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - ascaiInfoData

AscaiInfoData:
  description: >
    Represents the Application Satellite Coverage Availability Information data.
  type: object
  properties:
    ascaiInfo:
      type: array
      items:
        $ref: '#/components/schemas/AscaiInfo'
      minItems: 1
    valTgtUe:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    valSvcId:
      type: string
    satId:
      type: string
    locInfo:
      $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
  required:
    - ascaiInfo
    - valTgtUe

AscaiInfo:
  description: Represents the Application Satellite Coverage Availability Information.
  type: object
  properties:
    geoArea:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
    availTimeWnds:
      type: array
      items:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
      minItems: 1
    availRatTypes:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
      minItems: 1
  required:
    - geoArea
    - availTimeWnds

```

```

#
# SIMPLE DATA TYPES
#

```

```

#
# ENUMERATIONS
#

```

```

# Data types describing alternative data types or combinations of data types:

```

A.33 SS_DAPProfileManagement API

openapi: 3.0.0

```

info:
  title: SS_DAPProfileManagement
  version: 1.0.0-alpha.1
  description: |
    SS_DAPProfileManagement service to manage digital asset profile on a DA server.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

```

```

externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.

```

```

url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

security:
- {}
- OAuth2ClientCredentials: []

servers:
- url: '{apiRoot}/ss-da-pm/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:
  /profile:
    post:
      description: Creates a new Individual DA profile.
      operationId: CreateDAProfile
      tags:
      - SEAL DA profile (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DigitalAssetProfile'
      responses:
        '201':
          description: Digital Asset Profile resource is created successfully.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DigitalAssetProfile'
          headers:
            Location:
              description: Contains the URI of the newly created resource.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  /profile/{daId}:
    get:
      description: Retrieves an individual SEAL DA profile.
      operationId: RetrieveDAProfile
      tags:
      - Individual SEAL DA Profile(Document)
      parameters:
      - name: daId
        in: path
        description: String identifying an individual DA profile resource.
        required: true
        schema:
          type: string
      responses:
        '200':
          description: Successful case. The requested "Individual DA profile" is retrieved.

```

```

    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DigitalAssetProfile'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
put:
  description: Updates an individual SEAL DA Profile.
  operationId: UpdatedDAProfile
  tags:
    - Individual SEAL DA Profile(Document)
  parameters:
    - name: daId
      in: path
      description: String identifying an individual configuration resource.
      required: true
      schema:
        type: string
  requestBody:
    description: Configuration information to be updated in DA server.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DigitalAssetProfile'
  responses:
    '200':
      description: The configuration is updated successfully.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DigitalAssetProfile'
    '204':
      description: No Content
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'

```

```

    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  patch:
    description: Modify an existing SEAL DA Profile.
    operationId: ModifyDAProfile
    tags:
      - Individual SEAL DA Profile(Document)
    parameters:
      - name: daId
        in: path
        description: Identifier of an individual SEAL DA Profile.
        required: true
        schema:
          type: string
    requestBody:
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/DigitalAssetProfilePatch'
    responses:
      '200':
        description: >
          The individual SEAL DA Profile is modified successfully and
          a representation of the updated SEAL DA Profile is returned
          in the request body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DigitalAssetProfile'
      '204':
        description: >
          No Content. The individual SEAL DA Profile is
          modified successfully.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  delete:
    description: Deletes an individual SEAL DA Profile.
    operationId: DeleteDAProfile
    tags:
      - Individual SEAL DA Profile(Document)
    parameters:
      - name: daId
        in: path
        description: String identifying an individual DA profile resource.
        required: true
        schema:
          type: string
    responses:
      '204':
        description: The individual configuration matching daId is deleted.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

schemas:

```

DigitalAssetProfile:
  description: Represents the DA Profile information.
  type: object
  properties:
    accCtrlLists:
      type: array
      minItems: 1
      items:
        $ref: '#/components/schemas/AccessControlList'
      description: >
        Represents the list of tuples indicating the requestors allowed to perform operations
        with this digital asset and the allowed operation types.
    accessories:
      type: array
      minItems: 1
      items:
        $ref: '#/components/schemas/DaId'
      description: >
        Represents the list of digital asset identifiers which are accessories (e.g. Hat, watch,
        shoes) purchased for this digital asset profile
    appIds:
      type: array
      items:
        type: string
      minItems: 1
    daId:
      $ref: '#/components/schemas/DaId'
    daOwnerIds:
      type: array
      minItems: 1
      items:
        $ref: '#/components/schemas/DigitalAssetOwnerId'
      description: >
        Represents the list of identifier(s) for the digital asset owner.
    daType:
      $ref: '#/components/schemas/DigitalAssetType'
    daUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    spatialCondt:
      type: array
      minItems: 1
      items:
        $ref: '#/components/schemas/SpatialCondition'
      description: >
        Represents the list of spatial conditions (e.g. locations) where this digital asset
        profile is allowed to be accessed.
    srvProviderIds:
      type: array

```

```

    minItems: 1
    items:
      type: string
    description: >
      Represents the list of service providers for the digital asset.
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  valServerId:
    type: string

```

DigitalAssetProfilePatch:

```

description: Represents the DA Profile information patch.
type: object
properties:
  accCtrlLists:
    type: array
    minItems: 1
    items:
      $ref: '#/components/schemas/AccessControlList'
    description: >
      Represents the list of tuples indicating the requestors allowed to perform operations
      with this digital asset and the allowed operation types.
  accessories:
    type: array
    minItems: 1
    items:
      $ref: '#/components/schemas/DaId'
    description: >
      Represents the list of digital asset identifiers which are accessories (e.g. Hat, watch,
      shoes) purchased for this digital asset profile
  appIds:
    type: array
    items:
      type: string
    minItems: 1
  daOwnerIds:
    type: array
    minItems: 1
    items:
      $ref: '#/components/schemas/DigitalAssetOwnerId'
    description: >
      Represents the list of identifier(s) for the digital asset owner.
  daType:
    $ref: '#/components/schemas/DigitalAssetType'
  expTime:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  spatialCondtIs:
    type: array
    minItems: 1
    items:
      $ref: '#/components/schemas/SpatialCondition'
    description: >
      Represents the list of spatial conditions (e.g. locations) where this digital asset
      profile is allowed to be accessed.
  srvProviderIds:
    type: array
    minItems: 1
    items:
      type: string
    description: >
      Represents the list of service providers for the digital asset.

```

AccessControlList:

```

description: >
  Represents the list of tuples indicating the requestors allowed to perform
  operations with this digital asset and the allowed operation types
type: object
properties:
  allowedUsers:
    type: array
    items:
      $ref: '#/components/schemas/AllowedUser'
    description: >
      Represents the list of users allowed to access this digital asset.
    minItems: 1

```

AllowedUser:

```

description: Represents the user allowed to access this digital asset.

```



```
type: object
properties:
  user:
    type: string
  allowedOperations:
    type: array
    items:
      $ref: '#/components/schemas/Operations'
    description: >
      Represents the list of operations allowed by the user.
    minItems: 1
  predModels:
    type: array
    items:
      type: string
    description: >
      Represents the list of one or more predictive model for the user.
    minItems: 1
  required:
    - user
```

```
SpatialCondition:
  description: Represents the location where DA profile is allowed to be accessed.
  type: object
  properties:
    currLoc:
      $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
```

Simple data types and Enumerations

```
DigitalAssetOwnerId:
  description: Represents the identity of the digital asset owner
  type: string
```

```
DaId:
  description: Represents the identity of the digital asset name
  type: string
```

```
DigitalAssetType:
  anyOf:
    - type: string
    enum:
      - ACCESSORY
      - AVATAR
      - GIFT_CERTIFICATES
      - SOFTWARE_LICENSE
      - TOKENS_AND_FILES
      - WALLET
    - type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration and is not used to encode
    content defined in the present version of this API.
  description: |
    Represents the different type of digital assets e.g. avatar, wallet
    Possible values are:
    - ACCESSORY: Represents the accessory.
    - AVATAR: Represents the avatar
    - GIFT_CERTIFICATES: Represents the gift certificates.
    - SOFTWARE_LICENSE: Represents the software license
    - TOKENS_AND_FILES: Represents the tokens and files.
    - WALLET: Represents the Digital wallet
```

```
Operations:
  anyOf:
    - type: string
    enum:
      - DISCOVERY
      - RETRIEVE
      - CREATE
      - UPDATE
      - DELETE
      - UPLOAD
      - DOWNLOAD
    - type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration and is not used to encode
```

content defined in the present version of this API.
 description: |
 Represents a desired condition of the requested location change.
 Possible values are:
 - DISCOVERY: Indicates that the operation is discovery.
 - RETRIEVE: Indicates that the operation is retrieve.
 - CREATE: Indicates that the operation is CREATE.
 - UPDATE: Indicates that the operation is UPDATE.
 - DELETE: Indicates that the operation is DELETE.
 - UPLOAD: Indicates that the Digital asset media operation is UPLOAD.
 - DOWNLOAD: Indicates that the Digital asset media operation is DOWNLOAD.

A.34 SS_DADiscovery API

openapi: 3.0.0

info:

title: DA Server digital asset Discovery Service
 version: 1.0.0-alpha.1
 description: |
 API for Digital Asset Discovery Service.
 ©2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
 All rights reserved.

externalDocs:

description: >
 3GPP TS 29.549 V19.4.0 Service Enabler Architecture Layer for Verticals (SEAL);
 Application Programming Interface (API) specification; Stage 3.
 url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/

servers:

- url: "{apiRoot}/ss-da-d/v1"
 variables:
 apiRoot:
 default: <https://example.com>
 description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549.

security:

- {}
 - oAuth2ClientCredentials: []

paths:

/digitalasset:
 get:
 summary: Discover Digital Asset.
 operationId: DiscDigitalAsset
 tags:
 - Digital Asset (Collection)
 parameters:
 - name: allowed-users
 in: query
 description: Contains the list of allowed users
 content:
 application/json:
 schema:
 type: array
 items:
 \$ref: 'TS29549_SS_DAProfileManagement.yaml#/components/schemas/AllowedUser'
 minItems: 1
 - name: da-desc
 in: query
 description: Contains the description of the digital asset.
 schema:
 type: string
 - name: da-ids
 in: query
 description: Contains the identifier(s) of the targeted digital asset(s).
 content:
 application/json:
 schema:
 type: array
 items:
 \$ref: 'TS29549_SS_DAProfileManagement.yaml#/components/schemas/DaId'
 minItems: 1
 - name: da-name
 in: query

```

    description: Contains the Digital asset name.
    schema:
      type: string
  - name: da-owner-id
    in: query
    description: Contains the Digital asset owner Identity.
    schema:
      $ref: 'TS29549_SS_DAProfileManagement.yaml#/components/schemas/DigitalAssetOwnerId'
  - name: da-type
    in: query
    description: >
      Contains the digital asset type.
    content:
      application/json:
        schema:
          $ref: 'TS29549_SS_DAProfileManagement.yaml#/components/schemas/DigitalAssetType'
  - name: spatial-condt
    in: query
    description: >
      Contains the Spatial condition including location.
    content:
      application/json:
        schema:
          $ref: 'TS29549_SS_DAProfileManagement.yaml#/components/schemas/SpatialCondition'
  - name: supp-feats
    in: query
    description: >
      Contains the list of supported feature(s) among the ones defined in clause 6.1.2.8.
    content:
      application/json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  - name: val-target-ue
    in: query
    required: true
    content:
      application/json:
        schema:
          $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
responses:
  '200':
    description: >
      OK. The Digital Asset matching the filter criteria are returned.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DaDiscResp'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: "{tokenUrl}"
          scopes: {}

```

```

schemas:
  # API specific definitions

#
# STRUCTURED DATA TYPES
#

DaDiscResp:
  description: >
    Represents the Digital Asset discovery response.
  type: object
  properties:
    results:
      type: array
      items:
        $ref: '#/components/schemas/DaDiscResult'
      minItems: 0
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - results

DaDiscResult:
  description: >
    Represents the Digital Asset discovery result.
  type: object
  properties:
    daId:
      $ref: 'TS29549_SS_DAProfileManagement.yaml#/components/schemas/DaId'
    srvProviderIds:
      items:
        type: string
      minItems: 0
    daDesc:
      type: string
    daStatus:
      $ref: '#/components/schemas/DaStatus'
  required:
    - daStatus

# SIMPLE DATA TYPES
#

#
# ENUMERATIONS
#

DaStatus:
  anyOf:
    - type: string
    enum:
      - IN_USE
      - ARCHIVED
    - type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration and is not used to encode
    content defined in the present version of this API.
  description: |
    Represents the analytic IDs for location related UE group analytics.
    Possible values are:
    - INUSE: Indicates that the digital asset is in use.
    - ARCHIVED: Indicates that the digital asset is Archived.

# Data types describing alternative data types or combinations of data types:
#

```

A.35 SS_DAMediaManagement API

openapi: 3.0.0

info:
 title: SS_DAMediaManagement
 version: 1.0.0-alpha.1

```
description: |
  SS_DAMediaManagement service to manage digital asset media on a DA server.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

```
externalDocs:
  description: >
    3GPP TS 29.549 V19.4.0; Service Enabler Architecture Layer for Verticals (SEAL);
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.549/
```

```
security:
  - {}
  - OAuth2ClientCredentials: []
```

```
servers:
  - url: '{apiRoot}/ss-da-medm/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
```

```
paths:
  /media:
    post:
      description: Upload a new Individual DA media information.
      operationId: UploadDAMedia
      tags:
        - SEAL DA media information (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DigitalAssetMedia'
      responses:
        '201':
          description: Digital Asset Media resource is created successfully.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DigitalAssetMedia'
          headers:
            Location:
              description: Contains the URI of the newly created resource.
              required: true
              schema:
                type: string
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
/media/{daId}:
  get:
    description: Download an individual SEAL DA media information.
    operationId: DownloadDAMedia
    tags:
      - Individual SEAL DA Media(Document)
    parameters:
```

```

- name: daId
  in: path
  description: String identifying an individual DA media identity.
  required: true
  schema:
    type: string
responses:
  '200':
    description: The DA media information information.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DigitalAssetMedia'
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
put:
  description: Updates an individual SEAL DA Media.
  operationId: UpdatedAMedia
  tags:
    - Individual SEAL DA Media(Document)
  parameters:
    - name: daId
      in: path
      description: Identifier of an an individual DA media resource.
      required: true
      schema:
        type: string
  requestBody:
    description: DA media information to be updated in DA server.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DigitalAssetMedia'
  responses:
    '200':
      description: The DA Media is updated successfully.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DigitalAssetMedia'
    '204':
      description: No Content
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
patch:
  description: Modify an existing SEAL DA Media.
  operationId: ModifyDAMedia
  tags:
    - Individual SEAL DA Media(Document)
  parameters:
    - name: daId
      in: path
      description: Identifier of an individual SEAL DA Media.
      required: true
      schema:
        type: string
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/DigitalAssetMediaPatch'
  responses:
    '200':
      description: >
        The individual SEAL DA Media is modified successfully and
        a representation of the updated SEAL DA Media is returned
        in the request body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DigitalAssetMedia'
    '204':
      description: >
        No Content. The individual SEAL DA Media is
        modified successfully.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
delete:
  description: Deletes an individual SEAL DA Media.
  operationId: DeleteDAMedia
  tags:
    - Individual SEAL DA Media(Document)
  parameters:
    - name: daId
      in: path
      description: Identifier of an individual DA media information resource.

```

```
      required: true
      schema:
        type: string
    responses:
      '204':
        description: The individual DA Media matching daId is deleted.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oauth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    DigitalAssetMedia:
      description: Represents the DA Media information.
      type: object
      properties:
        daId:
          $ref: '#/components/schemas/DaId'
        daMediaInfo:
          type: array
          minItems: 1
          items:
            $ref: '#/components/schemas/DaMediaInfo'
          description: >
            Represents the Information related to digital asset media.
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        valServerId:
          type: string

    DigitalAssetMediaPatch:
      description: Represents the DA Media information patch.
      type: object
      properties:
        daMediaInfo:
          type: array
          minItems: 1
          items:
            $ref: '#/components/schemas/DaMediaInfo'
          description: >
            Represents the Information related to digital asset media.
        valServerId:
          type: string

    DaMediaInfo:
      description: Represents the DA Media information patch.
      type: object
      properties:
        uri:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        object:
          type: string
      anyOf:
```


- required: [uri]
- required: [object]

Simple data types and Enumerations

DaId:

description: Represents the identity of the digital asset identifier.
type: string

Annex B (normative): SEAL NRM server support integration with TSN

When the SEAL Network Resource Management (NRM) server act as a TSN AF, the NRM server shall support integration with TSN including 5GS Bridge information reporting as defined in clause 14.3.8.2 of 3GPP TS 23.434 [2] and 5GS Bridge configuration as defined in clause 14.3.8.3 of 3GPP TS 23.434 [2].

The 5GS integration with TSN only support fully-centralized model as defined in IEEE Std 802.1Qcc-2018 [29], the NRM server acts as a TSN AF as defined in clause 14.2.2.2 of 3GPP TS 23.434 [2], shall support the TSN bridge information report as defined in clause 14.3.2.29 of 3GPP TS 23.434 [2], TSN bridge information confirmation as defined in clause 14.3.2.30 of 3GPP TS 23.434 [2], TSN bridge configuration request as defined in clause 14.3.2.31 of 3GPP TS 23.434 [2] and TSN bridge configuration response as defined in clause 14.3.2.32 of 3GPP TS 23.434 [2]. TSN CNC (as defined in IEEE 802.1Qcc [29]) via the NRM-S reference point configures the TSN flows in the 5GS. As a TSN AF, the SEAL NRM server shall interact with the 5GS PCF over the N5 reference point to configure the 5G QoS and TSCAI parameters in 5GS as defined in clause 14.2.2.24 of 3GPP TS 29.514 [30].

Annex C (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2019-10	CT3#106					TS skeleton for Services Enabler Architecture Layer for Verticals Application Programming Interface specification.	0.0.0
2019-10	CT3#106	C3-194418				Inclusion of TS skeleton document with clauses reflecting SEAL service APIs, agreed in the meeting CT3#106: C3-194418	0.1.0
2019-10	CT3#106	C3-194314				Inclusion of documents agreed in CT3#106: C3-194297, C3-194298, C3-194299, C3-194300	0.2.0
2019-11	CT3#107	C3-195307				Inclusion of documents agreed in CT3#107: C3-195157, C3-195260, C3-195441, C3-195262, C3-195263, C3-195264, C3-195185	0.3.0
2019-12	CT#86	CP-193176				Sent to plenary for Information	1.0.0
2020-03	CT3#108e					Inclusion of documents agreed in CT3#108-e meeting: C3-201346, C3-201347, C3-201348, C3-201349, C3-201350, C3-201456, C3-201457, C3-201351, C3-201352, C3-201271	1.1.0
2020-04	CT3#109e	C3-202444				Inclusion of documents agreed in CT3#109e meeting: C3-202241, C3-202275, C3-202334, C3-202335, C3-202336, C3-202337, C3-202338, C3-202339, C3-202340, C3-202341, C3-202342, C3-202343, C3-202481	1.2.0
2020-06	CT3#110e	C3-203459				Inclusion of documents agreed in CT3#110e meeting: C3-203233, C3-203317, C3-203409, C3-203411, C3-203412, C3-203413, C3-203414, C3-203415, C3-203416, C3-203417, C3-203418, C3-203419, C3-203530, C3-203587, C3-203634	1.3.0
2020-06	CT#88e	CP-201209				TS sent to plenary for approval	2.0.0
2020-06	CT#88e	CP-201334				Implementation errors fixed. TS sent to plenary for approval	2.0.1
2020-06	CT#88e	CP-201334				TS approved by plenary	16.0.0
2020-09	CT#89e	CP-202074	0001		F	Correct apiVersion notation	16.1.0
2020-09	CT#89e	CP-202074	0002	1	F	Corrections to API and Event names	16.1.0
2020-09	CT#89e	CP-202074	0003		F	Correct Identity filter in Events API	16.1.0
2020-09	CT#89e	CP-202087	0004	1	F	SS_KeyInfoRetrieval API correction	16.1.0
2020-09	CT#89e	CP-202074	0005		F	Key Management API description	16.1.0
2020-09	CT#89e	CP-202074	0006	1	F	UnicastSubscription attribute presence correction	16.1.0
2020-09	CT#89e	CP-202084	0009		F	Update of OpenAPI version and TS version in externalDocs field	16.1.0
2020-12	CT#90e	CP-203139	0010	1	F	Essential corrections and alignments	16.2.0
2020-12	CT#90e	CP-203142	0011	1	F	Immediate reporting	16.2.0
2020-12	CT#90e	CP-203139	0012	1	F	Storage of YAML files in 3GPP Forge	16.2.0
2020-12	CT#90e	CP-203142	0013	1	F	SEAL Group configuration corrections	16.2.0
2020-12	CT#90e	CP-203152	0014		F	Update of OpenAPI version and TS version in externalDocs field	16.2.0
2021-03	CT#91e	CP-210221	0015	1	F	Adding some missing description fields to data type definitions in OpenAPI specification files	17.0.0
2021-03	CT#91e	CP-210221	0016	1	F	Corrections to HTTP custom headers handling for Northbound APIs	17.0.0
2021-03	CT#91e	CP-210220	0017		F	OpenAPI reference	17.0.0
2021-03	CT#91e	CP-210240	0018		F	Update of OpenAPI version and TS version in externalDocs field	17.0.0
2021-06	CT#92e	CP-211238	0019	1	F	Correction of invalid characters in OpenAPI specification files	17.1.0
2021-06	CT#92e	CP-211241	0022	1	F	204 No Content during modification procedure on SS_GroupManagement API	17.1.0
2021-06	CT#92e	CP-211241	0023	1	F	Support redirection for SEAL APIs	17.1.0
2021-06	CT#92e	CP-211235	0025		A	Notification URI	17.1.0
2021-06	CT#92e	CP-211240	0026		F	204 No Content for resource modification in SS_LocationReporting API	17.1.0
2021-06	CT#92e	CP-211265	0027		F	Update of OpenAPI version and TS version in externalDocs field	17.1.0
2021-09	CT#93e	CP-212214	0028		F	Resource URI correction on SEAL APIs	17.2.0
2021-09	CT#93e	CP-212207	0029	1	B	Support 5G CN external group information for SEAL groups	17.2.0
2021-09	CT#93e	CP-212207	0030	1	B	Message filters for SEAL groups	17.2.0
2021-09	CT#93e	CP-212223	0031		F	Update of OpenAPI version and TS version in externalDocs field	17.2.0
2021-12	CT#94e	CP-213232	0032	1	B	Support local MBMS	17.3.0
2021-12	CT#94e	CP-213232	0033	1	B	Support Tracking UE and obtaining dynamic UE information	17.3.0
2021-12	CT#94e	CP-213231	0034	1	B	Group Management enhancement for 5G-VN groups	17.3.0
2021-12	CT#94e	CP-213250	0035	4	B	eSEAL Events Monitoring service	17.3.0
2021-12	CT#94e	CP-213220	0036		B	Alignment with SA3 supported TLS profiles	17.3.0
2021-12	CT#94e	CP-213254	0037	2	B	Network slice capability management API for SEAL	17.3.0
2021-12	CT#94e	CP-213231	0038	1	B	eSEAL location deviation service	17.3.0
2021-12	CT#94e	CP-213231	0039	1	B	Introduce TSC related service operations	17.3.0
2021-12	CT#94e	CP-213231	0041	1	B	Support Create_TSC_Stream service operation	17.3.0
2021-12	CT#94e	CP-213231	0042	1	B	Support Delete_TSC_Stream service operation	17.3.0
2021-12	CT#94e	CP-213231	0045	2	B	Create_TSC_Stream data model and OpenAPI	17.3.0
2021-12	CT#94e	CP-213231	0046		B	Delete_TSC_Stream OpenAPI definition	17.3.0
2021-12	CT#94e	CP-213236	0052	1	D	Editorial corrections for tables, figures, clauses, headers and references	17.3.0
2021-12	CT#94e	CP-213246	0054		F	Update of OpenAPI version and TS version in externalDocs field	17.3.0
2022-03	CT#95e	CP-220205	0040	4	B	Support Discover_TSC_Stream_Availability service operation	17.4.0

2022-03	CT#95e	CP-220205	0043	4	B	Resource structure to support TSC related service operations	17.4.0
2022-03	CT#95e	CP-220205	0044	4	B	Discover TSC Stream Availability data model and OpenAPI	17.4.0
2022-03	CT#95e	CP-220205	0055	2	B	Obtain service operation in SS_NetworkResourceMonitoring	17.4.0
2022-03	CT#95e	CP-220205	0056	2	B	SS_NetworkResourceMonitoring API support	17.4.0
2022-03	CT#95e	CP-220205	0057	2	B	SS_NetworkResourceMonitoring OpenAPI implementation	17.4.0
2022-03	CT#95e	CP-220205	0058	1	B	Support integration with TSN	17.4.0
2022-03	CT#95e	CP-220205	0059		F	Terminology replacement of NSCM with NSCE	17.4.0
2022-03	CT#95e	CP-220205	0060	1	B	Location deviation service and Open API	17.4.0
2022-03	CT#95e	CP-220205	0061	2	B	SS_LocationAreaMonitoring API	17.4.0
2022-03	CT#95e	CP-220205	0062		B	Location report timestamp support	17.4.0
2022-03	CT#95e	CP-220205	0063		B	Add VAL service specific information	17.4.0
2022-03	CT#95e	CP-220205	0065	1	B	SS_NetworkResourceMonitoring API definition and Subscribe/Unsubscribe/Notify service operations	17.4.0
2022-03	CT#95e	CP-220205	0066		B	Supporting temporary group formation within a VAL system	17.4.0
2022-03	CT#95e	CP-220205	0067	1	B	Subscription update for SS_Events API	17.4.0
2022-03	CT#95e	CP-220205	0068	1	B	Clarification on location based group for SS_GroupManagement API	17.4.0
2022-03	CT#95e	CP-220204	0070	1	B	Support PATCH for update of Individual SEAL Location Reporting Configuration resource	17.4.0
2022-03	CT#95e	CP-220204	0071		B	Support PATCH for update of Individual VAL group document resource	17.4.0
2022-03	CT#95e	CP-220194	0072		F	Update of info and externalDocs fields	17.4.0
2022-06	CT#96	CP-221140	0073	1	F	Tags and OperationId support in the SS_NetworkResourceMonitoring API	17.5.0
2022-06	CT#96	CP-221140	0074	1	F	Dimension of QoS parameters in the SS_NetworkResourceMonitoring API	17.5.0
2022-06	CT#96	CP-221140	0075	2	F	Clarifications of reporting, reporting termination, and subscription termination in SS_NetworkResourceMonitoring API	17.5.0
2022-06	CT#96	CP-221140	0076	1	F	The "Requestor identity" attributes removal in Release 17 APIs	17.5.0
2022-06	CT#96	CP-221140	0077	1	F	Resolving EN for the Subscribe service operation in the SS_NetworkResourceMonitoring API	17.5.0
2022-06	CT#96	CP-221140	0078		F	The corrections of naming in the SS_NetworkResourceMonitoring API	17.5.0
2022-06	CT#96	CP-221140	0079	1	F	NO-REF SIBLINGS error correction	17.5.0
2022-06	CT#96	CP-221140	0080	2	F	SEAL-S security update for Release-17	17.5.0
2022-06	CT#96	CP-221140	0082	3	F	Partial success support in the SS_NetworkResourceMonitoring API	17.5.0
2022-06	CT#96	CP-221140	0083	1	B	Supplementary location information to verticals	17.5.0
2022-06	CT#96	CP-221140	0084		F	Resolution of the Editor's note for Network slice capability Enablement API.	17.5.0
2022-06	CT#96	CP-221140	0085	1	F	Correction of arrays cardinality in the SS_NetworkResourceMonitoring OpenAPI file	17.5.0
2022-06	CT#96	CP-221156	0087		A	SEAL-S security update	17.5.0
2022-06	CT#96	CP-221148	0088	1	F	Resource URI overview and apiVersion placeholder	17.5.0
2022-06	CT#96	CP-221148	0089	1	F	OpenAPI long descriptions	17.5.0
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History

Version	Date	Status
V19.4.0	February 2026	Publication