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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 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".

[6] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".

[7] IETF RFC 7232: "Hypertext Transfer Protocol (HTTP/1.1): Conditional Requests".

[8] IETF RFC 7233: "Hypertext Transfer Protocol (HTTP/1.1): Range Requests".

[9] IETF RFC 7234: "Hypertext Transfer Protocol (HTTP/1.1): Caching".

[10] IETF RFC 7235: "Hypertext Transfer Protocol (HTTP/1.1): Authentication".

[11] Void

[12] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (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 4122: "A Universally Unique IDentifier (UUID) URN Namespace".

# 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

AEF API Exposing Function

API Application Programming Interface

BDT Background Data Transfer

DS-TT Device-Side TSN Translator

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

SCEF Service Capability Exposure Function

SCS Service Capability Server

SEAL Service Enabler Architecture Layer for Verticals

SEALDD SEAL Data Delivery

TMGI Temporary Mobile Group Identity

TSC Time Sensitive Communication

TSN Time Sensitive Networking

UE User Equipment

VAL Vertical Application Layer

# 4 Overview

3GPP has considered in 3GPP TS 23.434 [2] and 3GPP TS 23.433 [34] (for SEALDD) 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 includes, group management, configuration management, location management, identity management, key management, network resource management, network slice capability enablement, application data analytics enablement (ADAE) and data delivery management.

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.

# 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 |
| SS\_LocationInfoEvent | Subscribe\_Location\_Info | Subscribe/Notify | 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 |
| 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\_GroupManagement | Query\_Group\_Info | Request/ Response | VAL server |
| Update\_Group\_Info | Request/ Response | VAL server |
| Create\_Group | Request/ Response | VAL server |
| Delete\_Group | Request/Response | VAL server |
| SS\_GroupManagementEvent | 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\_UserProfileEvent | Subscribe\_User\_Profile\_Update | Subscribe/Notify | VAL server |
| Notify\_User\_Profile\_Update | VAL server |
| SS\_NetworkResourceAdaptation  (NOTE 3) | Reserve\_Network\_Resource | Request/Response | VAL server |
| Request\_Unicast\_Resource | Request/Response | VAL server |
| Update\_Unicast\_Resource | Request/Response | VAL server |
| Request\_Multicast\_Resource | Request/Response | VAL server |
| Notify\_UP\_Delivery\_Mode | Subscribe/Notify | VAL server |
| Discover\_TSC\_Stream\_Availability | Request/Response | VAL server |
| Create\_TSC\_Stream | Request/Response | VAL server |
| Delete\_TSC\_Stream | Request/Response | VAL server |
| Create\_MBS\_Resource | Request/Response | VAL server |
| Update\_MBS\_Resource | Request/Response | VAL server |
| Delete\_MBS\_Resource | Request/Response | VAL server |
| Activate\_MBS\_Resource | Request/Response | VAL server |
| Deactivate\_MBS\_Resource | Request/Response | VAL server |
| 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\_NetworkSliceAdaptation | Request\_Network\_Slice\_Adaptation | 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 |
| NOTE 1: The service operations of SS\_Events API are reused by the SS\_LocationInfoEvent, SS\_LocationMonitoring, SS\_LocationAreaMonitoring, SS\_GroupManagementEvent, SS\_UserProfileEvent and SS\_EventsMonitoring 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]. | | | |

Editor's Note: The definition of the update/modify service operations for the VAL service area event subscription are FFS.

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 | Report Location Information Service. | TS29549\_SS\_LocationReporting.yaml | ss-lr | A.2 |
| SS\_GroupManagement | 7.2 | Group Management Service | TS29549\_SS\_GroupManagement.yaml | ss-gm | A.3 |
| SS\_UserProfileRetrieval | 7.3 | User Profile Retrieval Service | TS29549\_SS\_UserProfileRetrieval.yaml | ss-upr | A.4 |
| SS\_NetworkResourceAdaptation | 7.4 | Network Resource Adaptation Service | TS29549\_SS\_NetworkResourceAdaptation.yaml | ss-nra | A.5 |
| SS\_Events | 7.5 | Events Notify Service | TS29549\_SS\_Events.yaml | ss-events | A.6 |
| SS\_KeyInfoRetrieval | 7.6 | Key Information Retrieval Service | TS29549\_SS\_KeyInfoRetrieval.yaml | ss-kir | A.7 |
| SS\_LocationAreaInfoRetrieval | 7.1 | Location Area Info Retrieval Service | TS29549\_SS\_LocationAreaInfoRetrieval.yaml | ss-lair | A.8 |
| SS\_NetworkSliceAdaptation | 7.7 | Network Slice Adaptation Service | TS29549\_SS\_NetworkSliceAdaptation.yaml | ss-nsa | A.9 |
| SS\_NetworkResourceMonitoring | 7.4 | Network Resource Monitoring | TS29549\_SS\_NetworkResourceMonitoring.yaml | ss-nrm | A.10 |
| SS\_VALServiceData | 7.3 | VAL Service Data Service | TS29549\_SS\_VALServiceData.yaml | ss-vsd | A.11 |
| SS\_VALServiceAreaConfiguration | 7.1 | VAL Service Area Configuration Service | TS29549\_SS\_VALServiceAreaConfiguration.yaml | ss-vsac | A.12 |
| SS\_IdmParameterProvisioning | 7.8 | VAL Service Parameter Provisioning Service | TS29549\_SS\_IdmParameterProvisioning.yaml | ss-ipp | A.13 |
| NOTE: The APIs exposed by the SEALDD Server are specified in clause 5 of 3GPP TS 29.548 [35]. | | | | | |

## 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 |

##### 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 SEAL Server targeting the notification URI provided during location trigger configuration (see clause 5.2.1.2.2.2) as specified in clause 5.2.7.2.6.

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.

### 5.2.2 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 7.1.2.2.2.3.1. 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; or

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;

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.

## 5.3 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 and on temporary VAL group formation. The SS\_GroupManagementEvent API supports this via the "GM\_GROUP\_CREATE", "GM\_GROUP\_INFO\_CHANGE" and "GM\_TEMP\_GROUP\_FORMATION" 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 |

##### 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 obtain VAL service data.

###### 5.4.3.2.2.2 SEAL server retrieving VAL service data using Obtain\_VAL\_Service\_Data service operation

To obtain a VAL service data, the SEAL server shall send HTTP GET request message to CM Server, on the VAL Service Data Sets resource representation URI, with query parameters defined in clause 7.3.2.2.2.3.1.

Upon receiving the HTTP GET message as described above, the CM Server shall:

1. verify the identity of the SEAL Server and check if the SEAL Server is authorized to obtain the VAL service data;

2. if the SEAL server is authorized to obtain the requested VAL service data, the CM Server shall return in the response message the VAL service data corresponding to the query parameters that were received in the request message. 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 resource(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 in the "val-tgt-ues" query parameter;

and

3. if the CM server is unable to satisfy the request, the CM server server shall respond to the SEAL server with an appropriate error status code.

## 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 VAL server via NRM-S reference point 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 for network resource adaptation | VAL server |
| Request\_Unicast\_Resource | Requesting unicast resource | VAL server |
| Update\_Unicast\_Resource | Updating unicast resource | VAL server |
| Request\_Multicast\_Resource | Requesting multicast resource | 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. | VAL server |
| Create\_TSC\_Stream | Requesting the NRM server to create a TSC stream. | VAL server |
| Delete\_TSC\_Stream | Requesting the NRM server to delete a TSC stream. | VAL server |
| Create\_MBS\_Resource | Request the creation of a new MBS Resource. | VAL server |
| Update\_MBS\_Resource | Request the update of an existing "Individual MBS Resource" resource. | VAL server |
| Delete\_MBS\_Resource | Request the deletion of an existing "Individual MBS Resource" resource. | VAL server |
| Activate\_MBS\_Resource | Request the activation of an existing MBS Resource. | VAL server |
| Deactivate\_MBS\_Resource | Request the deactivation of an existing MBS Resource. | VAL server |
| BDT\_Configuration\_Request | Request the configuration of BDT policy. | VAL server |
| BDT\_Negotiation\_Notification | Notify about update in the negotiated BDT policy. | VAL server |

##### 5.5.1.2.2 Reserve\_Network\_Resource

###### 5.5.1.2.2.1 General

This service operation is used by a VAL server to request for network resource adaptation.

###### 5.5.1.2.2.2 VAL server requesting for network resource adaptation using Reserve\_Network\_Resource service operation

The VAL server shall send a HTTP POST message to the NRM server. The body of the POST message shall include VAL UE(s) or VAL group information and the VAL service QoS requirement. Upon receiving HTTP POST message, the NRM server shall

1. verify the identity of the VAL server and check if the VAL server is authorized to request for network resource adaptation;

2. if the VAL server is authorized, the NRM server shall determine the QoS requirements for each VAL UE based on the VAL UE(s) or VAL group information;

3. for each VAL UE, the NRM server initiates the PCC procedures; and

4. the NRM server provides result and optionally includes the accepted value for the QoS requirements based on the outcome of the PCC procedure in the response message

##### 5.5.1.2.3 Request\_Unicast\_Resource

###### 5.5.1.2.3.1 General

This service operation is used by a VAL server to request for unicast resource.

###### 5.5.1.2.3.2 VAL server requesting for unicast resource using Request\_Unicast\_Resource service operation

The VAL server 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 VAL server and check if the VAL server is authorized to request for unicast resource;

2. if the VAL server 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 Update\_Unicast\_Resource

###### 5.5.1.2.4.1 General

This service operation is used by a VAL server to request for updating the unicast resource used by the VAL user or UE.

###### 5.5.1.2.4.2 VAL server requesting for updating the unicast resource using Update\_Unicast\_Resource service operation

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

1. verify the identity of the VAL server and check if the VAL server is authorized to request for updating the unicast resource;

2. if the VAL server 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 VAL server to request for multicast resource.

###### 5.5.1.2.5.2 VAL server requesting for multicast resource using Request\_Multicast\_Resource service operation

The VAL server 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 VAL server notification endpoint address information. Upon receiving HTTP POST message, the NRM server shall

1. verify the identity of the VAL server and check if the VAL server is authorized to request for multicast resource;

2. if the VAL server 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 VAL server.

###### 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 VAL server 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 VAL server to request the NRM server to create TSC stream resources.

###### 5.5.1.2.7.2 VAL server requesting for create TSC stream using Create\_TSC\_Stream service operation

In order to create a TSC stream resource, the VAL server 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 VAL server, check whether the VAL server 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 VAL server to secure the uniqueness of the VAL Stream ID.

2. if the VAL server 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 VAL server 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 VAL server 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 VAL server to delete a TSC stream.

###### 5.5.1.2.8.2 VAL server requesting to delete a TSC stream using Delete\_TSC\_Stream service operation

In order to delete a TSC stream, the VAL server 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 VAL server 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 VAL server 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 VAL server 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 VAL server 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 VAL server 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 VAL server is authorized to discover the TSC stream availability;

2. if the VAL server 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 VAL server.

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 VAL server 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 responsde 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 VAL server 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 VAL Server 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 VAL Server 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 VAL Server 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 VAL Server and whether the VAL server is authorized to initiate such request;

- if the VAL Server is authorized and upon successful processing of the request, the NRM Server shall create a new "Individual MBS Resource" resource and respond to the VAL Server 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 VAL Server 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 VAL Server 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 VAL Server requesting the update of an existing MBS Resource using the Update\_MBS\_Resource service operation

In order to request the modification of an existing MBS Resource, the VAL Server shall send an HTTP PATCH request message to the NRM server targeting the corresponding "Individual MBS Resource" resource, with the request body containing the MBSResourcePatch data structure.

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

- verify whether the VAL server is authorized to initiate such request;

- if the VAL Server is authorized and upon successful processing of the request, the NRM Server shall modify the targeted "Individual MBS Resource" resource and respond to the VAL Server 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 MBSResourceResp 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 VAL Server 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 VAL Server 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 VAL Server 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 VAL Server shall send an HTTP DELETE request message to the NRM server targeting the corresponding "Individual MBS Resource" resource.

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

- verify whether the VAL server is authorized to initiate such request;

- if the VAL Server is authorized and upon successful processing of the request, the NRM Server shall delete the targeted "Individual MBS Resource" resource and respond to the VAL Server 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 VAL Server 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 VAL Server 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 VAL Server 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 VAL Server 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 VAL server is authorized to initiate such request;

- if the VAL Server is authorized and upon successful processing of the request, the NRM Server shall respond to the VAL Server 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 VAL Server 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 VAL Server 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 VAL Server 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 VAL Server 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 VAL server is authorized to initiate such request;

- if the VAL Server is authorized and upon successful processing of the request, the NRM Server shall respond to the VAL Server 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 VAL Server 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 VAL Server to request the background data transfer policy at the NRM Server.

###### 5.5.1.2.15.2 VAL Server requesting the background data transfer policy using the BDT\_Configuration\_Request service operation

In order to create resource for the background data transfer policy, the VAL Server shall invoke HTTP POST message to the NRM server to negotiate the transfer policy targeting the URI of the corresponding "BDT Policy Configurations" resource, i.e. "{apiRoot}/ss-nra/<apiVersion>/bdt-policy-configs/", with the request body including the "BdtPolConfig" data structure.

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

- verify whether the VAL server is authorized to initiate such request;

- If the VAL server is authorized, when the NRM server decides to negotiate BDT policy with the 3GPP network, it triggers background data transfer procedure defined in the clause 4.16.7.2 of 3GPP TS 23.502 [39];

- upon success, the NRM Server responds to the VAL Server with an HTTP "201 Created" status code with the response body including 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 VAL Server 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 the update in the negotiated BDT policies received from the 3GPP network, the NRM server shall send an HTTP POST request message using the Notification URI received during the creation of the corresponding BDT policy configuration as defined in clause 5.5.1.2.15, and the request body including the BdtNotification data structure.

Upon successful processing of the request, the VAL server shall respond with an HTTP "204 No Content" status code.On failure, the VAL server 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.

### 5.5.2 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 7.4.2.2.2.3.1. 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 it 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 7.4.2.2.3.3.1.

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.

## 5.6 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 reference points to subscribe and unsubscribe from SEAL events and to receive notifications from the Location Management Server, Group Management Server and Configuration 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 "failureReport" 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 the update of the existing Individual SEAL Events Subscription from the VAL server is authorized or not;

2. if the VAL server is authorized to update the SEAL Events Subscription, then the SEAL server shall replace/modify the existing resource "Individual SEAL Events Subscription", respond to the VAL server with "204 No Content", or "200 OK" with the updated Individual SEAL Events Subscription message.

## 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.

## 5.8 Network slice capability Enablement APIs

### 5.8.1 SS\_NetworkSliceAdaptation API

#### 5.8.1.1 Service Description

##### 5.8.1.1.1 Overview

As specified in 3GPP TS 23.434 [2], the SS\_NetworkSliceAdaptation API, enables a VAL server to communicate with the Network Slice Capability Enablement (NSCE) server for network slice adaptation over the NSCE-S reference point.

#### 5.8.1.2 Service Operations

##### 5.8.1.2.1 Introduction

The service operation defined for SS\_NetworkSliceAdaptation API is shown in the table 5.8.1.2.1-1.

Table 5.8.1.2.1-1: Operations of the SS\_NetworkSliceAdaptation API

|  |  |  |
| --- | --- | --- |
| Service operation name | Description | Initiated by |
| Network\_slice\_adaptation | This service operation is used by a VAL server to request network slice adaptation to the NSCE server. | VAL server |

##### 5.8.1.2.2 Network\_slice\_adaptation

###### 5.8.1.2.2.1 General

This service operation is used by a VAL server to request network slice adaptation to the NSCE server.

###### 5.8.1.2.2.2 VAL server requesting network slice adaptation using Network\_slice\_adaptation service operation

To request network slice adaptation, the VAL server shall send an HTTP POST request message (i.e. custom operation "Request") to the NSCE server, with the request body containing the NwSliceAdptInfo data structure which shall include the parameters VAL service ID and list of VAL UE ID(s), and may include the parameters Network slice adaptation cause, Requested slice information (S-NSSAI or ENSI) and Requested DNN, as specified in clause 7.7.1.3.2.

Upon reception of the HTTP POST request message as described above, the NSCE server shall:

1. process the request and trigger the network slice configuration per VAL UE within the VAL Application to provide the updated S-NSSAI and DNN per VAL UE;

2. send guidance with the information (i.e., the updated S-NSSAI and DNN per VAL UE) to the PCF via NEF as part of the AF-driven guidance for URSP determination to 5G system, using Nnef\_ServiceParameter API as defined in 3GPP TS 29.522 [28]; and

3. after receiving a successful response from the NEF, send an HTTP 204 No content response to the VAL server confirming the fulfilment of the network slice adaptation request per VAL application.

## 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 udpate 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].

# 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] and 3GPP TS 23.433 [34] (for SEALDD).

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. |
| WebsockNotifConfig | 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 7230 [5], IETF RFC 7231 [6], IETF RFC 7232 [7], IETF RFC 7233 [8], IETF RFC 7234 [9] and IETF RFC 7235 [10]) over TLS is mandatory and support of HTTP/2 (IETF RFC 7540 [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 7540 [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 7.1.1.2.2.2-1: 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 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 7.1.1.2.3.3.4-4: 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. |

##### 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 | Contans 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. |

#### 7.1.1.4 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 |
| 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 29.571 [21] | | Used to represent the subscription duration. | |  | |
| DurationSec | | 3GPP TS 29.571 [21] | | Used to represent the time interval between successive location reports. | |  | |
| 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. | |  | |
| 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 |
| valSvcAreaIds | array(string) | O | 0..1 | Represents the VAL service area ID(s). | ValSrvArea |
| suppFeat | SupportedFeatures | O | 0..1 | Used to negotiate the supported features of the API as defined in clause 7.1.1.6.  This attribute shall be provided in the HTTP POST request and in the response of successful resource creation. |  |
| 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(string) | O | 0..1 | Represents the VAL service area ID(s). | ValSrvArea |
| trigCriteria | ValServAreaTriggCriteria | 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 periodicy.  This attribute shall be present if the "reportingMode" attribute is set to the "PERIODIC". |  |
| locChgCond | LocChangeCond | C | 0..1 | Identifies the reporting time interval 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 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 subscription ID. |  |
| 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. |  |

Editor's Note: How to indicate the triggering event to which the notification is related is FFS.

##### 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. | | |

#### 7.1.1.5 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. |

### 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 7.1.2.2.2.3.1-1: 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 | string | 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 7.1.2.2.2.3.1-2 and the response data structures and response codes specified in table 7.1.2.2.2.3.1-3.

Table 7.1.2.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 7.1.2.2.2.3.1-3: 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 7.1.2.2.2.3.1-4: 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 7.1.2.2.2.3.1-5: 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. |  |

##### 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 request URIs used in HTTP requests from the VAL server towards the LM Server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName>shall be "ss-vsac".

- The <apiVersion> shall be "v1".

- The <apiSpecificSuffixes> shall be set as described in clause 7.1.3.2.

#### 7.1.3.2 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(string) | O | 1..N | Represents the requested VAL service area(s). |
| supp-feats | SupportedFeatures | O | 0..1 | To filter irrelevant responses related to unsupported features. |
| 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. | | | | |

Editor's note: The format of the "val-svc-area-ids" query parameter is FFS.

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 7.1.3.2.2.3.1-3: 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 5.2.7.1-1 of 3GPP TS 29.122 [3] shall also apply. | | | | |

Table 7.1.3.2.2.3.1-4: 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 LM Server. |

Table 7.1.3.2.2.3.1-5: 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 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. | | | | |

Editor's note: The error cases for the SS\_VALServiceAreaConfiguration API are FFS.

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. | | | | |

Editor's note: The error cases for the SS\_VALServiceAreaConfiguration API are FFS.

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. | | | | |

Editor's note: The error cases for the SS\_VALServiceAreaConfiguration API are FFS.

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 5.2.7.1-1 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 |
| ValServiceAreaSubsc | 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) notifcation. |  |
| 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. |  |

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 29.571 [21] | 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 attriute is not applicable and shall not be present. | | | | | |

Editor's note: The alignment of the VAL service area ID with ValSvcAreaId data type across the specification is TBD.

###### 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 | SupportedFeatures | C | 0..1 | Represents the supported features.  This attribute shall be provided when feature negotiation needs to take place. |  |

###### 7.1.3.4.2.4 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 | SupportedFeatures | O | 0..1 | Used to negotiate the applicability of optional features defined in table 7.1.3.6-1. |  |

###### 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(string) | M | 1..N | Represents the successfully handled VAL service area ID(s). |  |
| suppFeat | SupportedFeatures | C | 0..1 | Represents the supported features.  This attribute shall be provided when feature negotiation needs to take place. |  |

###### 7.1.3.4.2.6 Type: ValServiceAreaSubsc

Table 7.1.3.4.2.6-1: Definition of type ValServiceAreaSubsc

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| events | array(ValServiceAreaEventType) | 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(string) | 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 |
| valSvcAreaConts | array(ValServiceAreaEventInfo) | M | 1..N | Represents the VAL service area change event(s) content. |  |

###### 7.1.3.4.2.9 Type: ValServiceAreaEventContentInfo

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(string) | 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 |
| ValSvcAreaId | 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 4122 [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

General feature negotiation procedures are defined in clause 6.8. Table 7.1.3.6-1 lists the supported features for SS\_VALServiceAreaConfiguration API.

Table 7.1.3.6-1: Supported Features

|  |  |  |
| --- | --- | --- |
| **Feature number** | **Feature Name** | **Description** |
| n/a |  |  |

## 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

#### 7.2.1.2 Resources

##### 7.2.1.2.1 Overview

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 7.2.1.2.2.3.2-3: 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 7.2.1.2.2.3.2-4: 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 7.2.1.2.2.3.2-5: 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. |  |
| 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 |
| valGroupId | 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 | SupportedFeatures | O | 0..1 | Used to negotiate the supported optional features of the API as described in clause 6.8.  This attribute shall be provided in the HTTP POST request and in the response of successful resource creation. |  |
| 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. |  |
| addLocInfo | LocationArea5G | O | 0..1 | The additional location information related to the VAL group. This information is used to determing the members of the group. |  |
| valSvcAreaId | string | O | 0..1 | Identifier of the VAL service area. | 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 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. | | | | | |

Editor's note: The cardinality and the presence condition of the "valSvcAreaId" attribute is FFS and to be aligned based on stage-2 requirements.

###### 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. |  |
| 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. |  |
| valSvcAreaId | string | O | 0..1 | Identifier of the VAL service area. | 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. | | | | | |

Editor's note: The cardinality and the presence condition of the "valSvcAreaId" attribute is FFS and to be aligned based on stage-2 requirements.

##### 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. |  |

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. | | | | | |

##### 7.3.1.4.3 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 request URIs used in HTTP requests from the VAL server towards the CM Server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName>shall be "ss-vsd".

- The <apiVersion> shall be "v1".

- The <apiSpecificSuffixes> shall be set as described in clause 7.3.1.2.

#### 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 parameters. |

##### 7.3.2.2.2 Resource: VAL Service Data Sets

###### 7.3.2.2.2.1 Description

The VAL Service Data Sets resource represents all the 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 7.3.2.2.2.2-1.

Table 7.3.2.2.2.2-1: 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 7.3.2.2.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| val-tgt-ues | array(ValTargetUe) | O | 1..N | Identifying the list of the target VAL UE(s) or 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 | O | 0..1 | To filter irrelevant responses related to unsupported features. |
| 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. | | | | |

Editor's Note: Whether either the VAL UE(s) or the VAL user(s) can be provided in the query string, or combinations of VAL UE(s) and the VAL user(s) can be provided in the query string of this GET method is FFS and pending stage 2 feedback.

This method shall support the request data structures specified in table 7.3.2.2.2.3.1-2 and the response data structures and response codes specified in table 7.3.2.2.2.3.1-3.

Table 7.3.2.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 7.3.2.2.2.3.1-3: 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. | | | | |

Editor's Note: The application errors in the SS\_VALServiceData API are FFS.

Table 7.3.2.2.2.3.1-4: 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 7.3.2.2.2.3.1-5: 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. |

###### 7.3.2.2.2.4 Resource Custom Operations

None.

#### 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 container for the requested VAL service data. |  |
| 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: Re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| ValTargetUe | 7.3.1.4.2.3 | Used to indicate the VAL user ID or VAL UE ID. |  |
| SupportedFeatures | 3GPP TS 29.571 [21] | Used to negotiate the applicability of optional features defined in table 7.3.2.7-1. |  |

##### 7.3.2.5.2 Structured data types

###### 7.3.2.5.2.1 Introduction

###### 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) | O | 1..N | Contains the requested VAL service data.  If this attribute is not present, this means that no VAL service data instance satisfies the provided query parameter(s) in the request. |  |
| suppFeats | SupportedFeatures | O | 0..1 | Used to negotiate the applicability of optional features defined in table 7.3.2.7-1. |  |

###### 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 | Unique identifier of a VAL user or a VAL UE. |  |
| valServIds | array(string) | M | 1..N | List of the VAL services associated with the VAL user or VAL UE defined in 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 |
|  |  |
|  |  |

#### 7.3.2.6 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

General feature negotiation procedures are defined in clause 6.8.

Table 7.3.2.7-1: 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 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-nra".

- The <apiVersion> shall be "v1".

- The <apiSpecificSuffixes> shall be set as described in clause 7.4.1.2

#### 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.



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. |
| 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 | Read an existing background data transfer policy configuration. |
| DELETE | Delete an existing background data transfer configuration. |

Editor's Note: Whether the HTTP PUT/PATCH is needed for BDT Policy Configrations is FFS.

##### 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 5.2.7.1-1 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 5.2.7.1-1 of 3GPP TS 29.500 [22] 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 GET method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] 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 5.2.7.1-1 of 3GPP TS 29.500 [22] 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 5.2.7.1-1 of 3GPP TS 29.500 [22] 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 GET method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] 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. |

###### 7.4.1.2.5.4 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(TscStreamAvailability) | 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 avaiability 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(TscStreamData) | 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 | TSC stream creation request data from the VAL server to the NRM server. |

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 | TSC stream created data response from the NRM server to the VAL server. |
| 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 GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply. | | | | |

Table 7.4.1.2.8.3.3-4: 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 a VAL Server 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. |
| 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 7.4.1.2.9.3.1-4: 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 a VAL Server 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 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 a VAL Server 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 targeted "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 targeted "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]. |
| 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 7.4.1.2.10.3.2-4: 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 a VAL Server 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 targeted "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 targeted "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]. |
| 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 7.4.1.2.10.3.3-4: 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 a VAL Server 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 targeted "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 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 operaration 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 a VAL Server 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 manadatory 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 a VAL Server 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 manadatory 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 5.2.7.1-1 of 3GPP TS 29.500 [22] 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 5.2.7.1-1 of 3GPP TS 29.500 [22] 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 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 7.4.1.12.3.2-1 and table 7.4.1.2.12.3.2-2.

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 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 5.2.7.1-1 of 3GPP TS 29.500 [22] 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 | Contains 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 | 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.

#### 7.4.1.3 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}  (NOTE) | POST | Report User Plane delivery mode. |
| 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 5.2.7.1-1 of 3GPP TS 29.500 [22] 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 5.2.7.1-1 of 3GPP TS 29.500 [22] 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. |

#### 7.4.1.4 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 |
| 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. |  |
| 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. |  |
| ServiceAnnoucementMode | 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. |  |
| 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. |  |
| UnicastSubscription | 7.4.1.4.2.3 | Represents a unicast subscription. |  |
| UserPlaneNotification | 7.4.1.4.2.4 | Represents a notification on User Plane events. |  |

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 |
| DateTime | 3GPP TS 29.571 [21] | 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. |  |
| 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. |  |
| 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 29.571 [21] | 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. |  |
| WebsockNotifConfig | 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. |  |
| anncMode | ServiceAnnoucementMode | M | 1 | Indicates whether the service announcement is sent by NRM server or by the VAL server. |  |
| 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 VAL server. When omitted in the response, it indicates the resource is set to valid forever by the VAL server. |  |
| 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 |
| localMbmsActInd | 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 | WebsockNotifConfig | 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 | Used to negotiate the applicability of optional features defined in table 7.4.1.6-1.  This parameter may be supplied by the VAL server in the POST request that requests the creation of a Multicast Subscription resource and shall be supplied in the corresponding POST response if it was present in the request. |  |
| 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 |
| valTgtUe | ValTargetUe | M | 1 | The identity of the VAL user or VAL UE that the unicast bearer is requested for. |  |
| uniQosReq | string | O | 0..1 | The QoS requirement for the unicast. |  |
| 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 VAL server. When omitted in the response, it indicates the resource is set to valid forever by the VAL server. |  |
| 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 | WebsockNotifConfig | O | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 6.6. | Notification\_websocket |
| suppFeat | SupportedFeatures | O | 1 | This parameter may be supplied by VAL server in the POST request that request the creation of a Unicast Subscription resource and may be supplied in the reply of corresponding request. |  |

###### 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 | The subscription resource Uri to which this notification is related. |  |
| eventNotifs | array(NrmEventNotification) | M | 1..N | Notifications about Individual Events |  |

###### 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 | Event that is notified. |  |
| ts | DateTime | M | 1 | Time at which the event is observed. |  |
| deliveryMode | DeliveryMode | C | 0..1 | Indicates delivery of the user data to the UE(s) via unicast mode, EPS MBMS multicast mode, 5GS MBS multicast mode or 5GS MBS broadcast mode.  This attribute shall be present if the "event" attribute is set to "UP\_DELIVERY\_MODE". |  |
| streamIds | array(string) | O | 1..N | Indicates the media streams (unicast or multicast) to be used.  This attribute may be present if the "event" attribute is set to "UP\_DELIVERY\_MODE" and the NRM Server already has the streams available. |  |

###### 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 | Used to negotiate the applicability of optional features.  This attribute shall be present only if feature negotiation needs to take place. |  |

###### 7.4.1.4.2.12 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 identitier(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 VAL Server. |  |
| 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) |  |
| localMbmsActInd | 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 VAL Server 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 VAL Server for downlink packets delivery.  (NOTE 1) |  |
| upPortNum | Port | O | 0..1 | Contains the user plane UDP port number to be used by VAL Server 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 | Used to negotiate the applicability of optional features.  This attribute shall be present only if feature negotiation is taking place (i.e. this attribute was present in the corresponding request). |  |

###### 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) |  |
| localMbmsActInd | 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 | Used to negotiate the applicability of optional features.  This attribute shall be present only if feature negotiation needs to take place. |  |

###### 7.4.1.4.2.17 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 | Used to negotiate the applicability of optional features.  This attribute shall be present only if feature negotiation needs to take place. |  |

###### 7.4.1.4.2.18 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 | O | 0..1 | Represents the Data volume per UE. |  |
| desiredTimeWindow | TimeWindow | O | 0..1 | Represents the desrired 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. |  |
| geoArea | GeoArea | O | 0..1 | Represents the desired geographical area for BDT. |  |
| policyGuidance | FFS | O | 0..N | Represents a list of policy guidance. |  |
| 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. | | | | | |

Editor's Note: complete definition of the attribute "policyGuidance" is FFS.

###### 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(CivicAddress) | 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 | The BDT policy configuration resource Uri to which this notification is related. |  |
| bdtConfigId | string | M | 0..1 | Identifies the BDT policy configuration to which the notification is related. |  |
| 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 correponding 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". |  |

##### 7.4.1.4.3 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: ServiceAnnoucementMode

Table 7.4.1.4.3.1-1: Enumeration ServiceAnnoucementMode

|  |  |  |
| --- | --- | --- |
| **Enumeration value** | **Description** | **Applicability** |
| NRM | NRM server performs the service announcement. |  |
| VAL | VAL server 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. |  |
| MBS\_BROADCAST | Indicates 5GS MBS Broadcast delivery. |  |

###### 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. |  |

#### 7.4.1.5 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 |
|  |  |  |  |

#### 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. |

### 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 7.4.2.2.2.3.2-1: 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 5.2.7.1-1 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 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 7.4.2.2.3.3.3-4: 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 accodring 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 29.571 [21] | 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 29.571 [21] | 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. |  |
| WebsockNotifConfig | 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. |  |
| 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). |  |
| 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). |  |
| avrDlTrafficVol | Uinteger | O | 0..1 | The average traffic volume for downlink in bytes (NOTE). |  |
| avrUlTrafficVol | 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 "reportingThr" 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 "avgPlr" 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", "avrDlTrafficVol" and "avrUlTrafficVol" 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) |  |
| measReqs | MeasurementRequirements | O | 0..1 | It indicates the measurement requirements (NOTE 2). |  |
| reportReqs | ReportingRequirements | O | 0..1 | It indicates the requested requirements of reporting (NOTE 3). |  |
| notifUri | Uri | C | 0..1 | It indicates the URI where the notification should be delivered to. The notifUri attribute shall be presented for subscription without immediate report. |  |
| 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 | WebsockNotifConfig | 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 | This parameter shall be supplied by VAL server in the POST request that request the creation of an individual measurement resource and shall be supplied in the reply of corresponding request. |  |
| NOTE 1: Only one of these attributes shall be provided.  NOTE 2: If absent, the default values shall be used.  NOTE 3: If absent, the default event triggered reporting is used. | | | | | |

###### 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. |  |

##### 7.4.2.4.3 Simple data types and enumerations

###### 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. |

## 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 udpate the values of the "subscriberId", "requestTestNotification" (if previously provisioned), "websockNotifConfig" (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 PATCH 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 7.5.1.2.3.3.3-5: 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. |  |
| 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. |  |
| ReferenceUEDetail | 7.5.1.4.2.19 | Represents the reference UE details |  |
| 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 |
| TempGroupInfo | 7.5.1.4.2.16 | Represents the created temporary VAL group information. | GM\_TempGroup |
| 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 |
| AnalyticsEvent | 3GPP TS 29.522 [28] | Analytics event in NWDAF. | NRM\_EventMonitor |
| DateTime | 3GPP TS 29.571 [21] | Used to indicate a timestamp. |  |
| DurationSec | 3GPP TS 29.571 [21] | 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. |  |
| 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 |
| 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 |
| Uinteger | 3GPP TS 29.571 [21] | Used to represent maximum number of messages in MesageFilter data type. |  |
| Uri | 3GPP TS 29.122 [3] | Used to indicate a notification URI. |  |
| VALGroupDocument | Clause 7.2.1.4.2.2 | Used to send VAL group document as part of event detail in the event notification. |  |
| 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 |
| websockNotifConfig | WebsockNotifConfig | 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 | O | 0..1 | Used to negotiate the supported optional features of the API as described in clause 6.8.  This attribute shall be provided in the HTTP POST request and in the response of successful resource creation. |  |

###### 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(VALGroupFilter) | 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" or "LM\_LOCATION\_INFO\_CHANGE". (NOTE) | CM\_UserProfileChange, LM\_LocationInfoChange |
| monFltr | 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(MonLocAreaInterestFltr) | 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 successfully.  This attribute shall be provided only if the PartialFailureSupport feature is supported and the event subscription is not created successfully for all requested target identifier(s). | PartialFailureSupport |
| 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 |
| msgFltrs | 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 |

###### 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" or "LM\_LOCATION\_INFO\_CHANGE". |  |
| 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 |

###### 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) |  |
| profId | 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 | string | 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 |
| notInt | DurationSec | M | 1 | Periodic time interval in which the LM server needs to notify the VAL UE's location information. |  |
| NOTE: If the " ValSrvArea" feature is supported, then one of "locInt" or "valSvcId" attributes shall be provided; otherwise the "locInt" attribute shall be provided. | | | | | |

###### 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 MonLocAreaInterestFltr

Table 7.5.1.4.2.17-1: Definition of type MonLocAreaInterestFltr

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| locInfoCri | LocationInfoCriteria | M | 1 | Location area information where the VAL server wishes to monitor the VAL UE(s) moving in or moving out |  |
| trigEvnts | array(MonLocTriggerEvent) | O | 1..N | Identifies the triggering events when to send the notification. |  |

###### 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 | string | 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. | | | | | |

Editor's note: The definition and presence condition of "valSvcAreaId" attribute and its update in OpenAPI file is FFS.

###### 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 attribure 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 | List of the identities of all VAL UEs who are currently present in the given location area. |  |
| moveInOutUEs | MoveInOutUEDetails | O | 0..1 | List of UEs either moved in to the location area or moved out of the location area. |  |
| trigEvnt | MonLocTriggerEvent | O | 0..1 | Event that triggered the sending of the notification. |  |
| NOTE: For first notification report "curPreUEs" shall be provided, for next notification report either "curPreUEs" or "moveInOutUEs" 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 | List of the identities of the VAL UEs who moved in to the given location area since previous notification. |  |
| moveOutUEs | array(ValTargetUe) | O | 1..N | List of the identities of the VAL UEs who moved out of the given location area since previous notification. |  |

###### 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. | | | | | |

##### 7.5.1.4.3 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 |

###### 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. |  |

###### 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. |  |

#### 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 |
|  |  |  |  |

Editor's note: The application errors for the SS\_Events API are FFS.

#### 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. |

## 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** |
|  |  |  |

## 7.7 Network slice capability Enablement APIs

### 7.7.1 SS\_NetworkSliceAdaptation API

#### 7.7.1.1 API URI

The request URI used in each HTTP request from the VAL server towards the NSCE server shall have the structure as defined in clause 6.5 with the following clarifications:

- The <apiName>shall be "ss-nsa".

- The <apiVersion> shall be "v1".

- The <custOpName> shall be set as described in clause 7.7.1.3.

#### 7.7.1.2 Resources

There are no resources defined for this API in this release of the specification.

#### 7.7.1.3 Custom Operations without associated resources

##### 7.7.1.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 7.7.1.3.1-1 depicts the resource URIs structure for the SS\_NetworkSliceAdaptation API.

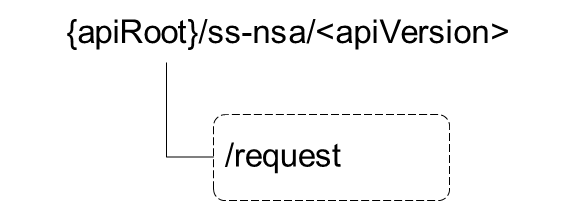


Figure 7.7.1.3.1-1: Custom operation URI structure of the SS\_NetworkSliceAdaptation API

Table 7.7.1.3.1-1 provides an overview of the custom operation and applicable HTTP methods.

Table 7.7.1.3.1-1: Custom operations without associated resources

|  |  |  |  |
| --- | --- | --- | --- |
| Operation name | Custom operation URI | Mapped HTTP method | Description |
| Request | /request | POST | Request the network slice adaptation. |

##### 7.7.1.3.2 Operation: Request

###### 7.7.1.3.2.1 Description

The custom operation allows a VAL server to request network slice adaptation to the NSCE server.

###### 7.7.1.3.2.2 Operation Definition

This operation shall support the request and response data structures and response code specified in table 7.7.1.3.2.2-1 and table 7.7.1.3.2.2-2.

Table 7.7.1.3.2.2-1: Data structures supported by the POST Request Body for this operation

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| NwSliceAdptInfo | M | 1 | Parameters to request network slice adaptation. |

Table 7.7.1.3.2.2-2: Data structures supported by the POST Response Body for this operation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| n/a |  |  | 204 No Content | The success of the network slice adaptation with the underlying network. |
| n/a |  |  | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI representing an alternative NSCE server to which the request 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 an alternative NSCE server to which the request 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 29.500 [22] also apply. | | | | |

Table 7.7.1.3.2.2-3: Headers supported by 307 Response Code for this operation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing an alternative NSCE server to which the request should be redirected. |

Table 7.7.1.3.2.2-4: Headers supported by 308 Response Code for this operation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing an alternative NSCE server to which the request should be redirected. |

#### 7.7.1.4 Notifications

None.

#### 7.7.1.5 Data Model

##### 7.7.1.5.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.7.1.5.1-1 specifies the data types defined specifically for the SS\_NetworkSliceAdaptation API service.

Table 7.7.1.5.1-1: SS\_NetworkSliceAdaptation API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| NwSliceAdptInfo | 7.7.1.5.2.3 | Represents the information associated with requested network slice adaptation with the underlying network. |  |

Table 7.7.6.1.4.1-2 specifies data types re-used by the NetworkSliceAdaptation API service.

Table 7.7.1.5.1-2: Re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| Dnn | 3GPP TS 29.571 [21] | Used to Identify a DNN. |  |
| Snssai | 3GPP TS 29.571 [21] | Used to Identify the S-NSSAI. |  |
| SupportedFeatures | 3GPP TS 29.571 [21] | Used to negotiate the applicability of the optional features. |  |
| NOTE: Properties marked with a feature as defined in clause 5.14.6 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property applies for all the features. | | | |

##### 7.7.1.5.2 Structured Data Types

###### 7.7.1.5.2.1 Introduction

###### 7.7.1.5.2.2 Type: NwSliceAdptInfo

Table 7.7.1.5.2.2-1: Definition of type NwSliceAdptInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| valServiceId | string | M | 1 | The VAL service ID of the VAL application for which the network slice adaptation may corresponds to. |  |
| valTgtUeIds | array(string) | M | 1..N | List of the VAL UE IDs within the VAL service for which the slice adaptation request corresponds. |  |
| snssai | Snssai | O | 0..1 | Indication of the new S-NSSAI which is requested. |  |
| dnn | Dnn | O | 0..1 | Indication of the new DNN which is requested. |  |
| suppFeat | SupportedFeatures | O | 0..1 | This parameter shall be supplied by VAL server in the POST request that requests the network slice adaptation and shall be supplied in the reply of corresponding request. |  |
| NOTE: Properties marked with a feature as defined in clause 7.7.1.7 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [3]. If no feature is indicated, the related property applies for all the features. | | | | | |

##### 7.7.1.5.3 Simple data types and enumerations

None.

#### 7.7.1.6 Error Handling

##### 7.7.1.6.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

##### 7.7.1.6.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the SS\_NetworkSliceAdaptation API.

##### 7.7.1.6.3 Application Errors

The application errors defined for SS\_NetworkSliceAdaptation API are listed in table 7.7.1.6.3-1.

Table 7.7.1.6.3-1: Application errors

|  |  |  |  |
| --- | --- | --- | --- |
| Application Error | HTTP status code | Description | Applicability |
|  |  |  |  |

#### 7.7.1.7 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8.

Table 7.7.1.7-1: Supported Features

|  |  |  |
| --- | --- | --- |
| **Feature number** | **Feature Name** | **Description** |
|  |  |  |

## 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 request URIs used in HTTP requests from the VAL server towards the Identity management server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- 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 | Provision VAL services configuration. |
| GET | Retrieve VAL services configurations according to the query parameters. |
| Individual VAL Services Configuration | /configurations/{confId} | GET | Retrieve an existing individual VAL services configuration resource. |
| PUT | Update an individual VAL services configuration. |
| PATCH | Partially update an individual VAL services configuration. |
| DELETE | Deletes an individual VAL services configuration. |

##### 7.8.1.2.2 Resource: VAL Services Configurations

###### 7.8.1.2.2.1 Description

The VAL Services Configurations resource represents all the VAL services configurations that are provisioned at 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

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 | Details of 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 | O | 0..1 | 201 Created | Successful case. The requested VAL services configuration are successfully created.  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 7.8.1.2.2.3.1-4: 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/{valSvcConfId} |

7.8.1.2.2.3.2 GET

This operation retrieves the VAL services configurations satisfying filter criteria. This method shall support the URI query parameters specified in table 7.8.1.2.2.3.2-1.

Table 7.8.1.2.2.3.2-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| val-server-id | string | O | 0..1 | String identifying the VAL server. |
| config-ids | array(string) | O | 1..N | List of identifiers identifying the "Individual VAL Services Configuration" resources. |

This method shall support the request data structures specified in table 7.8.1.2.2.3.2-2 and the response data structures and response codes specified in table 7.8.1.2.2.3.2 -3.

Table 7.8.1.2.2.3.2-2: Data structures supported by the GET Request Body on this resource

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

Table 7.8.1.2.2.3.2-3: 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 | List of VAL services configurations matching the query parameters provided in the request. |
| 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 GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply. | | | | |

Table 7.8.1.2.2.3.2-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | 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 | 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 sepcifciation.

##### 7.8.1.2.3 Resource: Individual VAL Services Configuration

###### 7.8.1.2.3.1 Description

The "Individual VAL Services Configuration" resource represents an individual VAL services configuration that is provisioned at a given 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

This operation retrieves an I"ndividual VAL Services Configuration" resource. 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 | The VAL services configuration resource. |
| 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 GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] 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 | 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 | An alternative URI of the resource located in an alternative IM server. |

7.8.1.2.3.3.2 PUT

This operation updates the VAL service configuration information. 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 details of the VAL services configuration. |

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 | The VAL services configuration updated successfully and the updated VAL services configuration returned in the response. |
| n/a |  |  | 204 No Content | The VAL services configuration updated 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 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 PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] 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 | 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 | An alternative URI of the resource located in an alternative IM server. |

7.8.1.2.3.3.3 PATCH

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 | Individual VAL Services Configuration resource is modified successfully and representation of the modified VAL Services Configuration resource is returned. |
| n/a |  |  | 204 No Content | The Individual VAL Services Configuration resource is updated 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 7.8.1.2.3.3.3-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located in an alternative SEAL 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 | An alternative URI of the resource located in an alternative SEAL server. |

7.8.1.2.3.3.4 DELETE

This operation deletes the VAL services configuration. 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 | The individual VAL service configuration matching the confId 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 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 DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] 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 | 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 | 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 sepcifciation.

#### 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 sepcifciation.

#### 7.8.1.4 Notifications

There are no notifications defined for this API in this release of the sepcifciation.

#### 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 details of the VAL server services configuration information. |  |
| VALServicesParams | 7.8.1.5.2.3 | Represent details of the VAL services configuration information. |  |
| VALServicesConfigPatch | 7.8.1.5.2.4 | Represent details of the partial update of VAL server services configuration information. |  |

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] | Used to negotiate the applicability of optional features defined in table 7.8.1.6-1. |  |
| ValTargetUe | Clause 7.3.1.4.2.3 | Used to indicate either VAL User ID or VAL UE ID, that are provisioned for a VAL service. |  |

##### 7.8.1.5.2 Structured data types

###### 7.8.1.5.2.1 Introduction

###### 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 | List of VAL services and the VAL services specific information. |  |
| valServerId | string | M | 1 | Identity of the VAL server (VAL server ID) as per TS 23.434 [2] that has provisioned the VAL services configuration information. |  |
| suppFeat | SupportedFeatures | O | 0..1 | Used to negotiate the supported optional features of the API as described in clause 6.8.  This attribute shall be provided in the HTTP POST request and in the response of successful resource creation. |  |

###### 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 | Identifier of the VAL service whose information is provisioned. |  |
| idList | array(ValTargetUe) | M | 1..N | List of VAL User IDs or VAL UE IDs, which are provisioned for the VAL service identified by valServiceId. |  |

###### 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 | List of VAL services and the VAL services specific information. |  |

##### 7.8.1.5.3 Simple data types and enumerations

None.

#### 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 7.8.1.5.3-1.

Table 7.8.1.6.3-1: Application errors

|  |  |  |  |
| --- | --- | --- | --- |
| Application Error | HTTP status code | Description | Applicability |
|  |  |  |  |

#### 7.8.1.7 Feature negotiation

General feature negotiation procedures are 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.

Editor's Note: Definitions of service operations descriptions for this API is FFS.

Editor's Note: The OpenAPI for this API is FFS.

#### 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 the event of:  - VAL performance analytics; or  - VAL performance data collection |
| Individual application performance event subscription | /application-performance/{appPerfId} | GET | Request the retrieval of an existing "Individual subscription to the event of the application performance analytics" resource. |
| PUT | Request the update of an existing "Individual subscription to the event of the application performance analytics" resource. |
| PATCH | Request the modification of an existing "Individual subscription to the event of the application performance analytics" resource. |
| DELETE | Request the deletion of an existing "Individual subscription to the event of the application performance analytics" resource. |

Editor's Note: Definitions of GET, PUT, PATCH, DELETE methods are FFS.

##### 7.10.1.2.2 Resource: Application performance event subscription

###### 7.10.1.2.2.1 Description

The application performance event subscription to the event of the VAL performance analytics or the event of the VAL performance historic data logs.

###### 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 |
| AppPerfSubs | M | 1 | Subscription to the event of:  - VAL performance analytics; or  - VAL performance data collection. |

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 |
| AppPerfSubs |  |  | 201 (Created) | Subscription to the VAL performance analytics or the VAL performance historic logs is created. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall 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 |

###### 7.10.1.2.2.4 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 | {notificationUri} | POST | Notification on:  - VAL performance analytics; or  - VAL performance data collection |

##### 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 or the event of the VAL performance historic logs.

###### 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 consumer during the subscription to the event.

Callback URI: **{notificationUri}**

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 |  |  |  |  |

If the notification is on the VAL performance analytics or the VAL performance historic logs, 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; or  - VAL performance data collection. |

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) | Notification for the VAL performance analytics event or VAL performance historic data log is accepted. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

#### 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 |
| AppPerfSubs | 7.10.1.4.2.2 | Subscription to the VAL application performance analytics |  |
| AppPerfNotif | 7.10.1.4.2.3 | Notification information of the application performance analytics. |  |
| ProdProfileInfo | 7.10.1.4.2.4 | Information about the data producer's support data collection and its access to the produced data |  |
| DataCollectReq | 7.10.1.4.2.5 | Data Collection requirements |  |
| AnalyticsType | 7.10.1.4.3.3 | Type of analytics for the event of the VAL application performance analytics. |  |
| DataType | 7.10.1.4.3.4 | Type of data for the event of the VAL application performance historic logs. |  |
| ProducerType | 7.10.1.4.3.5 | Type of the data producer. |  |
| ProducerData | 7.10.1.4.3.6 | Type of the data produced by the data producer. |  |
| ProducerRole | 7.10.1.4.3.7 | The role of the data producer. |  |
| DataAbstraction | 7.10.1.4.3.8 | The level of data abstraction |  |

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 |
| Accuracy | 3GPP TS 29.122 [3] | Represent the desired level of accuracy of the requested information. |  |
| BitRate | 3GPP TS 29.571 [21] | Represents a bit rate measurement value. |  |
| ConfidenceLevel | 3GPP TS 29.122 [3] | Presents confidence level |  |
| DateTime | 3GPP TS 29.571 [21] | Used to represent a date and time. |  |
| DurationSec | 3GPP TS 29.122 [3] | Represents a period of time in units of seconds. |  |
| LocationArea | 3GPP TS 29.122 [3] | Represents location information. |  |
| ReportingRequirements | 7.4.2.4.2.5 | Indicates the requested requirements of reporting. |  |
| ScheduledCommunicationTime | 3GPP TS 29.122 [3] | Used to define the time frame for message filters. |  |
| 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: AppPerfSubs

Table 7.10.1.4.2.2-1: Definition of type AppPerfSubs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsType | AnalyticsType | C | 0..1 | Identity the type of the VAL application performance analytics. (NOTE 1) |  |
| valServiceId | string | C | 0..1 | The identifier of the VAL service, to which the performance analytics subscription is applied. (NOTE 1) |  |
| dataCollectReq | DataCollectReqs | C | 0..1 | Requirements for data collection. (NOTE 2) |  |
| valUeIds | array(ValTargetUe) | O | 1..N | A list of identities of one or more VAL UEs, whose performance analytics or performance data collection, 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 or VAL performance data collection subscription, is applied. |  |
| dataProdProfile | ProdProfileInfo | O | 0..1 | Characteristics of the data producer to be used. (NOTE 3) |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Defines the accuracy level for the VAL performance analytics if the VAL performance analytics is prediction. |  |
| area | LocationArea | O | 0..1 | The geographical or service area, to which the VAL performance analytics subscription or the VAL performance data collection subscription, is applied. |  |
| timeInterval | DurationSec | O | 0..1 | The time interval as the start time and end time, to which the VAL performance analytics subscription or the VAL performance data collection subscription, is applied. |  |
| dataProdIds | array(string) | O | 1..N | In case of the VAL performance data collection subscription, if the request for the data collection is routed via A-DCCF, the list of data producer IDs is needed. |  |
| NOTE 1: This attribute is mandatory if the subscription is to the event of the VAL performance analytics. This attribute is not used if the subscription is to the event of the VAL performance data collection. | | | | | |
|  | | | | | |
| NOTE 2: This attribute is mandatory if the subscription is to the event of the VAL performance data collection. This attribute is not used if the subscription is to the event of the VAL performance analytics. | | | | | |
|  | | | | | |
| NOTE 3: This attribute is applicable for the both cases when the subscription is to the event of the VAL performance analytics or to the event of the VAL performance data collection. | | | | | |
|  | | | | | |

Editor's Note: Detailed definitions for data types are FFS.

###### 7.10.1.4.2.3 Type: AppPerfNotif

Table 7.10.1.4.2.5-1: Definition of type AppPerfNotif

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| dataOutput | array(string) | M | 1..N | Predicted or expected change or sustainability of the VAL performance for a VAL server or a VAL session. (NOTE) |  |
| 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(ValTargetUe) | 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. |  |
| dataType | DataType | O | 0..1 | Identity the type of the of the VAL performance analytics or the VAL performance historic logs |  |
| analyticsId | string | O | 0..1 | To identify the analytics for the data collection which may be VAL server performance nalytics or VAL session performance analytics, in the case of the notification is on the VAL performance data collection. |  |
| confidence-level | ConfidenceLevel | O | 0..1 | Provides accuracy level if the VAL performance analytics is prediction. |  |
| NOTE: This attribute is applicable for the both cases when the notification is on the event of the VAL performance analytics or on the event of the VAL performance data collection. | | | | | |
|  | | | | | |

Editor's Note: Detailed definitions for data types are FFS.

###### 7.10.1.4.2.4 Type: ProdProfileInfo

This type implements the capability of the data producer for the data production to support data collection for data analytics services.

Table 7.10.1.4.2.6-1: 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 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: DataCollectReqs

Table 7.10.1.4.2.7-1: Definition of type DataCollectReqs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| dataFormat | string | M | 1 | Format of the data |  |
| reporting | ReportingRequirement | M | 1 | Frequency of reporting |  |
| abstractedData | DataAbstraction | O | 0..1 | Level of abstracted values for data |  |
| accuracy | Accuracy | O | 0..1 | Desired level of accuracy of the requested data. |  |

Editor's Note: Whether this data type is needed to be moved to SS\_AADRF\_Data\_Collection API is FFS.

###### 7.10.1.4.2.6 Type: ProducerCap

Table 7.10.1.4.2.8-1: Definition of type ProducerCap

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| durationTime | DateTime | O | 0..1 | Duration time that the data can be stored |  |
| anonymization | boolean | O | 0..1 | True if anonymization is supported, else false |  |
| dataRate | BitRate | O | 0..1 | Rate of data generation; |  |
| schedule | ScheduledCommunicationTime | O | 0..1 | Represents scheduling |  |

Editor's Note: Whether this data type is needed to be moved to SS\_AADRF\_Data\_Collection API is FFS.

##### 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: AnalyticsType

Table 7.10.1.4.3.3-1: Enumeration AnalyticsType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| ANALYTICS\_ONLINE | The event for the VAL application performance analytics is for online analytics. |  |
| ANALYTICS\_OFFLINE | The event for the VAL application performance analytics is for offline analytics. |  |
| ANALYTICS\_ML\_ENABLED | The event for the VAL application performance analytics is for ML-enabled analytics. |  |
| ANALYTICS\_PREDICTIVE | The event for the VAL application performance analytics is for predictive analytics. |  |
| ANALYTICS\_STATISTICS | The event for the VAL application performance analytics is for statistics analytics. |  |

###### 7.10.1.4.3.4 Enumeration: DataType

Table 7.10.1.4.3.4-1: Enumeration DataType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| UE\_DATA | The event for the VAL application performance data is for UE data. |  |
| NETWORK\_DATA | The event for the VAL application performance data is for network data. |  |
| APPLICATION\_DATA | The event for the VAL application performance data is for application data. |  |
| EDGE\_DATA | The event for the VAL application performance data is for edge data. |  |
| GRANULARITY\_LEVEL | The event for the VAL application performance data is for granularity level. |  |
| REAL\_TIME | The event for the VAL application performance data is for real time data. |  |
| NON\_REAL\_TIME | The event for the VAL application performance data is for non real time data. |  |

###### 7.10.1.4.3.5 Enumeration: ProducerType

Table 7.10.1.4.3.5-1: 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. |  |

###### 7.10.1.4.3.6 Enumeration: ProducerData

Table 7.10.1.4.3.6-1: Enumeration ProducerData

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| PERFORMANCE\_INDICATOR | The data type of the data producer is performance indictor. |  |
| 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 dge load. |  |

###### 7.10.1.4.3.7 Enumeration: ProducerRole

Table 7.10.1.4.3.7-1: 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 origina producer. |  |
| RESPOSITORY | The role of the data producer is repository. |  |

###### 7.10.1.4.3.8 Enumeration: DataAbstraction

Table 7.10.1.4.3.8-1: Enumeration DataAbstraction

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| HIGH | The data abstraction is high. |  |
| MEDIUM | The data abstraction is medium. |  |
| LOW | The data abstraction is low. |  |

#### 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 |
|  |  |  |

### 7.10.2 SS\_ADAE\_SlicePerformanceAnalytics

#### 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.

Editor's Note: Definitions of service operations descriptions for this API is FFS.

Editor's Note: The OpenAPI for this API is FFS.

#### 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 subscription to the event of the slice-specific application performance analytics" resource. |
| PUT | Request the update of an existing "Individual subscription to the event of the slice-specific application performance analytics" resource. |
| PATCH | Request the modification of an existing "Individual subscription to the event of the slice-specific application performance analytics" resource. |
| DELETE | Request the deletion of an existing "Individual subscription to the event of the slice-specific application performance analytics" resource. |

Editor's Note: Definitions of GET, PUT, PATCH, DELETE methods are FFS.

##### 7.10.2.2.2 Resource: Slice-specific application performance event subscription

###### 7.10.2.2.2.1 Description

The slice-specific application performance event 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 |
| SliceAppPerfSubs | M | 1 | Subscription to the slice-specific application performance analytics event. |

Table 7.10.2.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SliceAppPerfSubs |  |  | 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 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

Table 7.10.2.2.2.3.1-4: 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-adae-sspa/<apiVersion>/slice-specific-application-performance |

###### 7.10.2.2.2.4 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 | {notificationUri} | 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: **{notificationUri}**

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 |
| SliceAppPerfNotif |  |  | 204 (No Content) | Notification for the slice-specific application performance analytics event is accepted. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

#### 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 |
| SliceAppPerfSubs | 7.10.2.4.2.2 | Subscription to the slice-specific application performance analytics |  |
| SliceAppPerfNotif | 7.10.2.4.2.3 | Notification information of the slice specific application performance analytics. |  |

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 7.10.1.4.3.3 | Type of analytics for the event of the VAL application performance analytics. |  |
| ConfidenceLevel | 3GPP TS 29.122 [3] | Presents confidence level |  |
| Dnn | 3GPP TS 29.571 [21] | Used to Identify a DNN. |  |
| DurationSec | 3GPP TS 29.122 [3] | Represents a period of time in units of seconds. |  |
| LocationArea | 3GPP TS 29.122 [3] | Represents location information. |  |
| Snssai | 3GPP TS 29.571 [21] | Used to Identify the S-NSSAI. |  |
| 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 structures to be used in resource representations.

###### 7.10.2.4.2.2 Type: SliceAppPerfSubs

Table 7.10.2.4.2.2-1: Definition of type SliceAppPerfSubs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsType | AnalyticsType | M | 1 | Identity the type of the slice-specific application performance analytics |  |
| sliceId | Snssai | 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. |  |
| valUeIds | 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. |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Defines the accuracy level for the slice-specific performance analytics if the slice-specific performance analytics is prediction. |  |
| area | LocationArea | O | 0..1 | The geographical or service area, to which the slice specific application performance analytics subscription is applied. |  |
| timeInterval | DurationSec | O | 0..1 | The time interval as the start time and end time, to which the slice-specific application performance analytics subscription is applied. |  |

Editor's Note: Detailed definitions for data types are FFS.

###### 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(string) | M | 1..N | Predicted or expected change or sustainability of the slice-specific performance for a VAL server or a VAL session. |  |
| analyticsType | AnalyticsType | O | 0..1 | Identity the type of the slice-specific application performance analytics |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Provides accuracy level if the slice-specific performance analytics is prediction. |  |

Editor's Note: Detailed definitions for data types are FFS.

#### 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 |
|  |  |  |

### 7.10.3 SS\_ADAE\_Ue2UePerformanceAnalytics

#### 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-u2upa".

- The <apiVersion> shall be "v1".

- The <apiSpecificSuffixes> shall be set as described in clause 7.10.3.2.

Editor's Note: Definitions of service operations descriptions for this API is FFS.

Editor's Note: The OpenAPI for this API is FFS.

#### 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 | Subscription to the event of the UE-to-UE session performance analytics |
| Individual UE-to-UE session performance event subscription | /ue2ue-session-performance/{u2uPerfId} | GET | Request the retrieval of an existing "Individual subscription to the event of the UE-to-UE session performance analytics" resource. |
| PUT | Request the update of an existing "Individual subscription to the event of the UE-to-UE session performance analytics" resource. |
| PATCH | Request the modification of an existing "Individual subscription to the event of the UE-to-UE session performance analytics" resource. |
| DELETE | Request the deletion of an existing "Individual subscription to the event of the UE-to-UE session performance analytics" resource. |

Editor's Note: Definitions of GET, PUT, PATCH, DELETE methods are FFS.

##### 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 |
| U2UPerfSubs | 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 |
| U2UPerfSubs |  |  | 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 5.2.7.1-1 of 3GPP TS 29.500 [22] 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 |

###### 7.10.3.2.2.4 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 | {notificationUri} | 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: **{notificationUri}**

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 |  |  |  |  |

If the notification is on the UE-to-UE session performance analytics, 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 |
| U2UPerfNotif |  |  | 204 (No Content) | Notification for the UE-to-UE session performance analytics event is accepted. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

#### 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 |
| U2UPerfSubs | 7.10.3.4.2.2 | Subscription to the UE-to-UE session performance analytics |  |
| U2UPerfNotif | 7.10.3.4.2.3 | Notification information of the 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 7.10.1.4.3.3 | Type of analytics for the event of the VAL application performance analytics. |  |
| ConfidenceLevel | 3GPP TS 29.122 [3] | Presents confidence level |  |
| DurationSec | 3GPP TS 29.122 [3] | Represents a period of time in units of seconds. |  |
| LocationArea | 3GPP TS 29.122 [3] | Represents location information. |  |
| 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: U2UPerfSubs

Table 7.10.3.4.2.2-1: Definition of type U2UPerfSubs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsType | AnalyticsType | M | 1 | Identity the type of the UE-to-UE session performance analytics |  |
| valUeIds | array(ValTargetUe) | O | 1..N | A list of identities of one or more VAL UEs, whose UE-to-UE session 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 UE-to-UE session analytics subscription is applied. |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Defines the accuracy level for the UE-to-UE session analytics if the UE-to-UE session performance analytics is for prediction. |  |
| area | LocationArea | O | 0..1 | The geographical or service area, to which the UE-to-UE session performance analytics subscription is applied. |  |
| timeInterval | DurationSec | 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. |  |

Editor's Note: Detailed definitions for data types are FFS.

###### 7.10.3.4.2.3 Type: Ue2UePerfNotif

Table 7.10.3.4.2.3-1: Definition of type U2UPerfNotif

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsOutput | array(string) | M | 1..N | UE-to-UE session performance analytics for prediction or statistics depending on the type. |  |
| analyticsType | AnalyticsType | O | 0..1 | Identity the type of the UE-to-UE session performance analytics |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Provides accuracy level if the UE-to-UE performance analytics is prediction. |  |

Editor's Note: Detailed definitions for data types are FFS.

#### 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

#### 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.

Editor's Note: Definitions of service operations descriptions for this API is FFS.

Editor's Note: The OpenAPI for this API is FFS.

#### 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 /{locAccId} | GET | Request the retrieval of an existing "Individual subscription to the event of the location accuracy analytics" resource. |
| PUT | Request the update of an existing "Individual subscription to the event of the location accuracy analytics" resource. |
| PATCH | Request the modification of an existing "Individual subscription to the event of the location accuracy analytics" resource. |
| DELETE | Request the deletion of an existing "Individual subscription to the event of the location accuracy analytics" resource. |

Editor's Note: Definitions of GET, PUT, PATCH, DELETE methods are FFS.

##### 7.10.4.2.2 Resource: Location accuracy event subscription

###### 7.10.4.2.2.1 Description

Location accuracy event 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 |
| LocAccurSubs | 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 |
| LocAccurSubs |  |  | 201 (Created) | Subscription to the location accuracy analytics is created. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall 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 |

###### 7.10.4.2.2.4 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 | {notificationUri} | 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: **{notificationUri}**

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. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

#### 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 |
| LocAccurSubs | 7.10.4.4.2.2 | Subscription to the location accuracy analytics event |  |
| LocAccurNotif | 7.10.4.4.2.3 | Notification information of 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 7.10.1.4.3.3 | Type of analytics for the event of the VAL application performance analytics. |  |
| ConfidenceLevel | 3GPP TS 29.122 [3] | Presents confidence level |  |
| DurationSec | 3GPP TS 29.122 [3] | Represents a period of time in units of seconds. |  |
| LocationArea | 3GPP TS 29.122 [3] | Represents location information. |  |
| UeMobility | 3GPP TS 29.520 [33] | Represents UE Mobility and route information |  |
| 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 structures to be used in resource representations.

###### 7.10.4.4.2.2 Type: LocAccurSubs

Table 7.10.4.4.2.2-1: Definition of type LocAccurSubs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsType | AnalyticsType | M | 1 | Identity the type of the location accuracy analytics |  |
| valUesIds | 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. |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Defines the accuracy level for the location analytics analytics if the location accuracy analytics is for prediction. |  |
| area | LocationArea | O | 0..1 | The geographical or service area, to which the location accuracy analytics subscription is applied. |  |
| timeInterval | DurationSec | O | 0..1 | The time interval as the start and the end time, to which the location accuracy analytics subscription is applied. |  |
| ueMobs | array(UeMobility) | O | 1..N | Mobility and route information on the one or more target VAL UE. |  |

Editor's Note: Detailed definitions for data types are FFS.

###### 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 |
| analyticsOutputs | array(string) | M | 1..N | Location accuracy analytics for prediction or statistics depending on the type. |  |
| analyticsType | AnalyticsType | O | 0..1 | Identity the type of the location accuracy analytics |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Provides accuracy level if the location accuracy analytics is prediction. |  |

Editor's Note: Detailed definitions for data types are FFS.

#### 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 |
|  |  |  |

### 7.10.5 SS\_ADAE\_ServiceApiAnalytics

#### 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.

Editor's Note: Definitions of service operations descriptions for this API is FFS.

Editor's Note: The OpenAPI for this API is FFS.

#### 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 subscription to the event of the service API analytics" resource. |
| PUT | Request the update of an existing "Individual subscription to the event of the service API analytics" resource. |
| PATCH | Request the modification of an existing "Individual subscription to the event of the service API analytics" resource. |
| DELETE | Request the deletion of an existing "Individual subscription to the event of the service API analytics" resource. |

Editor's Note: Definitions of GET, PUT, PATCH, DELETE methods are FFS.

##### 7.10.5.2.2 Resource: Service API event subscription

###### 7.10.5.2.2.1 Description

Service API event 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 |
| SrvApiSubs | M | 1 | Subscription to the service API analytics event. |

Table 7.10.5.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SrvApiSubs |  |  | 201 (Created) | Subscription to the service API analytics is created. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

Table 7.10.5.2.2.3.1-4: 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-sa/<apiVersion>/service-api |

###### 7.10.5.2.2.4 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 | {notificationUri} | 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: **{notificationUri}**

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. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

#### 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 |
| SrvApiSubs | 7.10.5.4.2.2 | Subscription to the service API analytics event |  |
| SrvApiNotif | 7.10.5.4.2.3 | Notification information of the service API analytics event. |  |
| SrvApiIdType | 7.10.5.4.3.3 | Type of service API |  |

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 |
| ConfidenceLevel | 3GPP TS 29.122 [3] | Presents confidence level |  |
| DurationSec | 3GPP TS 29.122 [3] | Represents a period of time in units of seconds. |  |
| LocationArea | 3GPP TS 29.122 [3] | Represents location information. |  |

##### 7.10.5.4.2 Structured data types

###### 7.10.5.4.2.1 Introduction

This clause defines the structures to be used in resource representations.

###### 7.10.5.4.2.2 Type: SrvApiSubs

Table 7.10.5.4.2.2-1: Definition of type SrvApiSubs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| serviceApiId | SrviApiIdType | M | 1 | The identifier for the service API |  |
| area | LocationArea | O | 0..1 | The geographical or service area, to which the service API analytics subscription is applied. |  |
| timeInterval | DurationSec | O | 0..1 | The time interval as the start and the end time, to which the service API analytics subscription is applied. |  |

Editor's Note: Detailed definitions for data types are FFS.

###### 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 |
| serviceApiId | SrvApiIdType | M | 1 | The identifier for the service API |  |
| analyticsOutputs | array(string) | M | 1..N | Service API analytics for prediction or statistics depending on the type. |  |
| area | LocationArea | O | 0..1 | The geographical or service area, to which the service API analytics subscription is applied. |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Provides accuracy level if the service API analytics is prediction. |  |

Editor's Note: Detailed definitions for data types are FFS.

##### 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.

###### 7.10.5.4.3.3 Enumeration: SrvApiIdType

Table 7.10.5.4.3.3-1: Enumeration SrvApiIdType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| SERVICE\_API\_NAME | The identity of the service API is the service API name. |  |
| SERVICE\_API\_TYPE | The identity of the service API is the service API type. |  |

#### 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

#### 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 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-sup".

- The <apiVersion> shall be "v1".

- The <apiSpecificSuffixes> shall be set as described in clause 7.10.6.2.

Editor's Note: Definitions of service operations descriptions for this API is FFS.

Editor's Note: The OpenAPI for this API is FFS.

#### 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 | Subscription to the event of the slice usage pattern analytics |
| Individual slice usage pattern event subscription | /slice-usage-pattern/{sliceUseId} | GET | Request the retrieval of an existing "Individual subscription to the event of the slice usage pattern analytics" resource. |
| PUT | Request the update of an existing "Individual subscription to the event of the slice usage pattern analytics" resource. |
| PATCH | Request the modification of an existing "Individual subscription to the event of the slice usage pattern analytics" resource. |
| DELETE | Request the deletion of an existing "Individual subscription to the event of the slice usage pattern analytics" resource. |

Editor's Note: Definitions of GET, PUT, PATCH, DELETE methods are FFS.

##### 7.10.6.2.2 Resource: Slice usage pattern event subscription

###### 7.10.6.2.2.1 Description

Slice usage pattern event subscription 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 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 |
| SUPSubs | 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 |
| SUPSubs |  |  | 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 5.2.7.1-1 of 3GPP TS 29.500 [22] shall 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 |

###### 7.10.6.2.2.4 Resource Custom Operations

7.10.6.2.2.4.1 Overview

Table 7.10.6.2.2.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation name | Custom operation URI | Mapped HTTP method | Description |
| GetStatLog | /slice-usage-pattern/GetStatLog | POST | Retrieves the slice usage statistics data |

7.10.6.2.2.4.2 Operation: POST

This method retrieves the slice usage statistics data and shall support the URI query parameters specified in table 7.10.6.2.2.4.2-1.

Table 7.10.6.2.2.4.2-1: 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 7.10.6.2.2.4.2-2 and the response data structures and response codes specified in table 7.10.6.2.2.4.2-3.

Table 7.10.6.2.2.4.2-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SUSLogReq | M | 1 | Retrieval of to the slice usage statistics data |

Table 7.10.6.2.2.4.2-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SUSLogResp |  |  | 200 (OK) | The retrieval of the slice usage statistics data is successful and returned in the response. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

#### 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 | {notificationUri} | 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: **{notificationUri}**

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 |  |  |  |  |

If the notification is on the slice usage pattern analytics, 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. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

#### 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 |
| SUPSubs | 7.10.6.4.2.2 | Subscription to the slice usage pattern analytics event |  |
| SUPNotif | 7.10.6.4.2.3 | Notification information of the slice usage pattern analytics event. |  |
| SUSLogReq | 7.10.6.4.2.4 | Retrieval request of the slice usage statistics data |  |
| SUSLogResp | 7.10.6.4.2.5 | Retrieval response of the slice usage statistics data |  |

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 7.10.1.4.3.3 | Type of analytics for the event of the VAL application performance analytics. |  |
| ConfidenceLevel | 3GPP TS 29.122 [3] | Presents confidence level |  |
| Dnn | 3GPP TS 29.571 [21] | Identifies a DNN. |  |
| DurationSec | 3GPP TS 29.122 [3] | Represents a period of time in units of seconds. |  |
| LocationArea | 3GPP TS 29.122 [3] | Represents location information. |  |
| Snssai | 3GPP TS 29.571 [21] | Identifies the S-NSSAI. |  |
| 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: SUPAnalyticsSubs

Table 7.10.6.4.2.2-1: Definition of type SUPSubs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsType | AnalyticsType | M | 1 | Identity of the type of the slice usage pattern analytics |  |
| sliceId | Snssai | M | 1 | Identity of the network slice |  |
| dnn | Dnn | O | 0..1 | Associated target DNN |  |
| sliceReq | NetworkSliceType | O | 0..1 | Identity the the required slice type |  |
| valUeIds | 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. |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Defines the accuracy level for the slice usage pattern analytics if the slice usage pattern analytics is prediction. |  |
| area | LocationArea | O | 0..1 | The geographical or service area, to which the slice usage pattern analytics subscription is applied. |  |
| timeInterval | DurationSec | O | 0..1 | The time interval as the start and the end time, to which the slice usage pattern analytics subscription is applied. |  |
| historicTimeInt | DurationSec | O | 0..1 | The historic time interval as the start and the end time, to which the slice usage pattern analytics subscription is applied. |  |

Editor's Note: Detailed definitions for data types are FFS.

###### 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 |
| analyticsOutputs | array(string) | M | 1..N | Slice usage pattern analytics for prediction or statistics depending on the type. |  |

Editor's Note: Detailed definitions for data types are FFS.

###### 7.10.6.4.2.4 Type: SUSLogReq

Table 7.10.6.4.2.4-1: Definition of type SUSLogReq

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| dataId | string | M | 1 | Identity of the slice usage statistics data which is to be collected. |  |
| valServiceId | string | M | 1 | The identifier of the VAL service, for which the request applies. |  |
| sliceId | Snssai | M | 1 | Identity of the network slice, for which the slice usage statistics data is collected. |  |
| dnn | Dnn | O | 0..1 | Associated DNN, for which the request applies. |  |
| valUeIds | array(ValTargetUe) | O | 0..N | A list of identities of one or more VAL UEs, for which the request applies. |  |
| area | LocationArea | O | 0..1 | The geographical or service area, to which the slice usage statistics data applies. |  |
| timeInterval | DurationSec | M | 1 | The time interval as the start and the end time, to which the slice usage statistics data applies. |  |

Editor's Note: Detailed definitions for data types are FFS.

###### 7.10.6.4.2.5 Type: SUSLogResp

Table 7.10.6.4.2.5-1: Definition of type SUSLogResp

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| dataOutputs | array(string) | M | 1..N | Reported data |  |
| sliceId | Snssai | M | 1 | Represents identity of the network slice. |  |

Editor's Note: Detailed definitions for data types are FFS.

##### 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 Enumeration: NetworkSliceType

Table 7.10.6.4.3.3-1: Enumeration NetworkSliceType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| NETWORK\_SLICE\_EMBB | Slice suitable for the handling of 5G enhanced Mobile Broadband. |  |
| NETWORK\_SLICE\_URLLC | Slice suitable for the handling of ultra- reliable low latency  communications. |  |
| NETWORK\_SLICE\_MIOT | Slice suitable for the handling of massive IoT. |  |
| NETWORK\_SLICE\_V2X | Slice suitable for the handling of V2X services. |  |
| NETWORK\_SLICE\_HMTC | Slice suitable for the handling of High-Performance Machine-Type  Communications. |  |

#### 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

#### 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.

Editor's Note: Definitions of service operations descriptions for this API is FFS.

Editor's Note: The OpenAPI for this API is FFS.

#### 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 | Subscription to the event of the edge load analytics and the edge load historic data collection |
| Individual edge load event subscription | /edge-load/{edgeLdId} | GET | Request the retrieval of an existing "Individual subscription to the event of the edge load analytics" resource. |
| PUT | Request the update of an existing "Individual subscription to the event of the edge load analytics" resource. |
| PATCH | Request the modification of an existing "Individual subscription to the event of the edge load analytics" resource. |
| DELETE | Request the deletion of an existing "Individual subscription to the event of the edge load analytics" resource. |

Editor's Note: Detailed definitions for data types are FFS.

##### 7.10.7.2.2 Resource: Edge load event subscription

###### 7.10.7.2.2.1 Description

Edge load event subscription to the event of the slice usage pattern 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 or the edge load historic data collection 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 |
| EdgeSubs | M | 1 | Subscription to the event of:  - edge load analytics; or  - edge load historic data collection. |

Table 7.10.7.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| EdgeSubs |  |  | 201 (Created) | Subscription to the edge load analytics or to the edge load historic data collection is created. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

Table 7.10.7.2.2.3.1-4: 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 |

###### 7.10.7.2.2.4 Resource Custom Operations

7.10.7.2.2.4.1 Overview

Table 7.10.7.2.2.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation name | Custom operation URI | Mapped HTTP method | Description |
| GetLog | /edge-load/GetLog | POST | Retrieves the edge load analytics data |

7.10.7.2.2.4.2 Operation: POST

This method retrieves the edge load analytics data and shall support the URI query parameters specified in table 7.10.7.2.2.4.2-1.

Table 7.10.7.2.2.4.2-1: 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 7.10.7.2.2.4.2-2 and the response data structures and response codes specified in table 7.10.7.2.2.4.2-3.

Table 7.10.7.2.2.4.2-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| EdgeLogReq | M | 1 | Retrieval of to the edge load analytics data |

Table 7.10.7.2.2.4.2-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| EdgeLogResp |  |  | 200 (OK) | The retrieval of the edge load analytics data is successful and returned in the response. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

#### 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 | {notificationUri} | POST | Notification on the event of the edge load analytics or the edge load historic data collection |

##### 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 historic data collection.

###### 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: **{notificationUri}**

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 historic data collection, 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 on:  - edge load analytics; or  - edge load historic data collection. |

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) | Notification for the edge load analytics event or the edge load historic data collection is accepted. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

#### 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 |
| EdgeSubs | 7.10.7.4.2.2 | Subscription to the edge load analytics event |  |
| EdgeNotif | 7.10.7.4.2.3 | Notification information of the edge load analytics event. |  |
| EdgeLogReq | 7.10.7.4.2.4 | Retrieval request of the edge load analytics data |  |
| EdgeLogResp | 7.10.7.4.2.5 | Retrieval response of the edge load analytics data |  |

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 7.10.1.4.3.3 | Type of analytics for the event of the VAL application performance analytics. |  |
| ConfidenceLevel | 3GPP TS 29.122 [3] | Presents confidence level |  |
| DataCollectReqs | Clause 7.10.1.4.2.7 | Represents requirements for data collection. |  |
| DataProdProfileInfo | Clause 7.10.1.4.2.6 | Presents characteristics of the data producer. |  |
| Dnn | 3GPP TS 29.571 [21] | Identifies a DNN. |  |
| DurationSec | 3GPP TS 29.122 [3] | Represents a period of time in units of seconds. |  |

##### 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: EdgeSubs

Table 7.10.7.4.2.2-1: Definition of type EdgeSubs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsType | AnalyticsType | C | 0..1 | Identity of the type of the edge load analytics (NOTE 1) |  |
| dataCollectionReq | DataCollectReqs | C | 0..1 | The requirements for edge load data collection subscription (NOTE 2) |  |
| destinationEasId | string | O | 0..1 | Identifier for the destination EAS, for which the edge load analytics subscription or the edge load data collection subscription, is requested. (NOTE 3) |  |
| destinationEesId | string | O | 0..1 | Identifier for the destination EES, for which the edge load analytics subscription or the edge load data collection subscription, is requested. (NOTE 3) |  |
| dnn | Dnn | O | 0..1 | Target DNN, for which the edge load analytics subscription or the edge load data collection subscription, is requested. (NOTE 3) |  |
| dataProdIds | array(string) | O | 1..N | In case of or the edge load data collection subscription if the request for the data collection is routed via A-DCCF, the list of data producer IDs is needed. |  |
| dataProdProfile | DataProdProfileInfo | O | 0..1 | Characteristics of the data producer to be used when subscribing to edge load analytics or the edge load data collection. |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Defines the accuracy level for the edge load analytics if the edge load analytics or the edge load data collection, is prediction. |  |
| area | LocationArea | O | 0..1 | The geographical or service area, to which the edge load analytics subscription or the edge load data collection subscription, is applied. |  |
| timeInterval | DurationSec | O | 0..1 | The time interval as the start and the end time, to which the edge load analytics subscription or the edge load data collection, applies. |  |
| NOTE 1: This attribute is mandatory if the subscription is to the event of the edge load analytics. This attribute is not used if the subscription is to the event of the edge load data collection. | | | | | |
|  | | | | | |
| NOTE 2: This attribute is mandatory if the subscription is to the event of the edge load data collection. This attribute is not used if the subscription is to the event of the edge load analytics. | | | | | |
|  | | | | | |
| NOTE 3: At least one of these attributes shall be present. | | | | | |
|  | | | | | |

Editor's Note: Detailed definitions for data types are FFS.

###### 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 |
| analyticsOutputs | array(string) | M | 1..N | Edge load analytics or edge load data collection for prediction or statistics depending on the type. |  |
| analyticsType | AnalyticsType | C | 0..1 | Identity of the type of the edge load analytics or the type of the edge load data collection. (NOTE 1) |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | In case of notification on the edge load analytics, it provides accuracy level if the edge load analytics is prediction. |  |
| destinationEasId | string | O | 0..1 | Identifier for the destination EAS, for which the edge load data collection applies. (NOTE 2) |  |
| destinationEesId | string | O | 0..1 | Identifier for the destination EES, for which the edge load data collection applies. (NOTE 2) |  |
| dnn | Dnn | O | 0..1 | Target DNN for for which the edge load data collection applies. (NOTE 2) |  |
| NOTE 1: This attribute is optional if the notification is on the event of the edge load analytics and is optional if notitfication is on the event of the edge load data collection. | | | | | |
|  | | | | | |
| NOTE 2: At least one of these attributes shall be present. | | | | | |
|  | | | | | |

Editor's Note: Detailed definitions for data types are FFS.

###### 7.10.7.4.2.4 Type: EdgeLogReq

Table 7.10.7.4.2.6-1: Definition of type EdgeLogReq

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsType | AnalyticsType | M | 1 | Identity of the type of the edge load analytics |  |
| destinationEasId | string | O | 0..1 | Identifier for the destination EAS, for which the edge load data analytics is requested. (NOTE) |  |
| destinationEesId | string | O | 0..1 | Identifier for the destination EES, for which the edge load data analytics is requested. (NOTE) |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Defines the accuracy level for the edge load data analytics if the edge load data analytics is prediction. |  |
| timeInterval | DurationSec | O | 0..1 | The time interval as the start and the end time, to which the edge load data analytics applies. |  |
| NOTE: At least one of these attributes shall be present. | | | | | |
|  | | | | | |

Editor's Note: Detailed definitions for data types are FFS.

###### 7.10.7.4.2.5 Type: EdgeLogResp

Table 7.10.7.4.2.7-1: Definition of type EdgeLogResp

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsOutput | array(string) | M | 1..N | Edge load data analytics for prediction or statistics depending on the type. |  |
| analyticsType | AnalyticsType | O | 0..1 | Identity of the type of the edge load data analytics |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Provides accuracy level if the edge load analytics is prediction. |  |

Editor's Note: Detailed definitions for data types are FFS.

#### 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 |
|  |  |  |

# 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.

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version: "1.2.0-alpha.2"

externalDocs:

description: >

3GPP TS 29.549 V18.4.0 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 sucessfully.

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'

/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: 'TS29571\_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:

type: string

description: >

Represents the VAL service area ID(s).

triggCriteria:

$ref: '#/components/schemas/TriggeringCriteria'

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: 'TS29571\_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:

type: string

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 subscription ID.

valTgtUe:

$ref: 'TS29549\_SS\_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'

locInfo:

$ref: 'TS29122\_MonitoringEvent.yaml#/components/schemas/LocationInfo'

timeStamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

required:

- subscriptionId

- valTgtUe

- locInfo

# 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.

# A.3 SS\_GroupManagement API

openapi: 3.0.0

info:

title: SS\_GroupManagement

description: |

API for SEAL Group management.

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version: "1.2.0-alpha.1"

externalDocs:

description: >

3GPP TS 29.549 V18.1.0 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-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 idenitity.

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:

type: string

description: Identity of the VAL service area.

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:

type: string

description: Identity of the VAL service area.

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.

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version: "1.2.0-alpha.1"

externalDocs:

description: >

3GPP TS 29.549 V18.0.0 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

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]

# A.5 SS\_NetworkResourceAdaptation API

openapi: 3.0.0

info:

version: 1.2.0-alpha.4

title: SS\_NetworkResourceAdaptation

description: |

SS Network Resource Adaptation Service.

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externalDocs:

description: >

3GPP TS 29.549 V18.4.0; 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'

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

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 VAL server 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)Config

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'

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'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

MulticastSubscription:

description: Represents a multicast subscription.

type: object

properties:

valGroupId:

type: string

anncMode:

$ref: '#/components/schemas/ServiceAnnoucementMode'

multiQosReq:

type: string

locArea:

$ref: 'TS29122\_GMDviaMBMSbyMB2.yaml#/components/schemas/MbmsLocArea'

duration:

$ref: 'TS29571\_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: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

reqTestNotif:

type: boolean

wsNotifCfg:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

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

- anncMode

- multiQosReq

- notifUri

UnicastSubscription:

description: Represents a unicast subscription.

type: object

properties:

valTgtUe:

$ref: 'TS29549\_SS\_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'

uniQosReq:

type: string

duration:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

notifUri:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

reqTestNotif:

type: boolean

wsNotifCfg:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- valTgtUe

- notifUri

UserPlaneNotification:

description: Represents a notification on User Plane events.

type: object

properties:

notifId:

$ref: 'TS29571\_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: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

deliveryMode:

$ref: '#/components/schemas/DeliveryMode'

streamIds:

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'

suppFeat:

$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

dataVolUe:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/UsageThreshold'

desiredTimeWindow:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

grantTimeWindow:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

geoArea:

$ref: '#/components/schemas/GeoArea'

bdtPolRefId:

type: string

notifUri:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

oneOf:

- required: [valGroupId]

- required: [valUeIds]

required:

- valServId

- notifUri

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: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

bdtConfigId:

type: string

grantTimeWindow:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

bdtPolicyRemoveInd:

type: boolean

default: false

required:

- notifId

- bdtConfigId

# Simple data types and Enumerations

EpsMbmsInfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Bytes'

ServiceAnnoucementMode:

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: NRM server performs the service announcement.

- VAL: VAL server 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.

# A.6 SS\_Events API

openapi: 3.0.0

info:

title: SS\_Events

description: |

API for SEAL Events management.

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version: "1.2.0-alpha.3"

externalDocs:

description: >

3GPP TS 29.549 V18.3.0 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-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.

websockNotifConfig:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

eventDetails:

type: array

items:

$ref: '#/components/schemas/SEALEventDetail'

minItems: 1

suppFeat:

$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'

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.

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'

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: 'TS29571\_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'

scheds:

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:

description: Identifier of the VAL service area to monitor the location deviation.

type: string

notInt:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

required:

- tgtUes

- notInt

oneOf:

- required: [locInt]

- required: [valSrvId]

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'

notifType:

$ref: '#/components/schemas/LocDevNotification'

required:

- tgtUes

- locInfo

- notifType

TempGroupInfo:

description: Represents the created temporary VAL group information.

type: object

properties:

valGrpIds:

type: array

items:

type: string

minItems: 1

tempValGrpId:

type: string

valServIds:

type: array

items:

type: string

minItems: 1

required:

- valGrpIds

- tempValGrpId

MonLocAreaInterestFltr:

description: Filter information indicate the area of interest and triggering events.

type: object

properties:

locInfoCri:

$ref: '#/components/schemas/LocationInfoCriteria'

trigEvnts:

type: array

items:

$ref: '#/components/schemas/MonLocTriggerEvent'

minItems: 1

description: Triggering events when to send information.

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'

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'

trigEvnt:

$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.

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.

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]

# 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

- 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.

LocDevNotification:

anyOf:

- type: string

enum:

- NOTIFY\_MISMATCH\_LOCATION

- NOTIFY\_ABSENCE

- NOTIFY\_PRESENCE

- 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.

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.

# A.7 SS\_KeyInfoRetrieval API

openapi: 3.0.0

info:

title: SS\_KeyInfoRetrieval

description: |

API for SEAL Key Information Retrieval.

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version: "1.1.1"

externalDocs:

description: >

3GPP TS 29.549 V17.6.0 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-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

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.

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version: "1.1.0-alpha.2"

externalDocs:

description: >

3GPP TS 29.549 V18.3.0 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-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

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:

type: string

- 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 SS\_NetworkSliceAdaptation API

openapi: 3.0.0

info:

title: SS\_NetworkSliceAdaptation

description: |

API for SEAL Network Slice Adaptation.

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version: "1.1.0-alpha.1"

externalDocs:

description: >

3GPP TS 29.549 V18.0.0 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-nsa/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

/request:

post:

summary: request the network slice adaptation.

operationId: RequestNetworkSliceAdaptation

tags:

- Network Slice Adaptation Request

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/NwSliceAdptInfo'

responses:

'204':

description: No Content. The requested network slice adaptation is successfully processed.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

NwSliceAdptInfo:

description: >

Represents the information associated with requested network slice adaptation

with the underlying network.

type: object

properties:

valServiceId:

type: string

valTgtUeIds:

type: array

items:

type: string

snssai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- valServiceId

- valTgtUeIds

# A.10 SS\_NetworkResourceMonitoring API

openapi: 3.0.0

info:

title: SS\_NetworkResourceMonitoring

description: |

API for SEAL Network Resource Monitoring.

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version: "1.1.0-alpha.2"

externalDocs:

description: >

3GPP TS 29.549 V18.1.0 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 resorce accoring 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'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'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'

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: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

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: 'TS29571\_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: '#/components/schemas/ReportingThreshold'

minItems: 1

immRep:

type: boolean

repTerminMode:

$ref: '#/components/schemas/TerminationMode'

expirationTimer:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

maxNumRep:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

termThr:

$ref: '#/components/schemas/MeasurementData'

termThrMode:

$ref: '#/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: '#/components/schemas/FailureReason'

measDataType:

$ref: '#/components/schemas/MeasurementDataType'

required:

- measDataType

MeasurementRequirements:

description: Indicates the measurement requirements.

type: object

properties:

measDataTypes:

type: array

items:

$ref: '#/components/schemas/MeasurementDataType'

minItems: 1

description: Indicates the required the QoS measurement data types.

measAggrGranWnd:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AverWindow'

measPeriod:

$ref: '#/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.

measReqs:

$ref: '#/components/schemas/MeasurementRequirements'

monRep:

$ref: '#/components/schemas/MonitoringReport'

reportReqs:

$ref: '#/components/schemas/ReportingRequirements'

notifUri:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

reqTestNotif:

type: boolean

wsNotifCfg:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

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: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

# Simple data types and Enumerations

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

description: |

API for VAL Service Data.

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version: "1.0.0-alpha.1"

externalDocs:

description: >

3GPP TS 29.549 V18.2.0 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 the VAL service data.

operationId: RetrieveValServiceData

tags:

- VAL Service Data Sets

parameters:

- name: val-tgt-ues

in: query

description: Identifying the list of the target VAL UE(s) or VAL user(s).

required: false

schema:

type: array

items:

$ref: 'TS29549\_SS\_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'

minItems: 1

- name: val-service-ids

in: query

description: Identifying the list of the target VAL service(s).

required: false

schema:

type: array

items:

type: string

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: Represents the requested VAL service data.

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 container for the requested VAL service data.

type: object

properties:

valServData:

type: array

items:

$ref: '#/components/schemas/ValServiceData'

minItems: 1

suppFeats:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

ValServiceData:

description: >

Represents the VAL service data associated with VAL user ID(s)/VAL UE ID(s)

and/or VAL service ID(s).

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

description: Contains the VAL service specific information.

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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version: "1.0.0-alpha.2"

externalDocs:

description: >

3GPP TS 29.549 V18.4.0 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:

type: string

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'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'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) accodring 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'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'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:

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:

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:

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:

description: Represents the identifier(s) of the successfully handled VAL service area(s).

minItems: 1

items:

type: string

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: 'TS29571\_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 4122.

ValServiceAreaSubsc:

description: Represents the VAL service area change event(s) subscription.

type: object

properties:

events:

description: Represents the subscribed VAL service area change event(s).

minItems: 1

items:

$ref: '#/components/schemas/ValServiceAreaEventType'

notifUri:

$ref: 'TS29571\_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:

description: Represents the VAL service area ID(s) associated with the event.

minItems: 1

items:

type: string

required:

- event

- valSvcAreaIds

ValServiceAreaNotif:

description: Represents the VAL service area change event(s) notifcation.

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:

description: Represents the VAL service area(s) associated with the event.

minItems: 1

items:

$ref: '#/components/schemas/ValServiceArea'

valSvcAreaIds:

description: Represents the VAL service area(s) associated with the event.

minItems: 1

items:

type: string

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

description: |

API for SEAL Identity management.

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version: "1.0.0-alpha.1"

externalDocs:

description: >

3GPP TS 29.549 V18.4.0 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-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 sucessfully.

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

responses:

'200':

description: List of VAL services configurations matching the query parameters in the request.

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 details of the VAL services configuration information.

type: object

properties:

valServerId:

type: string

description: The Identifier of the VAL server provisioning the VAL services configuration.

valSvcConf:

type: array

description: The list of VAL service parameters provisioned.

items:

$ref: '#/components/schemas/VALServiceParams'

minItems: 1

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- valServerId

- valSvcConf

VALServiceParams:

description: Represents details of VAL service parameters information.

type: object

properties:

valServiceId:

type: string

description: The identifier of the VAL service.

idList:

type: array

description: The list of VAL User IDs or VAL UE IDs provisioned to the VAL service.

items:

$ref: 'TS29549\_SS\_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'

minItems: 1

required:

- valServiceId

- idList

VALServicesConfigPatch:

description: Represents details of the partial update of VAL service configuration information.

type: object

properties:

valSvcConf:

type: array

description: The list of VAL service parameters provisioned.

items:

$ref: '#/components/schemas/VALServiceParams'

minItems: 1

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 | Notifcation URI | 17.1.0 |
| 2021-06 | CT#92e | CP-211240 | 0026 |  | F | 204 No Conent 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 refernces | 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 |
| 2022-06 | CT#96 | CP-221156 | 0091 |  | A | Correcting the ValTargetUe data type name in two occurrences | 17.5.0 |
| 2022-06 | CT#96 | CP-221260 | 0092 | 2 | F | Organizing and correcting the data model of the SS\_NetworkResourceMonitoring API | 17.5.0 |
| 2022-06 | CT#96 | CP-221151 | 0093 |  | F | Update of info and externalDocs fields | 17.5.0 |
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| 2022-09 | CT#97e | CP-222118 | 0097 | 1 | F | Tags and OperationId support in the SS\_GroupManagement API | 17.6.0 |
| 2022-09 | CT#97e | CP-222118 | 0098 | 1 | F | Tags and OperationId support in the SS\_KeyInfoRetrieval API | 17.6.0 |
| 2022-09 | CT#97e | CP-222118 | 0099 | 1 | F | Tags and OperationId support in the SS\_LocationAreaInfoRetrieval API | 17.6.0 |
| 2022-09 | CT#97e | CP-222117 | 0100 |  | F | Tags and OperationId support in the SS\_NetworkSliceAdaptation API | 17.6.0 |
| 2022-09 | CT#97e | CP-222117 | 0101 |  | F | Tags and OperationId support in the SS\_UserProfileRetrieval API | 17.6.0 |
| 2022-09 | CT#97e | CP-222118 | 0102 | 1 | F | Tags and OperationId support in the SS\_LocationReporting API | 17.6.0 |
| 2022-09 | CT#97e | CP-222108 | 0103 | 1 | F | Path correction in the SS\_LocationAreaInfoRetrieval OpenAPI file | 17.6.0 |
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| 2023-12 | CT#102 | CP-233243 | 0202 | 1 | F | EN resolution for the VAL service area ID representation | 18.4.0 |
| 2023-12 | CT#102 | CP-233243 | 0203 | 1 | B | Update subscription service operation implementation in the SS\_VALServiceAreaConfiguration API | 18.4.0 |
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