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T8 reference point for Northbound APIs;

(Release 18)

**



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# Foreword

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

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

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

Y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

# 1 Scope

The present specification describes the protocol for the T8 reference point between the SCEF and the SCS/AS. The T8 reference point and the related stage 2 functional requirements are defined in 3GPP TS 23.682 [2].

# 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 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".

[3] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[4] Void.

[5] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[6] Hypertext Transfer Protocol (HTTP) Status Code Registry at IANA, <http://www.iana.org/assignments/http-status-codes>.

[7] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

[8] IETF RFC 9457: "Problem Details for HTTP APIs".

[9] 3GPP TS 29.154: "Service capability exposure functionality over Nt reference point".

[10] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".

[11] 3GPP TS 29.336: "Home Subscriber Server (HSS) diameter interfaces for interworking with packet data networks and applications".

[12] 3GPP TS 29.128: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) interfaces for interworking with packet data networks and applications".

[13] 3GPP TS 29.201: "Representational State Transfer (REST) reference point between Application Function (AF) and Protocol Converter (PC)".

[14] 3GPP TS 23.003: "Numbering, addressing and identification".

[15] IETF RFC 3339: "Date and Time on the Internet: Timestamps".

[16] IETF RFC 9112: "HTTP/1.1".

[17] IETF RFC 9110: "HTTP Semantics".

[18] Void.

[19] Void.

[20] IETF RFC 9111: "HTTP Caching".

[21] Void.

[22] IETF RFC 9113: "HTTP/2".

[23] 3GPP TS 29.155: "Traffic steering control; Representational state transfer (REST) over St reference point".

[24] 3GPP TS 29.368: "Tsp interface protocol between the MTC Interworking Function (MTC-IWF) and Service Capability Server (SCS)".

[25] 3GPP TS 29.337: "Diameter-based T4 interface for communications with packet data networks and applications".

[26] 3GPP TS 29.250: "Nu reference point between SCEF and PFDF for sponsored data connectivity".

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[29] IETF RFC 5952: "A recommendation for Ipv6 address text representation".

[30] 3GPP TS 29.153: "Service capability exposure functionality over Ns reference point".

[31] 3GPP TS 24.250: "Protocol for Reliable Data Service; Stage 3".

[32] IETF RFC 6455: "The Websocket Protocol".

[33] 3GPP TS 29.272: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".

[34] 3GPP TS 29.338: "Diameter based protocols to support Short Message Service (SMS) capable Mobile Management Entities (MMEs)".

[35] 3GPP TS 33.187: "Security aspects of Machine-Type Communications (MTC) and other mobile data applications communications enhancements".

[36] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE\_LTE);MB2 Reference Point;Stage 3".

[37] 3GPP TS 29.116: "Presentational state transfer over xMB reference point between Content Provider and BM-SC".

[38] IETF RFC 5789: "PATCH method for HTTP".

[39] IETF RFC 7396: "JSON Merge Patch".

[40] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[41] YAML (10/2009): "YAML Ain't Markup Language (YAML™) Version 1.2", <http://www.yaml.org/spec/1.2/spec.html>.

[42] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[43] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[44] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[45] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".

[46] IETF RFC 6733: "Diameter Base Protocol".

[47] 3GPP TS 23.222: "Common API Framework for 3GPP Northbound APIs; Stage 2".

[48] 3GPP TS 29.222: "Common API Framework for 3GPP Northbound APIs; Stage 3".

[49] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[50] 3GPP TS 29.554: "5G System; Background Data Transfer Policy Control Service; Stage 3".

[51] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[52] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[53] 3GPP TS 33.122: "Security Aspects of Common API Framework for 3GPP Northbound APIs".

[54] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[55] 3GPP TS 23.468: "Group Communication System Enablers for LTE (GCSE\_LTE); stage 2".

[56] 3GPP TS 26.348, "Northbound Application Programming Interface (API) for Multimedia Broadcast/Multicast Service (MBMS) at the xMB reference point".

[57] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

[58] 3GPP TR 21.900: "Technical Specification Group working methods".

[59] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Resource Control (RRC); Protocol Specification".

[60] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[61] 3GPP TS 29.675: "User Equipment (UE) radio capability provisioning service; Stage 3".

[62] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[63] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[64] 3GPP TS 24.526: "User Equipment (UE) policies for 5G System (5GS); Stage 3".

[65] 3GPP TS 29.515: "5G System; Gateway Mobile Location Services; Stage 3".

[66] IETF RFC 5322: "Internet Message Format".

[67] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".

[68] 3GPP TS 33.558: "Security aspects of enhancement of support for enabling edge applications; Stage 2".

[69] IETF RFC 5234: "Augmented BNF for Syntax Specifications: ABNF".

[70] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".

[71] IETF RFC 6901: "JavaScript Object Notation (JSON) Pointer".

# 3 Definitions and abbreviations

## 3.1 Definitions

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

## 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].

AF Application Function

AI/ML Artificial Intelligence/Machine Learning

AS Application Server

ASP Application Service Provider

BAT Burst Arrival Time

BDT Background Data Transfer

CAPIF Common API Framework

CP Communication Pattern

DDN Downlink Data Notification

DNN Data Network Name

DL Downlink

eNB Evolved Node B

GMD Group Message Delivery

IMEI-TAC Type Allocation Code part of an IMEI

IWK-SCEF Interworking SCEF

JSON JavaScript Object Notation

LC Load Control

LCI Load Control Information

MIME Multipurpose Internet Mail Extensions

MT Mobile Terminated

MTC Machine Type Communications

MT-LR Mobile Terminated Location Request

NEF Network Exposure Function

NIDD Non-IP Data Delivery

NP Network Parameter

NSAC Network Slice Admission Control

OCI Overload Control Information

OLC OverLoad Control

PCRF Policy and Charging Rule Function

PDN Packet Data Network

PDV Packet Delay Variation

PFD Packet Flow Description

PFDF Packet Flow Description Function

RCAF RAN Congestion Awareness Function

REST Representational State Transfer

SACH Service Announcement Channel

SCEF Service Capability Exposure Function

SCS Services Capability Server

S-NSSAI Single Network Slice Selection Assistance Information

TAI Tracking Area Identity

TLTRI T8 Long Term Transaction Reference ID

TSC Time Sensitive Communication

TSCAI Time Sensitive Communication Assistance Information

WB Wide Band

YAML YAML Ain't Markup Language

# 4 T8 reference point

## 4.1 Overview

The T8 reference point is between the SCS/AS and the SCEF. It specifies APIs that allow the SCS/AS to access the services and capabilities provided by 3GPP network entities and securely exposed by the SCEF.

This document also specifies the procedures triggered at the SCEF by API requests from the SCS/AS and by event notifications received from 3GPP network entities.

The stage 2 level requirements and signalling flows for the T8 reference point are defined in 3GPP TS 23.682 [2].

The T8 reference point supports the following procedures:

- Monitoring Procedures

- Procedures for resource management of Background Data Transfer

- Procedures for changing the chargeable party

- Procedures for Non-IP Data Delivery

- Procedures for Device Triggering

- Procedures for Group Message Delivery

- Procedures for Reporting of Network Status

- Procedures for Communication Pattern Parameters Provisioning

- Procedures for PFD Management

- Procedures for Enhanced Coverage Restriction Control

- Procedures for Network Parameter Configuration

- Procedures for setting up an AS session with required QoS

- Procedures for MSISDN-less Mobile Originated SMS

- Procedures for RACS Parameter Provisioning

## 4.2 Reference model

The T8 reference point resides between the SCEF and the SCS/AS as depicted in figure 4.2.1. The overall SCEF architecture is depicted in clause 4.2 of 3GPP TS 23.682 [2].

NOTE: The SCS/AS can be provided by a third party.



Figure 4.2.1: T8 reference model

## 4.3 Functional elements

### 4.3.1 SCEF

The SCEF is a functional element which provides means to securely expose the services and capabilities provided by 3GPP network interfaces. The SCEF provides access to network capabilities through homogenous application programming interfaces.

Individual instances of SCEF may vary depending on what service capabilities are exposed and what API features are supported.

The SCEF shall protect the other PLMN entities (e.g. HSS, MME) from requests exceeding the permission arranged in the SLA with the third-party service provider.

When needed, the SCEF supports mapping between information exchanged with SCS/AS (e.g. geographical identifiers) and information exchanged with internal PLMN functions (e.g. cell-Id, eNB-Id, TAI, MBMS SAI, etc.). This mapping is assumed to be provided by the SCEF based on local configuration data.

### 4.3.2 SCS/AS

The SCS is the entity which connects MTC application servers to the 3GPP network to enable them to communicate through specific 3GPP defined services with UEs used for MTC and with the SCEF in the HPLMN. The SCS offers capabilities for use by one or multiple MTC application servers. The MTC applications in the external network are hosted on one or more ASs.

An SCS/AS can get services from multiple SCEFs, and an SCEF can provide services to multiple SCS/ASs.

The SCS is controlled by the operator of the HPLMN or by a MTC Service Provider.

The AS can be controlled by a 3rd party.

## 4.4 Procedures over T8 reference point

### 4.4.1 Introduction

All procedures that operate across the T8 reference point, as specified in 3GPP TS 23.682 [2], are specified in the following clauses.

### 4.4.2 Monitoring Procedures

#### 4.4.2.1 General

These procedures are used to perform event monitoring functions via the T8 interface, which include:

- Monitoring event configuration as specified in clause 4.4.2.2;

- Reporting of monitoring event as specified in clause 4.4.2.3;

- Network initiated notifications of monitoring event cancellation, as specified in clause 4.4.2.4 ; and

- Network initiated notifications of applied parameter configuration, as specified in clause 4.4.2.5.

#### 4.4.2.2 Monitoring Events Configuration

##### 4.4.2.2.1 General

In order to subscribe to a new monitoring event configuration, the SCS/AS shall send an HTTP POST request message to the SCEF targeting the "Monitoring Event Subscriptions" resource. The body of the HTTP POST request message shall include:

- the SCS/AS Identifier;

- the Monitoring Type;

- the Notification Destination Address; and

- the identifier(s) of the targeted UE(s), i.e. one of External Identifier, MSISDN or External Group Identifier. The External Identifier or the MSISDN identifies the subscription of an individual UE and the External Group Identifier points to a group of UEs.

and may include:

- the Maximum Number of Reports;

- the Monitoring Duration indicated by the property "monitorExpireTime";

- the Group Reporting Guard Time; and

- additional Monitoring Type(s), if the subscription request targets multiple event(s).

If the Subscription\_modification feature is supported, the SCS/AS may send an HTTP PUT message in order to update an existing monitoring event subscription. The HTTP PUT request targets the resource "Individual Monitoring Event Subscription" replacing all the properties in the existing configuration. The identifier(s) of the targeted UE(s) (i.e. "msisdn", "externalId" or "externalGroupId" attribute), the identifier of the MTC Provider (i.e. "mtcProviderId" attribute) and the supported features (i.e. "supportedFeatures" attribute) provided during the creation of the monitoring event subscription shall not be updated. Also, both the "requestTestNotification"and "websockNotifConfig" attributes shall not be updated, if previously provided.

For one-time monitoring type of requests, the SCS/AS shall include the Maximum Number of Reports with a value set to 1 and not include the Monitoring Duration in the HTTP request message sent to the SCEF.

If the Subscription\_Patch feature is supported, the SCS/AS may send an HTTP PATCH request to request the modification of an existing "Individual Monitoring Event Subscription" resource, with the request body including the modification instructions which may include any applicable attributes (e.g. "notificationDestination", "monitorExpireTime"), except the provided UE Identifier (e.g. "msisdn", "externalId" or "externalGroupId"), "mtcProviderId" and "supportedFeatures" attributes. Also, both the "requestTestNotification" and "websockNotifConfig" attributes shall not be modified, if previously provided.

For a group of UEs, if the Partial\_group\_modification feature is supported, the SCS/AS may send an HTTP PATCH request message in order to cancel or add certain UE(s) within an active group. The HTTP PATCH request targets the resource "Individual Monitoring Event Subscription" updates with the corresponding "excludedExternalIds" and/or "excludedMsisdns" attributes in the existing configuration for partial group cancellation, and/or updates with the corresponding "addedExternalIds" and/or "addedMsisdns" attributes in the existing configuration for partial group addition.

Upon reception of the HTTP POST, PUT or PATCH request message, if the SCS/AS is authorized to perform such request, the SCEF shall check whether the parameters (e.g. Maximum Number of Reports, Monitoring Duration, Maximum Latency, Maximum Response Time, suggested number of downlink packets in the HTTP POST or PUT request message) in the HTTP request body are within the range defined by operator policies. If one or more of these parameters are not within the range, the SCEF shall either:

- reject the request message by sending an HTTP response to the SCS/AS with a status code set to "403 Forbidden" and may include in the response body the "PARAMETER\_OUT\_OF\_RANGE" application error within the "cause" attribute of the ProblemDetails data structure and indicate which parameters are out of the range within the "invalidParams" attribute of the "ProblemDetails" data structure; or

- modify the parameters which are not within the range by selecting different values which are within the range.

For individual UE configuration requests, the SCEF shall also check whether the Idle Status Indication is included for the UE reachability event. If the Idle Status Indication is received in the request but not supported by the network, the SCEF may reject the request message by sending an HTTP response to the SCS/AS with a status code set to "403 Forbidden" and may include in the response body the "IDLE\_STATUS\_UNSUPPORTED" error within the "cause" attribute of the "ProblemDetails" structure.

If the SCEF receives an HTTP POST request to create a subscription resource for a monitoring event, but without an indication of the support for the feature corresponding to the requested monitoring event, the SCEF shall reject the request by sending an HTTP "400 Bad Request" HTTP error response including the "EVENT\_FEATURE\_MISMATCH" application error within the "cause" attribute of the "ProblemDetails" structure.

If the SCEF receives an HTTP POST request to create a subscription resource for a monitoring event that it does not support, the SCEF shall reject the request by sending an HTTP "500 Internal Server Error" HTTP error response including the "EVENT\_UNSUPPORTED" application error within the "cause" attribute of the "ProblemDetails" structure.

If the "enNB" feature is supported:

- if the SCEF receives an HTTP POST request to create a subscription resource for a monitoring event and determines that no more subscriptions are allowed for this client, the SCEF shall reject the request by sending an HTTP "403 Forbidden" error response including the "RESOURCES\_EXCEEDED" application error within the "cause" attribute of the "ProblemDetails" structure; and

- if the SCEF receives an HTTP POST request to create a subscription resource for a monitoring event and determines that a duplicate subscription already exists for this client, the SCEF shall reject the request by sending an HTTP "400 Bad Request" error response including the "DUPLICATE\_REQUEST" application error within the "cause" attribute of the "ProblemDetails" structure.

After validation, the SCEF shall store the parameters and:

- may assign a SCEF Reference ID related to the created monitoring event subscription resource; and

- based on operator policies, shall:

- map the accuracy into permissible granularity for the location reporting event; and

- map the location area into a list of cells, eNodeB(s) and/or RAI(s)/TAI(s) and derive the corresponding MME(s)/SGSN(s), for number of UEs present in a geographic area event.

In order to delete a previously active configured monitoring event subscription at the SCEF, the SCS/AS shall send an HTTP DELETE request message to the SCEF targeting the "Individual Monitoring Event Subscription" resource using the corresponding resource URI previously received in the response to the request that has created the monitoring events subscription resource. The SCEF shall then detemine the SCEF Reference ID related to the active monitoring subscription resource, and if the SCS/AS is authorized to perform such request, the SCEF shall delete the targeted resource.

##### 4.4.2.2.2 Monitoring Events Configuration via HSS

###### 4.4.2.2.2.1 General

The following monitoring events are applicable for the monitoring event configuration via HSS for an individual UE or a group of UEs:

- Loss of connectivity;

- UE reachability;

- Location Reporting;

- Change of IMSI-IMEI(SV) Association;

- Roaming Status;

- Communication Failure;

- PDN connectivity status;

- Availability after DDN Failure; and

- API support capability.

Only one-time reporting is supported if the "reachabilityType" attribute sets to "SMS" for the event "UE reachability" or if the "locationType" attribute sets to "LAST\_KNOWN\_LOCATION" for the event "Location Reporting" in the monitoring event request.

###### 4.4.2.2.2.2 Configuration Request for an individual UE

Upon receipt of a configuration request from the SCS/AS for an individual UE, the SCEF shall interact with the HSS via S6t, as specified in 3GPP TS 29.336 [11].

Upon receipt of a successful response from the HSS,

- if it is a one-time monitoring request and the monitoring event report is received, the SCEF shall delete the associated configuration, send an HTTP response message to the SCS/AS with a "200 OK" status code and including the received monitoring event report(s) (more than one report may be provided if the "enNB" is supported).

- otherwise, the SCEF shall,

- for an HTTP POST request, create a new "Individual Monitoring Event Subscription" resource addressed by the URI that contains the SCS/AS identifier and an SCEF-created subscription identifier, and send an HTTP response to the SCS/AS with a "201 Created" status code, containing the final suggested configuration parameter(s) (if modified), indication(s) of the discarded parameter(s) (if discarded), the monitoring event report(s) (more than one report may be provided if the "enNB" is supported), if received, and a location header field containing the URI of the created resource.

- for an HTTP PUT request, update the active "Individual Monitoring Event Subscription" resource addressed by the request URI and send an HTTP response to the SCS/AS with a "200 OK" status code, containing the final suggested configuration parameter(s) (if modified), indication(s) of the discarded parameter(s) (if discarded) and the monitoring event report(s) (more than one report may be provided if the "enNB" is supported), if received, or a "204 No Content" status code.

- for an HTTP DELETE request, delete the active "Individual Monitoring Event Subscription" resource addressed by the request URI and send an HTTP response to the SCS/AS with a "204 No Content" status code, or a "200 OK" status code and including the monitoring event report(s) (more than one report may be provided if the "enNB" is supported), if received.

If the SCEF receives a response with an error code from the HSS, the SCEF shall not create, update nor delete the concerned resource and respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

###### 4.4.2.2.2.3 Configuration Request for a group of UEs

Upon receipt of a request from the SCS/AS including an External Group Identifier, then the monitoring configuration is for a group of UEs. The SCEF shall interact with the HSS via S6t as specified in 3GPP TS 29.336 [11].

Upon receipt of a successful response from the HSS indicating that group processing is in progress and before beginning the processing of individual UEs, the SCEF shall,

- for an HTTP POST request, create a new "Individual Monitoring Event Subscription" resource addressed by a URI that contains the SCS/AS identity and an SCEF-created subscription identifier, store the number of UEs received in the response message from the HSS within the resource and send an HTTP response to the SCS/AS with "201 Created" status code and a location header field containing the URI of the created resource, in order to acknowledge the SCS/AS of the successful group processing request.

- for an HTTP PUT request, update the active "Individual Monitoring Event Subscription" resource addressed by the request URL and send an HTTP response with "200 OK" status code to acknowledge the SCS/AS of the successful group processing request, or a "204 No Content" status code.

- for an HTTP DELETE request, delete the active "Individual Monitoring Event Subscription" resource addressed by the request URI and send an HTTP response to the SCS/AS with "204 No Content" status code.

If the SCEF receives a response with an error code from the HSS, the SCEF shall not create, update nor delete the concerned resource and respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

Upon receipt of the processing result of the individual UEs from the HSS, the SCEF shall behave as follows:

- if no Group Reporting Guard Time is received, the SCEF shall send an HTTP POST request message to the SCS/AS including a reference to the related monitoring subscription, a list of configuration failure result if received for the group members, and the "monitoringEventReports" attribute including a list of monitoring event reports if received for the group members;

- otherwise, the SCEF shall accumulate all of the configuration results and/or monitoring event reports received from the HSS for the group members until the Group Reporting Guard Time expires. Then the SCEF shall send an HTTP POST request message to the SCS/AS including a reference to the related monitoring subscription, and a list of configuration failure result if received for the group members, and the "monitoringEventReports" attribute including a list of monitoring event reports received before the Group Reporting Guard Time.

- If the Partial\_group\_modification feature is supported,

- upon the cancellation of UE(s) within the active group identified by the "excludedExternalIds" and/or "excludedMsisdns" attributes is successful, the SCEF shall,

- if the maximum number of reports applies to the monitoring event configuration of the cancelled UE(s), set the stored number of reports of the indicated UE(s) to the maximum number of reports;

- still consider the rest of UE(s) as applicable within the active group based monitoring subscription to the group based Monitoring Event Report identified by the External Group Identifier;

- determine whether the reporting for the group based event subscription is completed or not. If completed, the SCEF shall delete the corresponding "Individual Monitoring Event Subscription" resource with procedures as described in clause 4.4.2.3.

- If the cancellation of UE(s) within the active group is unsuccessful, the SCEF shall respond with proper error code indicating the error and should return the appropriate additional error information in the POST response body.

- upon the addition of UE(s) within the active group identified by the "addedExternalIds" and/or "addedMsisdns" attributes is successful, the SCEF shall,

- still consider the existing of UE(s) as applicable within the active group based monitoring subscription to the group based Monitoring Event Report identified by the External Group Identifier;

- subsequently apply monitoring event subscription to the new group member UEs.

- If the addition of UE(s) within the active group is unsuccessful, the SCEF shall respond with proper error code indicating the error and should return the appropriate additional error information in the POST response body.

The SCS/AS shall send an HTTP response to acknowledge the SCEF about the handling result of the received HTTP POST request.

##### 4.4.2.2.3 Monitoring Events Configuration directly via MME/SGSN

The monitoring event "Number of UEs in a geographic area" is applicable for the monitoring event configuration via MME/SGSN. Only one-time reporting is supported for this event with the value of Maximum Number of Reports indicated by "maximumNumberOfReports" set to 1.

Upon receipt of an HTTP POST request from the SCS/AS, the SCEF shall

- resolve the location area to the involved SGSN(s)/MME(s) by local configuration;

- interact with the HSS via the S6t interface as specified in 3GPP TS 29.336 [11] if the External Group ID(s) is included; and

- interact with the SGSN(s)/MME(s) via the T6a/b inteface as specified in 3GPP TS 29.128 [12].

NOTE: The SCEF uses local configuration to resolve the involved SGSN(s)/MME(s) if the location area is not received.

After collecting responses from the SGSN(s)/MME(s), if the SCEF does not receive any successful response from the involved SGSN(s)/MME(s), the SCEF shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6; otherwise the SCEF should send a response with 200 OK status code to acknowledge the SCS/AS with one aggregated report in the requested area by including the total count of the number of UEs in the "ueCount" attribute and the External Identifier(s) (if available) or the MSISDN(s) (if available) associated with the External Group ID.

NOTE: It is possible that the number of UEs does not reflect the actual number of UEs in the designated area (e.g. some SGSN(s)/MME(s) do not respond successfully). The SCEF still provides the result to the SCS/AS if at least one SGSN/MME returns a successful response.

##### 4.4.2.2.4 Monitoring Events Configuration via PCRF

###### 4.4.2.2.4.1 General

The following monitoring events: the location reporting event and communication failure event are applicable for the monitoring event configuration via PCRF for an individual UE.

NOTE: If monitoring event configuration via PCRF is used for a subscription resource, the Subscription\_modification feature cannot be supported.

Only the location reporting event is applicabe for the monitoring event configuration via PCRF for a group of UEs.

Only one-time reporting is supported for the monitoring event configuration via PCRF.

HTTP PUT is not supported for the monitoring event configuration via PCRF. If it is received, the SCEF shall reject the HTTP PUT message with 403 Forbidden during monitoring and may indicate the "OPERATION\_PROHIBITED" error in the "cause" attribute of the "ProblemDetails" structure.

###### 4.4.2.2.4.2 Configuration Request for an individual UE

Upon receipt of an HTTP POST request from the SCS/AS for an individual UE, the SCEF shall:

- interact with the PCRF via the Rx inteface by using an existing AF session or establishing a new AF session as specified in 3GPP TS 29.214 [10];

NOTE 1: The SCEF can derive the service information over the Rx interface based on SCS/AS ID for communication failure event.

- after receiving the AAA message from the PCRF, create a resource which represents the monitoring event configuration addressed by a URI that contains the SCS/AS identifier and an SCEF-created subscription identifier; and

- send a corresponding status code to acknowledge the SCS/AS of the successful processing of the request in the HTTP response message.

Then the SCEF shall wait for the reporting from the PCRF as specified in 3GPP TS 29.214 [10].

NOTE 2: Different events can be reported in different messages according to 3GPP TS 29.214 [10], e.g. STR/RAR for communication failure.

During configuration resource deletion, the SCEF shall also terminate the AF session if it was established and used only for event monitoring.

###### 4.4.2.2.4.3 Configuration Request for a group of UEs

Upon receipt of an HTTP POST request from the SCS/AS for a group of UEs, the SCEF shall:

- interact with all PCRFs in the same PLMN via Nta application of Nt interface as specified in 3GPP TS 29.154 [9];

- after collecting ECA message from all PCRFs, create a resource which represents the monitoring event configuration addressed by a URI that contains the SCS/AS identifier and an SCEF-created subscription identifier; and

- send a corresponding status code to acknowledge the SCS/AS of the successful processing of the request in the HTTP response message.

Then the SCEF shall wait for the reporting from the PCRF(s) as specified in 3GPP TS 29.154 [9].

#### 4.4.2.3 Reporting of Monitoring Event Procedure

Upon receipt of a Monitoring Event Report from the HSS or the MME/SGSN as defined in clause 5.6.3 or clause 5.6.8 of 3GPP TS 23.682 [2], from the PCRF as defined in clause 5.6.5 or from the IWK-SCEF as defined in clause 5.6.8 of 3GPP TS 23.682 [2], the SCEF shall determine the monitoring event subscription associated with the corresponding Monitoring Event Report.

If the monitoring event subscription refers to a Monitoring Event Configuration for a single UE or to a group-based Monitoring Event configuration, and no Group Reporting Guard Time was set, then the SCEF shall send an HTTP POST message including a link to the SCEF-created subscription resource and the received Monitoring Event Report to the identified destination. If the monitoring event subscription refers to a group-based Monitoring Event Configuration and Group Reporting Guard Time was provided during the Monitoring Event configuration procedure, then the SCEF shall accumulate all of the received Monitoring Event reports for the group of UEs until the Group Reporting Guard Time expires or the monitoring duration indicated by the property "monitorExpireTime" is reached.

Upon expiration of Group Reporting Guard Time or expiration of the monitoring duration, the SCEF shall send an HTTP POST message to the identified destination including a link to the SCEF-created subscription resource and the list of accumulated Monitoring Event Reports for each UE identified by either its External Identifier or MSISDN. The destination URL of the HTTP POST message is provided by the SCS/AS during the Monitoring Event Configuration procedure.

If the monitoring event subscription refers to a one-time monitoring request or a continuous monitoring request, but the maximum number of reports is reached, the SCEF shall consider the reporting as completed, delete the corresponding "Individual Monitoring Event Subscription" resource and send an HTTP POST message including the subscription identifier and a cancellation indication to the identified destination. The cancellation indication shall set to "true" indicating to cancel the configured monitoring subscription. The destination URL of the HTTP POST is provided by the SCS/AS during the Monitoring Event Configuration procedure. In addition, the SCEF shall interact with the HSS to delete the event configuration if the latter was performed via the HSS whereas event reports were performed via the SGSN/MME. The SCEF determines that the reporting for a group is completed by comparing the total number of received reports with the number of UEs of the group (received from the HSS during event configuration for a group of UEs) multiplied by the maximum number of reports.

If the Partial\_group\_modification feature is supported and one or more MSISDN(s) or External Identifier(s) within the active group based monitor subscription have been cancelled or added, the existing UE(s) within the active group based monitoring subscription are still applicable to the group based Monitoring Event Report identified by the External Group Identifier, the added group member(s) shall be subsequently applied with the monitoring event subscription.

When the monitoring duration indicated by the property "monitorExpireTime" is reached, the SCEF shall delete the related event subscription and event configuration locally. The SCS/AS shall no longer address the corresponding "Individual Monitoring Event Subscription" resource.

#### 4.4.2.4 Network-initiated Explicit Monitoring Event Deletion Procedure

Upon receipt of an SCEF Reference ID for the event to be deleted from the HSS as defined in 3GPP TS 29.336 [11], the SCEF shall determine the subscription identifier associated with the indicated active monitoring subscription. Then the SCEF shall delete the related resource "Individual Monitoring Event Subscription", send an HTTP POST message including the subscription identifier and a cancellation indication to the identified destination. The cancellation indication shall set to "true" indicating to cancel the configured monitoring subscription. The destination URL of the HTTP POST is provided by the SCS/AS during the Monitoring Event Configuration procedure.

If the Partial\_group\_cancellation feature is supported, upon receipt of one or more MSISDN(s) or External Identifier(s) for the group member(s) to be cancelled within the active group based event subscription from the HSS as defined in 3GPP TS 29.336 [11], the SCEF shall,

- if the maximum number of reports applies to the monitoring event configuration, set the stored number of reports of the indicated UE(s) to the maximum number of reports;

- include the MSISDN(s) or External Identifier(s) to be cancelled in the MonitoringNotification Request to the destination URL provided by the SCS/AS during the Monitoring Event Configuration procedure; and

- determine whether the reporting for the group based event subscription is completed or not. If completed, the SCEF shall delete the corresponding "Individual Monitoring Event Subscription" resource with procedures as described in clause 4.4.2.3.

NOTE: The above procedure can be triggered from the HSS due to parameter overwritten by Network Parameter Configuration.

#### 4.4.2.5 Network initiated notification of applied parameter configuration

For "LOSS\_OF\_CONNECTIVITY" and "UE\_REACHABILITY" events, if the "Enhanced\_param\_config" feature is supported and the SCEF receives the currently applied parameter configuration from the HSS, the SCEF shall notify the SCS/AS via an HTTP POST message including the parameter changes in the "appliedParam" attribute.

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

These procedures are used by an SCS/AS to perform the resource management of background data transfer (BDT) to a set of UEs, i.e. the SCS/AS requests a time window and related conditions from the SCEF via the T8 interface.

In order to create a resource for the background data transfer policy, the SCS/AS shall send an HTTP POST message to the SCEF for the "BDT Subscriptions" resource to negotiate the transfer policy. The body of the HTTP POST message shall include SCS/AS Identifier, Volume per UE (total volume for both DL and UL or separate volume for DL and/or UL), Number of UEs, Desired Time Window and optionally a location area information.

After receiving the HTTP POST message, if the SCS/AS is authorized, the SCEF shall map the SCS/AS Identifier to ASP Identifier and negotiate the transfer policy with the PCRF as defined in 3GPP TS 29.154 [9]. After receiving the response including the determined transfer policies from the PCRF, the SCEF shall create a resource "Individual BDT Subscription" which represents the BDT subscription, addressed by a URI that contains the SCS/AS identifier and an SCEF-created subscription identifier, and shall respond to the SCS/AS with a 201 Created message, including a Location header field containing the URI for the created resource and a message body, which may also include Reference ID and a set of transfer policies. The SCS/AS shall use the URI received in the Location header in subsequent requests to the SCEF to refer to this background data transfer subscription. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not create the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

The SCS/AS may also send an HTTP PUT message to the SCEF for the "Individual BDT Subscription" resource to request starting an update for negotiation of background data transfer policy. The body of the HTTP PUT message shall include data as described in the POST message. The external group identifier shall remain unchanged from previously provided value. After receiving such request, if the SCS/AS is authorized, the SCEF shall negotiate the transfer policy with the PCRF as defined in 3GPP TS 29.154 [9]. After receiving the response including the determined transfer policies from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a "200 OK" status code and shall include the Bdt data type in the response body, or with a "204 No Content" status code. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not update the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

NOTE 1: The SCEF starts a new BDT policy negotiation in the Nt interface by sending the request to the PCRF without the previously associated BDT Reference ID.

If more than one policy is included in the HTTP response, the SCS/AS shall send an HTTP PATCH message to inform the SCEF for the "Individual BDT Subscription" resource of the transfer policy selected by the SCS/AS. After receiving the HTTP PATCH message, the SCEF shall send an HTTP response to the SCS/AS with a "200 OK" status code and shall include the Bdt data type in the response body, or with a "204 No Content" status code, then the SCEF shall interact with the PCRF as defined in 3GPP TS 29.154 [9]. If the SCEF identifies any error (e.g. selected policy is not within the set of transfer policies), the SCEF shall not update the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

The SCS/AS may also send an HTTP DELETE message to the SCEF for the "Individual BDT Subscription" resource requesting to remove an individual resource identified by the URI received in the response to the request that has created resource a URI. After receiving such request, the SCEF shall delete the resource and send an HTTP response to the SCS/AS with a corresponding status code.

NOTE 2: The SCEF can also remove the resource when the last window end time in transfer policies expires.

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

This procedure is used by an SCS/AS to either request to sponsor the traffic from the beginning or to request becoming the chargeable party at a later point in time via the T8 interface.

When setting up the connection between the AS and the UE via the SCEF, the SCS/AS shall send an HTTP POST request to the SCEF, targeting the "Chargeable Party Transactions" resource, to become the chargeable party for the session to be set up. The body of the HTTP POST message shall include the SCS/AS Identifier, UE IP address, IP Flow description, Sponsor ID, ASP ID, Sponsoring Status, notification destination URI identifying the recipient of notifications within the "notificationDestination" attribute and may include the time period and/or traffic volume used for sponsoring. The SCS/AS may also request to activate a previously selected policy of background data transfer by including the associated Reference ID in the body of the HTTP POST message. If the feature AppId is supported, either the Flow description or an external Application Identifier shall be included.

After receiving the HTTP POST request, if the authorization performed by the SCEF is successful, the SCEF shall act as an AF and interact with the PCRF via the Rx interface, as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13], to trigger a PCRF initiated IP-CAN Session Modification. The SCEF may map the SCS/AS Identifier to AF Application Identifier if the external Application Identifier is not provided and only one AF Application Identifier is mapped and may request to be notified about the traffic plane status based on local configuration. If the time period and/or traffic volume are received from the SCS/AS, the SCEF should subscribe with the PCRF to the USAGE\_REPORT event.

If the "enNB" feature is supported, the SCEF may explicitly receive a list of event(s) that the SCS/AS requests to subscribe to. The SCEF shall subscribe to the corresponding PCRF event(s) (e.g. INDICATION\_OF\_SUCCESSFUL\_RESOURCE\_ALLOCATION) for the received event(s) (e.g. SUCCESSFUL\_RESOURCES\_ALLOCATION) except for SESSION\_TERMINATION.

NOTE 1: PCRF does not need explicit subscription in order to notify Rx session termination.

After receiving a successful response from the PCRF, the SCEF shall create a new "Individual Chargeable Party Transaction" resource, which represents the chargeable party transaction, addressed by a URI that contains the SCS/AS identity and an SCEF-created transaction identifier, and shall respond to the SCS/AS with a 201 Created status code, including a Location header field containing the URI of the created resource. The SCS/AS shall use the URI received in the Location header in subsequent requests to the SCEF to refer to this chargeable party transaction. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not create a resource and respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

In order to update the sponsoring status of an established AS session, the SCS/AS shall send an HTTP PATCH message to the SCEF targeting the associated "Individual Chargeable Party Transaction" resource requesting to partial update a chargeable party transaction resource (e.g. change the Sponsoring Status, update the list of event(s) if the "enNB" feature is supported). When receiving the HTTP PATCH message, the SCEF shall make the change and interact with the PCRF to modify the Rx session as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]. After receiving a response with successful result code from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a "200 OK" status code and the result if any in the body of the HTTP response or a "204 No Content" status code. The accumulated usage received from the PCRF shall be included in the HTTP response with the "200 OK" status code if the SCS/AS requested to disable the sponsoring. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not update the resource and respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

NOTE 2: The SCS/AS can assume a successful resource allocation upon receipt of the POST/PATCH response until the FAILED\_RESOURCES\_ALLOCATION event is received.

NOTE 3: The SCS/AS can update the list of user plane event(s) only for one time specific events, i.e. INDICATION\_OF\_SUCCESSFUL\_RESOURCES\_ALLOCATION, INDICATION\_OF\_FAILED\_RESOURCES\_ALLOCATION and USAGE\_REPORT events, as specified in clause 5.3.13 of 3GPP TS 29.214 [10].

If the SCEF receives a traffic plane notification (e.g. the usage threshold is reached or transmission resource lost) or gets informed that the Rx session is terminated (e.g. due to the release of PDN connection), the SCEF shall send an HTTP POST message including the notified event (e.g. session terminated) and the accumulated usage to the SCS/AS identified by the notification destination URI received during session set up. The SCS/AS shall respond with an HTTP response to confirm the received notification.

In order to remove an established AS session, the SCS/AS shall send an HTTP DELETE message to the SCEF targeting the associated "Individual Chargeable Party Transaction" resource. After receiving the HTTP DELETE message, the SCEF shall remove all properties of the resource and interact with the PCRF to terminate the Rx session (as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]). After receiving the response from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code and the accumulated usage (if received from the PCRF).

### 4.4.5 Procedures for Non-IP Data Delivery

#### 4.4.5.1 General

This procedure is used by an SCS/AS to support the Non-IP Data Delivery (NIDD) via SCEF. It performs the NIDD configuration via the T8 interface. It also includes the mobile terminated (MT) and mobile originated (MO) communication with UEs via the T8 interface. It also includes the group message delivery via MT NIDD via the T8 interface and management of port numbers on UE and SCEF and their dynamic association with different applications.

Error handling for the procedures in this clause shall be handled based on clause 5.2.6.

#### 4.4.5.2 NIDD Configuration

##### 4.4.5.2.1 NIDD Configuration for a single UE

For a NIDD configuration creation, the SCS/AS shall send an HTTP POST message to the SCEF for the "NIDD configurations" resource. The body of the HTTP POST message shall include External Identifier or MSISDN, SCS/AS Identifier, notification destination URI identifying the recipient of notification within the "notificationDestination" attribute and may include NIDD Duration, PDN Connection Establishment Option and Reliable Data Service Configuration. In addition, the SCS/AS may send non-IP data and its associated parameters (e.g. Priority) as described in clause 4.4.5.3.1 in the NIDD configuration creation request. The Reliable Data Service Configuration includes port numbers on UE and SCEF that are used to identify specific applications for data transfer between UE and SCS/AS and an indication if reliable data service acknowledgement is enabled or not.

Upon receipt of the HTTP POST request from the SCS/AS to create a NIDD configuration, the SCEF shall check whether the SCS/AS is authenticated and authorized to create NIDD configuration, and also authorize the NIDD configuration. If authorization is successful, the SCEF shall interact with the HSS via S6t as specified in 3GPP TS 29.336 [11]. Upon receipt of the successful response from the HSS, the SCEF shall store the UE identity (IMSI and External Identifier or MSISDN) which is associated with the External Identifier or MSISDN and create a resource "Individual NIDD configuration", which represents the NIDD configuration, addressed by a URI that contains the SCS/AS identity and an SCEF-created NIDD configuration identifier, and shall respond to the SCS/AS with a 201 Created message, including a Location header field containing the URI for the created resource. The body of the response message shall include Maximum Packet Size and may include Reliable Data Service Indication. When the SCS/AS receives the URI in the Location header, it shall use this URI in subsequent requests to the SCEF to refer to this NIDD configuration.

If the SCS/AS includes a downlink non-IP data together with the NIDD configuration creation, the SCEF shall also create the corresponding "Individual NIDD downlink data delivery" sub-resource(s) and send each of the sub- resource(s) within the "self" attribute in the "niddDownlinkDataTransfers" attribute together with the created resource "Individual NIDD configuration" which included in the Location header field in the HTTP POST response. When the SCS/AS receives the URI the "self" attribute in the "niddDownlinkDataTransfers" attribute, it shall use this URI in subsequent requests to the SCEF to refer to this downlink data delivery transfer.

After sending the HTTP response to NIDD configuration request, the SCEF shall perform the procedure for individual MT NIDD as described in clause 4.4.5.3.1.

NOTE: Any further interaction with the SCS/AS for the piggybacked individual MT NIDD is performed by the notification of NIDD downlink data delivery status.

For a NIDD configuration modification, the SCS/AS shall send an HTTP PATCH message to the SCEF for the "Individual NIDD configuration" resource, using the URI received in the response to the request that has created the NIDD configuration resource. Upon receipt of the HTTP PATCH request from the SCS/AS to update the parameters of the NIDD configuration, the SCEF shall check whether the SCS/AS is authenticated and authorized to update NIDD configuration. If the authorization is successful, the SCEF shall verify that the resource to be modified already exists as identified by the URI. If the NIDD configuration resource is found, the SCEF shall update the NIDD configuration as requested. Upon successful update of the requested NIDD configuration including the interaction with the HSS via S6t as specified in 3GPP TS 29.336 [11], the SCEF shall respond to the SCS/AS with a 200 OK success message indicating that the NIDD configuration resource was successfully updated, or with a 204 No Content success message if the NIDD configuration modification is successful updated with no content in the PATCH response message body.

For a NIDD configuration cancellation, the SCS/AS shall send an HTTP DELETE message to the SCEF for the "Individual NIDD configuration" resource, using the URI received in the response to the request that has created the NIDD configuration resource. Upon receipt of the HTTP DELETE message from the SCS/AS, the SCEF shall check whether the SCS/AS is authenticated and authorized to delete NIDD configuration. If the authorization is successful, the SCEF shall verify that the NIDD configuration resource identified by the URI already exists. If the configuration resource exists, the SCEF shall delete the requested configuration, and perform related NIDD procedure to EPC network elements if applicable. Upon successful deletion of requested NIDD configuration, the SCEF shall respond to the SCS/AS with a 200 OK success message indicating that the NIDD configuration was successfully cancelled. As an alternative to the 200 OK success message, the SCEF may send a 204 No Content success message without any message content to the SCS/AS.

When the NIDD Duration expires, the SCEF may remove the associated NIDD configuration resource and all individual downlink data delivery resources under such NIDD configuration.

##### 4.4.5.2.2 NIDD Configuration for a group of UEs

The NIDD configuration procedure for a single UE as described in clause 4.4.5.2.1 shall be applicable for a group of UEs with the following differences:

- The External Group Identifier shall be included in the POST request instead of MSISDN or External Identifier.

- After receiving the response message from the HSS, the SCEF shall store the list of UE identifiers (IMSI and External Identifier or MSISDN) which are associated with the External Group Identifier.

- The downlink non-IP data is not supported to be handled together with the NIDD configuration.

#### 4.4.5.3 Mobile Terminated NIDD procedure

##### 4.4.5.3.1 Mobile Terminated NIDD for a single UE

If the SCS/AS needs to perform a downlink non-IP data delivery for a single UE, the SCS/AS shall send an HTTP POST message to the SCEF for the "NIDD downlink data deliveries" resource, identifying an existing NIDD configuration resource as parent resource. The body of the HTTP POST message shall include External Identifier or MSISDN and non-IP data and may include PDN Connection Establishment Option, Reliable Data Service Configuration, Maximum Latency and Priority. The Reliable Data Service Configuration includes port numbers on UE and SCEF that are used to identify a specific application for data transfer between UE and SCS/AS and an indication if reliable data service acknowledgement is enabled or not.

Upon receipt of a HTTP POST request from the SCS/AS for a downlink data delivery for a single UE, the SCEF shall:

- verify the NIDD configuration resource already exists based on the URI passed, if the configuration resource does not exist, the SCEF shall respond with a 404 Not Found response to reject the downlink data delivery, and

- check whether the SCS/AS is authorised to send NIDD requests, if not authorized, the SCEF shall respond with a 401 Unauthorized response to reject the downlink data delivery, and

- check whether the non-IP packet size is larger than the Maximum Packet Size that was provided to the SCS/AS during NIDD Configuration. If the packet is oversized, the SCEF shall respond with a 403 Forbidden response with a cause value "DATA\_TOO\_LARGE" in the "cause" attribute of the "ProblemDetails" data structure indicating received non-IP packet size is larger than "maximumPacketSize" of the NIDD configuration.

- if the Rds\_port\_verification feature is supported, check whether the RDS port numbers are within the configured RDS port list. If the RDS port numbers are unknown in the SCEF, the SCEF shall respond with a 403 Forbidden response with a cause value "RDS\_PORT\_UNKNOWN" in the "cause" attribute of the "ProblemDetails" data structure.

If all above checks are successful, the SCEF shall determine the EPS Bearer Context based on the APN associated with the NIDD configuration and the User Identity. If the SCEF EPS bearer context is not found in the SCEF, depending on PDN Connection Establishment Option received in the POST request or from NIDD configuration, the SCEF may:

- reject the request with an error message to the SCS/AS;

- send a Device Trigger to the UE as described in clause 4.4.6 without buffering the non-IP data and respond the SCS/AS with a 500 Internal Server Error response and a cause value "TRIGGERED" in the "cause" attribute of the "ProblemDetails" data structure; or

- buffer the non-IP data and create the "Individual NIDD downlink data delivery" sub-resource, then send a 201 Created response to the SCS/AS. The response message also includes an indication of whether the Device Trigger procedure (as described in clause 4.4.6) was performed by the SCEF. A Location header shall be included in the response message that provides the URI of the resource identifying this individual downlink data delivery. The SCS/AS shall use the URI received in the Location header in subsequent requests to the SCEF to refer to this individual downlink data delivery for possible replacement or cancellation. The non-IP data shall be delivered when the non-IP PDN connection is established.

If the SCEF EPS bearer context is found in the SCEF, the SCEF shall check if the SCS/AS has exceeded the quota or rate of data submission considering the number of existing buffered non-IP data and restriction in APN and serving PLMN rate control. If quota is reached, the SCEF shall respond the SCS/AS with a 403 Forbidden response and a cause value "QUOTA\_EXCEEDED" in the "cause" attribute of the "ProblemDetails" data structure indicating the reason for the failure condition. If rate limit is reached, the SCEF shall respond the SCS/AS with a 429 Too Many Requests response.

If the check is passed, the SCEF shall continue the downlink non-IP data delivery procedure as the defined 3GPP TS 29.128 [12].

If the non-IP data delivery was successful, the SCEF shall send a 200 OK response to the HTTP POST request indicating the downlink non-IP data delivery is successful along with the acknowledge information; otherwise the SCEF may:

- send a 500 Internal Server Error response and a cause value indicating the reason for the delivery failure within the "cause" attribute of the "ProblemDetails" data structure, i.e.:

1. if delivery was unsuccessful due to timeout, the cause value "TIMEOUT"; or

2. if delivery to the next hop was unsuccessful with the cause value "NEXT\_HOP"; or

- if the MME/SGSN indicates UE is temporary not reachable, either:

1. buffer the non-IP data and create the "Individual NIDD downlink data delivery" sub-resource, then send a 201 Created response to the SCS/AS. The response may include a Requested Re-Transmission time to indicate the SCS/AS when the UE is expected to be reachable so that the SCEF re-transmits the buffered non-IP data; or

2. send a 500 Internal Server Error response without buffering the non-IP data, and include a cause value "TEMPORARILY\_NOT\_REACHABLE" in the "cause" attribute of the "ProblemDetails" data structure indicating the downlink non-IP data delivery is performedbut stopped since UE is temporarily unreachable. The response may include a Requested Re-Transmission time to indicate the SCS/AS when the UE is expected to be reachable so that the SCS/AS may prepare any re-transmission.

If the MT\_NIDD\_modification\_cancellation feature is supported and the SCS/AS decides to replace the pending downlink data delivery in the SCEF, the SCS/AS shall send an HTTP PUT message to the SCEF, using the URI received in the response to the request that has created the individual downlink data delivery resource. The External Identifier or MSISDN shall remain unchanged from previous values. Upon receipt of the HTTP PUT request from the SCS/AS, the SCEF shall check whether a pending non-IP data exists with the same URI (i.e. resource exists). If it is found, the SCEF shall replace it with the new non-IP data and continue waiting for any message from the MME/SGSN for the UE indicating either the non-IP PDN connection is being established or the UE is reachable (such message may be an MO NIDD); otherwise the SCEF shall respond with a 409 Conflict response with a cause value "SENDING" in the "cause" attribute of the "ProblemDetails" data structure indicating replacement failure. If the buffered data is already delivered, the SCEF shall respond with a 404 Not Found response and include a cause value "ALREADY\_DELIVERED" in the "cause" attribute of the "ProblemDetails" data structure indicating replacement failure. If delivery was unsuccessful due to timeout, the SCEF shall respond with a 500 Internal Server Error response with a cause value "TIMEOUT" in the "cause" attribute of the "ProblemDetails" data structure. If delivery to the next hop was unsuccessful, the SCEF shall respond with a 500 Internal Server Error response with a cause value "NEXT\_HOP" in the "cause" attribute of the "ProblemDetails" data structure.

If the "PatchUpdate" feature defined in clause 5.6.4 is supported and the SCS/AS decides to partially modify the pending downlink data delivery in the SCEF, the SCS/AS shall send an HTTP PATCH message to the SCEF to the URI received in the response to the request that has created the concerned individual downlink data delivery resource. The request body shall contain the NiddDownlinkDataTransferPatch data structure including only the attributes that shall be updated. Upon reception of this HTTP PATCH request from the SCS/AS, the SCEF shall check whether a pending non-IP data with the received URI exists (i.e. the resource exists). If it is found, the SCEF shall apply the requested modifications and continue waiting for any message from the MME/SGSN for the UE indicating either the non-IP PDN connection is being established or the UE is reachable (such message may be an MO NIDD); otherwise the SCEF shall respond with a "409 Conflict" status code including a cause value "SENDING" within the "cause" attribute of the "ProblemDetails" data structure to indicate modification failure. If the buffered data is already delivered, the SCEF shall respond with a "404 Not Found" status code including a cause value "ALREADY\_DELIVERED" within the "cause" attribute of the "ProblemDetails" data structure to indicate modification failure. If delivery was unsuccessful due to timeout, the SCEF shall respond with a 500 Internal Server Error status code with a cause value "TIMEOUT" in the "cause" attribute of the "ProblemDetails" data structure. If delivery to the next hop was unsuccessful, the SCEF shall respond with a 500 Internal Server Error status code with a cause value "NEXT\_HOP" in the "cause" attribute of the "ProblemDetails" data structure.

If the MT\_NIDD\_modification\_cancellation feature is supported and the SCS/AS decides to cancel the pending downlink data delivery in the SCEF, the SCS/AS shall send an HTTP DELETE message to the SCEF, using the URI received in the response to the request that has created the individual downlink data delivery resource. Upon receipt of the HTTP DELETE request from the SCS/AS, the SCEF shall check whether a pending request exists with the same URI. If such non-IP data has not been delivered, the SCEF shall remove the individual downlink data delivery resource and respond with an HTTP 204 No Content response; otherwise the SCEF shall respond with a 404 Not Found response (i.e. data already delivered) with a cause value "ALREADY\_DELIVERED" in the "cause" attribute of the "ProblemDetails" data structure or 409 Conflict (i.e. data delivery ongoing) response with a cause value "SENDING" in the "cause" attribute of the "ProblemDetails" data structure, and include a cause value indicating cancellation failure.

If a pending non-IP data is delivered by the SCEF (e.g. due to non-IP PDN connection establishment), and the SCEF gets the delivery result from the MME/SGSN, the SCEF shall remove the "Individual NIDD downlink data delivery" sub-resource and send an HTTP POST message to the SCS/AS, identified by the notification destination URI received during the NIDD configuration, to notify the delivery result for the pending non-IP data. Upon receipt of the request, the SCS/AS shall acknowledge the notification with an HTTP 200 OK or 204 No Content response.

During MT NIDD delivery, if the UE indicates no support for RDS and the SCEF previously indicated RDS is enabled to the SCS/AS, the SCEF shall stop sending the non-IP data and send MT NIDD delivery notification with "FAILURE\_RDS\_DISABLED" delivery status.

##### 4.4.5.3.2 Mobile Terminated NIDD for a group of UEs

If the SCS/AS needs to perform a downlink non-IP data delivery to a group of UEs and if both the SCS/AS and the SCEF support GroupMesageDelivery feature as defined inclause 5.6.4, the SCS/AS shall send an HTTP POST request message to the SCEF for the "NIDD downlink data deliveries" resource, identifying an existing NIDD configuration resource as parent resource. The body of the HTTP POST request message shall include the External Group Identifier and the non-IP data, and may include Reliable Data Service Configuration, PDN Connection Establishment Option and Maximum Latency.

Upon receipt of such an HTTP POST request from the SCS/AS requesting the group message delivery, the SCEF checks whether the SCS/AS is authorised to send NIDD requests, whether the non-IP packet size is larger than the Maximum Packet Size that was provided to the SCS/AS during NIDD Configuration and if the Rds\_port\_verification feature is supported whether the RDS port numbers are recognized. If any of those checks fails, the SCEF shall respond with a HTTP response with a cause value indicating the reason for the failure condition. If all checks are successful, the SCEF shall create an "Individual NIDD downlink data delivery" resource and sends a 201 Created response to the SCS/AS to acknowledge acceptance of the HTTP POST request.

Then for each authorized External Identifier associated to the External Group Identifier which is retrieved from the HSS during preceding NIDD configuration procedure (as specified in clause 4.4.5.2.2), the SCEF shall determine the EPS Bearer Context based on the APN associated with the NIDD configuration and the User Identity and continue the procedure as described for MT NIDD for a single UE in clause 4.4.5.3.1 without sending downlink data delivery status notification for any individual UE to the SCS/AS.

At the end of buffering (duration determined by the Maximum Latency or local policy) or after processing data delivery for all UEs in the group, the SCEF shall send an HTTP POST message to SCS/AS to indicate the aggregated result of data delivery of each UE. The body of the HTTP POST request message shall include MSISDN or External Identifier, Retransmission Time (optional) and delivery result for each UE. Upon receipt of the request, the SCS/AS shall acknowledge the request with an HTTP 200 OK or 204 No Content response.

The MT\_NIDD\_modification\_cancellation feature is not supported for the group message delivery via NIDD. If a PUT or DELETE request is received for the "Individual NIDD downlink data delivery" resource which was created for a group of UEs, the SCEF shall reject the message with a 403 Forbidden response with a cause value "OPERATION\_PROHIBITED" in the "cause" attribute of the "ProblemDetails" data structure.

During MT NIDD delivery, if the UE indicates no support for RDS and the SCEF previously indicated RDS is enabled to the SCS/AS, the SCEF shall stop sending the non-IP data for the indicated UE. In the aggregated MT NIDD delivery notification, the SCEF shall send "FAILURE\_RDS\_DISABLED" delivery status for each failed UE.

#### 4.4.5.4 Mobile Originated NIDD procedure

When the SCEF receives the non-IP data from MME/SGSN (or IWK-SCEF) as defined in 3GPP TS 29.128 [12], and finds an SCEF EPS bearer context and the associated NIDD configuration, the SCEF shall determine the SCS/AS by the corresponding NIDD configuration, and send an HTTP POST request to the SCS/AS identified by the Notification Destination Address received in the NIDD configuration to notify the uplink non-IP data. The body of the HTTP POST message shall include External Identifier or MSISDN, non-IP data, NIDD configuration identifier, Reliable Data Service Configuration (if available). The Reliable Data Service Configuration includes port numbers on UE and SCEF that are used to identify a specific application for data transfer between UE and SCS/AS and an indication if reliable data service acknowledgement is enabled or not.

Upon receipt of the request, if the SCS/AS knows the NIDD configuration identified by the NIDD configuration identifier, the SCS/AS shall acknowledge a 200 OK or 204 No Content message to the SCEF.

#### 4.4.5.5 NIDD Authorisation Update procedure

When the SCEF receives a NIDD Authorisation Update Request message from HSS to update a user's NIDD authorisation as defined in 3GPP TS 29.336 [11], the SCEF shall determine the SCS/AS with the corresponding NIDD Configuration, and send an HTTP POST message to the SCS/AS to notify it of the NIDD Authorisation Update. The body of the HTTP POST message shall include External Identifier or MSISDN, NIDD configuration identifier and the NIDD configuration status.

Upon receipt of the request, if the SCS/AS knows the corresponding NIDD configuration, then the SCS/AS shall acknowledge the request with an HTTP 200 OK or 204 No Content response.

If the NIDD configuration is revoked by the HSS within the received NIDD Authorisation Update Request, the SCEF shall release the corresponding T6a/b PDN connection as specified in 3GPP TS 29.128 [12]. In this case, the SCEF shall reject any subsequent MT NIDD deliveries with a 403 Forbidden response. Or 404 Not Found is returned, if the SCEF locally removed the associated NIDD configuration resource when the configuration was revoked.

If the RDS capability is changed, e.g. when the T6a/b PDN connection is established, the UE indicates no support for RDS but the SCEF previously indicated RDS is supported to the SCS/AS in the NIDD configuration procedure, the SCEF shall send an HTTP POST message to notify the SCS/AS that the NIDD status is active and RDS capability indication. The SCS/AS shall acknowledge the request with an HTTP 200 OK or 204 No Content response.

If the Rds\_port\_verification feature is supported, before sending the MO NIDD to the SCS/AS as specified in clause 4.4.5.4, the SCEF shall check RDS port numbers (decoded from the uplink non-IP data according to 3GPP TS 24.250 [31]). If the RDS port numbers are not within the configured RDS port list, the SCEF shall notify the SCS/AS with NIDD status set to "RDS\_PORT\_UNKNOWN" and the unknown RDS port numbers. The SCS/AS shall acknowledge the request with an HTTP 200 OK or 204 No Content response.

#### 4.4.5.6 Port Management Configuration

##### 4.4.5.6.1 Port Reservation and Release

As part of the Port Management configuration, operations to reserve a combination of port numbers, release a combination of port numbers, query the list of port numbers that are reserved and notification of reservation of a port number may be performed, if the Rds\_dynamic\_port feature is supported.

Indication of the supported serialization formats by the SCS/AS, query of the supported and configured serialization formats by the SCS/AS, and notification of the supported and configured serialization formats by the SCS/AS may be performed if the Rds\_serialization\_format feature is supported.

If the SCS/AS needs to reserve port numbers and associate them with an application, the SCS/AS shall send an HTTP PUT message to the SCEF, using the URI received in the response to the request that has created the NIDD configuration resource and the specific part of "/rds-ports/{portId}" as described in clause 5.6.3.9.2. The SCS/AS may use this operation to reserve port numbers on the UE and SCEF and associate them with an application. The SCS/AS may also use this operation to indicate the serialization formats that are supported by the SCS/AS on the port. Upon receipt of the HTTP PUT request from the SCS/AS,

- if the "skipUeInquiry" is set to "false" and if the "individual ManagePort Configuration" resource already exists in the same NIDD configuration, the SCEF shall respond with a 403 Forbidden response with a cause value "PORT\_NOT\_FREE" in the "cause" attribute of the "ProblemDetails" data structure; otherwise, the SCEF shall interact with the UE via the SGSN/MME to reserve the port and optionally configure the serialization format by using RDS protocol as specified in 3GPP TS 24.250 [31] and return a 202 Accept response to the SCS/AS if successful response is received from the SGSN/MME. Then if the SCEF receives successful UE response, the SCEF shall create the "individual ManagePort Configuration" resource and notify the SCS/AS with the reserved port and configured serialization format as specified in clause 4.4.5.6.2, the SCEF shall also mark the resource is created by the SCS/AS; otherwise, the SCEF shall notify the SCS/AS about the currently reserved ports as specified in clause 4.4.5.6.2.

- if the "skipUeInquiry" is set to "true" and if the requested SCEF port already exists in an NIDD configuration within the same APN, the SCEF shall respond with a 403 Forbidden response with a cause value "PORT\_NOT\_FREE" in the "cause" attribute of the "ProblemDetails" data structure; otherwise, the SCEF shall create the "individual ManagePort Configuration" resource and send an HTTP 201 Created response to the SCS/AS, the SCEF shall also mark the resource is created by the SCS/AS and notify the UE by using RDS protocol as specified in 3GPP TS 24.250 [31].

If the SCEF is not able to configure a serialization format for the port and if the Rds\_serialization\_format feature is supported, the SCEF shall respond with a 500 Internal Server Error response with a cause value "SERIALIZATION\_FORMAT\_NOT\_SUPPORTED" in the "cause" attribute of the "ProblemDetails" data structure.

If the SCS/AS needs to release port numbers associated with an application, the SCS/AS shall send an HTTP DELETE message to the SCEF, using the URI received in the response to the request that has created the "individual ManagePort Configuration" resource. Upon receipt of the HTTP DELETE request from the SCS/AS, if the "individual ManagePort Configuration" resource does not exist in the same NIDD configuration, the SCEF shall respond with a 404 Not Found response with a cause value "PORT\_NOT\_ASSOC\_WITH\_APP" in the "cause" attribute of the "ProblemDetails" data structure; otherwise if the "individual ManagePort Configuration" resource was created by the SCS/AS and

- if the "skipUeInquiry" is set to "false", the SCEF shall interact with the UE via the SGSN/MME to release the port by using RDS protocol as specified in 3GPP TS 24.250 [31] and return 202 Accept to the SCS/AS if successful response is received from the SGSN/MME. Then upon receipt of the UE response, the SCEF shall notify the SCS/AS with the currently reserved ports as specified in clause 4.4.5.6.2.

- if the "skipUeInquiry" is set to "true", the SCEF shall delete the individual ManagePort Configuration resource and respond with an HTTP 204 No Content response to the SCS/AS. The SCEF shall also notify the UE by using RDS protocol as specified in 3GPP TS 24.250 [31].

If the HTTP DELETE request is received for the "Individual ManagePort Configuration" resource which was created by the UE, the SCEF shall reject the message with a 403 Forbidden response with a cause value "OPERATION\_PROHIBITED" in the "cause" attribute of the "ProblemDetails" data structure.

If the "skipUeInquiry" is set to "false" and the SCEF is not able to interact with the UE because:

- PDN connection is not established, the SCEF shall reject the HTTP PUT/DELETE request with a 500 Internal Server Error response with a cause value "NO\_PDN\_CONNECTION";

- UE is not reachable, the SCEF shall reject the HTTP PUT/DELETE request with a 500 Internal Server Error response with a cause value "TEMPORARILY\_NOT\_REACHABLE". The response may include a Requested Re-Transmission time to indicate the SCS/AS when the UE is expected to be reachable so that the SCS/AS may prepare any re-configuration for the RDS port; or

- the interaction with the SGSN/MME is not successful, the SCEF shall reject the HTTP PUT/DELETE request with a 500 Internal Server Error and a proper cause value indicating the reason for the delivery failure.

If the SCS/AS needs to read the port numbers and serialization formats that are associated with an application, the SCS/AS shall send an HTTP GET message to the SCEF, using the URI received in the response to the request that has created the NIDD configuration resource and the specific part of "/rds-ports/{portId}" as described in clause 5.6.3.9.2.

##### 4.4.5.6.2 Port Notification

If the SCEF needs to send the information about reserved ports and their configuration to the SCS/AS (e.g. due to 3GPP network created or released "individual ManagePort Configuration" resource upon UE triggered RDS port management procedures as specified in 3GPP TS 24.250 [31]), the SCEF shall send an HTTP POST message to the SCS/AS, using the URI received within the "notificationDestination" attribute in the NiddConfiguration resource. The body of the message is encoded in JSON format with the data structure defined in table 5.6.2.1.9-1. The SCS/AS shall acknowledge the HTTP POST request with an HTTP 200 OK or 204 No Content response.

### 4.4.6 Procedures for Device Triggering

The procedures are used by the SCS/AS to deliver the device trigger via T8 interface.

In order to create a new device trigger, the SCS/AS shall send an HTTP POST message to the SCEF for the "Device Triggering Transactions" resource. The body of the HTTP POST message shall include the External Identifier or MSISDN, validity period, priority, Application Port ID and trigger payload.

Upon receipt of the corresponding HTTP POST message, the SCEF shall check if the SCS/AS is authorised to send a trigger request and if the SCS/AS has exceeded its quota or rate of trigger submission. The SCEF shall also resolve the External Identifier or MSISDN to IMSI and retrieve the "Routing Information" from HSS for the triggering delivery. If the authorisation check fails, or if the quota or rate of trigger submission was exceeded, or if there is no valid subscription information or if the "Routing Information" cannot be found, then the SCEF shall reject the request with an error message to the SCS/AS. Otherwise, the SCEF shall perform the device trigger procedure over Tsp as defined in 3GPP TS 29.368 [24] and T4 as defined in 3GPP TS 29.337 [25]. Upon completion of this procedure, the SCEF shall create a resource "Individual Device Triggering Transaction" which represents the triggering transaction, addressed by a URI that contains the SCS/AS identity and an SCEF-created transaction identifier, and shall respond to the SCS/AS with a 201 Created message, including the trigger and a Location header field containing the URI for the created resource. The SCS/AS shall use the URI received in the Location header in subsequent requests to the SCEF to refer to this device triggering transaction.

In order to replace an existing device trigger, the SCS/AS shall send an HTTP PUT message to the SCEF for the "Individual Device Triggering Transaction" resource, using the URI received in the response to the request that has created the device triggering transaction resource. The body of the HTTP PUT message shall include the DeviceTriggering data structure containing the requested updates. The properties "msisdn" or "externalId" shall remain unchanged from the previously provided value.

If the "PatchUpdate" feature defined in clause 5.7.4 is supported, in order to partially modify an existing Individual Device Triggering Transaction resource, the SCS/AS shall send an HTTP PATCH message to the SCEF targeting the concerned "Individual Device Triggering Transaction" resource, using the URI received in the response to the request that has created the concerned Individual Device Triggering Transaction resource. The body of the HTTP PATCH message shall include the DeviceTriggeringPatch data structure containing the requested modifications.

After receiving the corresponding HTTP PUT / HTTP PATCH message from the SCS/AS, the SCEF shall check if the SCS/AS is authorised to replace/modify an existing device trigger and if the SCS/AS has not exceeded its quota or rate of trigger submission. If any of these checks fail, then the SCEF shall reject the message with a corresponding failure code as described in clause 5.2.6. Otherwise, the SCEF shall replace the device triggering with the SMS-SC by performing the device trigger replace procedure over Tsp as defined in 3GPP TS 29.368 [24] and T4 as defined in 3GPP TS 29.337 [25]. Upon completion of this procedure, the SCEF shall send an HTTP response to the SCS/AS with a "200 OK"status code and include the result in the body of the HTTP response or a "204 No Content" status code to indicate a successful trigger replacement/modification; otherwise, the SCEF shall send a corresponding failure code as described in clause 5.2.6.

In order to recall an existing device trigger, the SCS/AS shall send an HTTP DELETE message to the SCEF for the "Individual Device Triggering Transaction" resource, using the URI received in the response to the request that has created the device triggering transaction resource.

After receiving the corresponding HTTP DELETE message from the SCS/AS, the SCEF shall check if the SCS/AS is authorised to send a recall trigger request and if the SCS/AS has not exceeded its quota or rate of trigger submission. The SCEF shall also check if the device triggering transaction resource referenced by the URI exists. If any of these checks fail, then the SCEF shall reject the message with an error. Otherwise, the SCEF shall recall the device triggering with the SMS-SC by performing the device trigger recall procedure over Tsp as defined in 3GPP TS 29.368 [24] and T4 as defined in 3GPP TS 29.337 [25]. Upon completion of this procedure, the SCEF shall send an HTTP response to the SCS/AS to indicate trigger recall success or failure.

When it receives the Message Delivery Report from the SMS/SC, the SCEF shall send an HTTP POST message to the SCS/AS to report the trigger delivery result. The body of the HTTP POST message shall include the identifier if the transaction and cause. The SCS/AS shall respond with an HTTP 200 OK or 204 No Content response.

### 4.4.7 Procedures for Group Message Delivery

#### 4.4.7.1 General

This procedure is used by an SCS/AS to deliver a payload to a group of UEs. Two methods of Group Message Delivery via the T8 are specified:

- Group Message Delivery via MBMS which is intended to efficiently distribute the same content to the members of a group that are located in a particular geographical area when MBMS is used. This method further includes two varieties:

- the MB2 interface (see stage 2 in 3GPP TS 23.468 [55] and stage 3 in 3GPP TS 29.468 [36]) is used as southbound interface;

- the xMB interface (see stage 2 in 3GPP TS 26.348 [56] and stage 3 in 3GPP TS 29.116 [37]) is used as southbound interface.

- Group Message Delivery via unicast MT NIDD for UEs which are part of the same External Group Identifier.

NOTE: Group Message Delivery via MT NIDD is defined in clause 4.4.5.3.2.

Error handling for the procedures in the subsequent clauses shall be handled based on clause 5.2.6.

#### 4.4.7.2 Group Message Delivery via MBMS

##### 4.4.7.2.1 General

This procedure is used by an SCS/AS to deliver a payload to a group of UEs via the T8 interface. The SCEF use the Group Message Delivery via MBMS to efficiently distribute the same content to the members of a group that are located in a particular geographical area when MBMS is used.

The procedure of Group message Delivery via MBMS and MB2 used as southbound interface is described in caluse 4.4.7.2.2 and the procedure of Group message Delivery via MBMS and xMB used as southbound interface is described in caluse 4.4.7.2.3.

##### 4.4.7.2.2 Group Message Delivery via MBMS by MB2

###### 4.4.7.2.2.1 TMGI Allocation

If the SCS/AS acts as a GCS AS in the application level and if there is no assigned TMGI for an External Group Identifier, the SCS/AS shall send an HTTP message to the SCEF to the resource "TMGI Allocation". The body of the HTTP POST request message shall include the External Group Identifier. The SCS/AS may also include the location information in the body.

Upon receipt of the HTTP POST request from the SCS/AS to allocate a TMGI, the SCEF shall check whether the SCS/AS is authorized to request TMGI allocation. If authorization is successful, the SCEF shall initiate TMGI allocation by the BM-SC as defined in clause 5.2.1 of 3GPP TS 29.468 [36]. Upon successful allocation of a TMGI, the SCEF shall create the resource which represents the TMGI allocation, addressed by a URI that contains the SCS identity and TMGI, and shall respond to the SCS/AS with a 201 Created message including the TMGI and the TMGI expiration time.

In order to renew the TMGI expiration time, the SCS/AS shall send an HTTP PUT or PATCH message to the SCEF to the resource "Individual TMGI Allocation". Upon receipt of the HTTP PUT or PATCH request from the SCS/AS to renew TMGI expiration time, the SCEF shall initiate TMGI expiration time renewal to the BM-SC as defined in clause 5.2.1 of 3GPP TS 29.468 [36]. Upon successful result, the SCEF shall update the resource and respond to the SCS/AS by sending an HTTP response with 200 OK including the new TMGI expiration time or 204 No Content if the required TMGI expiration time renewal is successful with no content in the HTTP PUT or PATCH response message body.

If the SCEF receives the response with an error code from the BM-SC for the allocation of TMGI or renewal of expiration time for the existing TMGI, the SCEF shall not create or update the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

Upon the TMGI expiration, the SCEF may delete the resource of the TMGI locally.

Upon receipt of the notification of TMGI expiration by the BM-SC as defined in clause 5.2.3 of 3GPP TS 29.468 [36], the SCEF shall delete the resource if not yet deleted.

###### 4.4.7.2.2.2 TMGI Deallocation

In order to deallocate the TMGI, the SCS/AS shall send an HTTP DELETE message to the SCEF to the resource "Individual TMGI Allocation". Upon receipt of the HTTP DELETE request from the SCS/AS to deallocate the TMGI, the SCEF shall initiate TMGI deallocation by the BM-SC as defined in clause 5.2.2 of 3GPP TS 29.468 [36]. Upon successful deallocation of a TMGI, the SCEF shall delete the resource "Individual TMGI Allocation" together with all sub-resouces "GMD via MBMS by MB2" if available,and shall respond to the SCS/AS by sending an HTTP response with 204 No Content.

###### 4.4.7.2.2.3 Creation of group message delivery

If the SCS/AS acts as a GCS AS in the application level and if the SCS/AS has an assigned TMGI for the External Group Identifier, in order to perform the group message delivery, the SCS/AS shall sends an HTTP POST request message to the SCEF to the resource "GMD via MBMS by MB2". The body of the HTTP POST request message shall include the External Group Identifier and notification destination URI identifying the recipient of notification within the "notificationDestination" attribute. The SCS/AS may also include the Group Message Payload, the location information and a Message Delivery Start Time in the body.

The SCS/AS may also send an HTTP POST message to the SCEF directly to the resource "TMGI Allocation" without previously requesting TMGI allocation as defined in clause 4.4.7.2.2. The SCEF shall create the resource "Individual TMGI Allocation" and perform the procedure as define in clause 4.4.7.2.2, and shall also create resource "GMD via MBMS by MB2" and perform the procedure as mentioned in this subcaluse for MBMS bearer creation.

Upon receipt of the HTTP POST request from the SCS/AS to deliver the group message, the SCEF shall check whether the SCS/AS is authorized to send a group message request. It also checks to see if the Message Delivery Start Time does not start after the TMGI expiration. If authorization is successful, the SCEF shall initiate the Active MBMS Bearer procedure as defined in clause 5.3.2 of 3GPP TS 29.468 [36] with the difference that the SCEF acts as a GCS AS. The SCEF shall include the location information based on the local configuration if the location information is not provided in the HTTP POST request message.

Upon successful activation of MBMS bearer, the SCEF shall create resource which represents "Individual GMD via MBMS by MB2", addressed by a URI that contains Transaction Id allocated by the SCEF and respond to the SCS/AS by sending an HTTP response with a 201 Created status code, including a Location header field containing the URI for the created resource. When the SCS/AS receives the URI in the Location header, it shall use this URI in subsequent requests to the SCEF to refer to this active MBMS bearer. If the Group Message Payload was not include in the HTTP POST above, the HTTP response sent from the SCEF shall also include the SCEF message delivery Ipv4 address or Ipv6 address and port number.

If the SCEF receives the response with an error code from the BM-SC for the activation of MBMS bearer, the SCEF shall not create the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

If the Group Message Payload was included the HTTP POST above, the SCEF shall deliver to BM-SC the Group Message Payload(s) as defined in 3GPP TS 29.468 [36] at Message Delivery Start Time.

If the Group Message Payload was not include in the HTTP POST above, the SCEF shall transfer the contents received from the SCS/AS to the BM-CS at or after the requested Group Message Start Time, but before the TMGI Expiration time. In this case, when the SCEF detects the group message delivery was triggered successful, the SCEF shall send an HTTP POST request message to the SCS/AS.

NOTE: If Group Message Payload was included, then at Message Delivery Start Time, the SCEF delivers to BM-SC the Group Message Payload(s) to corresponding to MB2-U IP address and port number associated with respective TMGI.

###### 4.4.7.2.2.4 Modification of previous submitted group message delivery

If the SCS/AS determines that modification of previous accepted Group Message Delivery Request is required, the SCS/AS shall send an HTTP PATCH or HTTP PUT request message to the SCEF to the resource "Individual GMD via MBMS by MB2". The body of the HTTP PATCH request message shall include the Message Delivery Start Time. The SCS/AS may also include the External Group Identifier, the Group Message Payload and the location information in the body. The body of the HTTP PUT request message shall include the information as the information provided in the HTTP POST in clause 4.4.7.2.2.2.3. The body of the HTTP PATCH request message shall include the information defined in the data type of GMDViaMBMSByMb2Patch as defined in clause 5.8.2.1.1.6.

Upon receipt of the HTTP PATCH or HTTP PUT request from the SCS/AS to modify the previous group message delivery subscription, the SCEF shall check whether the SCS/AS is authenticated and authorized to modify the submitted group message delivery. If the authorization is successful, the SCEF shall initiate the Modify MBMS Bearer procedure as defined in clause 5.3.4 of 3GPP TS 29.468 [36] with the difference that the SCEF acts as a GCS AS. The SCEF shall include the location information based on the local configuration if the location information is not provided in the HTTP PATCH or HTTP PUT request message.

Upon successful modification of MBMS bearer, the SCEF shall update the resource and respond to the SCS/AS with a 200 OK success message indicating that previous group message delivery subscription is successfully updated, or 204 No Content if the updates or replacement is successful with no content in the HTTP PATCH or HTTP PUT response message body.

If the SCEF receives the response with an error code from the BM-SC for the modification of MBMS bearer, the SCEF shall not update the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

###### 4.4.7.2.2.5 Cancellation of previous submitted group message delivery

If the SCS/AS determines that deletion of previous accepted Group Message Delivery Request is required, the SCS/AS shall send an HTTP DELETE request message to the SCEF.

Upon receipt of the HTTP DELETE request from the SCS/AS to delete the previous group message delivery, the SCEF shall check whether the SCS/AS is authenticated and authorized to delete an existing group message delivery subscription. If the authorization is successful, the SCEF shall initiate the Delete MBMS Bearer procedure as defined in clause 5.3.3 of 3GPP TS 29.468 [36] with the difference that the SCEF acts as a GCS AS.

Upon successful deletion of MBMS bearer, the SCEF shall respond to the SCS/AS with a 204 No Content message indicating that submitted group message delivery is successfully deleted.

##### 4.4.7.2.3 Group message Delivery via MBMS by xMB

###### 4.4.7.2.3.1 Service Creation

If the SCS/AS acts as a content provider in the application level and if there is no assigned Service ID for an External Group Identifier, the SCS/AS shall send an HTTP POST message to the SCEF to the resource "xMB Services". The body of the HTTP POST request message shall include the External Group Identifier.

Upon receipt of the HTTP POST request from the SCS/AS to create a service, the SCEF shall check whether the SCS/AS is authorized to request service creation. If authorization is successful, the SCEF shall initiate service creation by the BM-SC as defined in clause 5.2.1.2.2 of 3GPP TS 29.116 [37]. Upon successful service creation, the SCEF shall create the resource which represents the service creation, addressed by a URI that contains the SCS identity and Service Id, and shall respond to the SCS/AS with a 201 Created message which may include the service announcement information.

If the SCEF receives the response with an error status code from the BM-SC for the service creation, the SCEF shall not create or update the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

###### 4.4.7.2.3.2 Service Deletion

In order to delete the service, the SCS/AS shall send an HTTP DELETE message to the SCEF to the resource "Individual xMB Service". Upon receipt of the HTTP DELETE request from the SCS/AS to delete the service, the SCEF shall initiate service deletion by the BM-SC as defined in clause 5.2.1.2.4 of 3GPP TS 29.116 [37]. Upon successful deletion of a service, the SCEF shall delete the resource "Individual xMB Service" together with all sub-resouces "GMD via MBMS by xMB" if available, and shall respond to the SCS/AS by sending an HTTP response with 204 No Content.

###### 4.4.7.2.3.3 Creation of group message delivery

If the SCS/AS acts as a content provider in the application level, the SCS/AS may sends an HTTP POST request message to the SCEF to the resource "GMD via MBMS by xMB". The body of the HTTP POST request message shall include the External Group Identifier and notification destination URI identifying the recipient of notification within the "notificationDestination" attribute. The SCS/AS may also include the Group Message Payload, the location information, a Message Delivery Start Time and Message Delivery Stop Time in the body.

Upon receipt of the HTTP POST request from the SCS/AS to deliver the group message, the SCEF shall check whether the SCS/AS is authorized to send a group message request. It also checks to see if the Message Delivery Start Time doesn't start after the Message Delivery Stop Time. If authorization is successful, the SCEF shall initiate the Create Session procedure as defined in clause 4.4.5.2 of 3GPP TS 29.116 [37] and the Update Session procedure as defined in clause 4.4.5.3 of 3GPP TS 29.116 [37] with the difference that the SCEF acts as a Content Provider, Session Start is set accordiong to the Message Delivery Start Time and the Session Stop is set according to the Message Delivery Stop Time. The SCEF shall include the location information based on the local configuration if the location information is not provided and include the session type set to "Files" in the HTTP POST request message.

Upon successful activation of MBMS bearer, the SCEF shall create resource which represents "Individual GMD via MBMS by xMB ", addressed by a URI that contains Transaction Id allocated by the SCEF and respond to the SCS/AS by sending an HTTP response with a 201 Created status code, including a Location header field containing the URI for the created resource. When the SCS/AS receives the URI in the Location header, it shall use this URI in subsequent requests to the SCEF to refer to this active MBMS bearer. If the Group Message Payload was not included in the HTTP POST above, the HTTP response sent from the SCEF shall also include the SCEF message delivery Ipv4 address or Ipv6 address and port number.

If the SCEF receives the response with an error code from the BM-SC for the activation of MBMS bearer, the SCEF shall not create the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

If the Group Message Payload was included the HTTP POST above, the SCEF shall deliver to BM-SC the Group Message Payload(s) as defined in 3GPP TS 29.468 [36] at Message Delivery Start Time.

If the Group Message Payload was not included in the HTTP POST above, the SCEF shall transfer the contents received from the SCS/AS to the BM-CS at or after the requested Message Delivery Start Time, but before the Message Delivery Stop Time. In this case, when the SCEF detects the group message delivery was triggered successful, the SCEF shall send an HTTP POST request message to the SCS/AS.

###### 4.4.7.2.3.4 Modification of previous submitted group message delivery

If the SCS/AS determines that modification of previous accepted Group Message Delivery Request is required, the SCS/AS shall send an HTTP PATCH or HTTP PUT request message to the SCEF to the resource "Individual GMD via MBMS by xMB ". The body of the HTTP PATCH request message shall include the Message Delivery Start Time and Message Delivery Stop Time. The SCS/AS may also include the External Group Identifier, the Group Message Payload and the location information in the body. The body of the HTTP PUT request message shall include the information as the information provided in the HTTP POST in clause 4.4.7.2.3.3. The body of the HTTP PATCH request message shall include the information defined in the data type of GMDViaMBMSByxMBPatch as defined in clause 5.8.3.1.1.4.

Upon receipt of the HTTP PATCH or HTTP PUT request from the SCS/AS to modify the previous group message delivery subscription, the SCEF shall check whether the SCS/AS is authenticated and authorized to modify the submitted group message delivery. If the authorization is successful, the SCEF shall initiate the Update Session procedure as defined in clause 4.4.5.3 of 3GPP TS 29.116 [37] with the difference that the SCEF acts as a Content Provider, Session Start is set accordiong to the Message Delivery Start Time and the Session Stop is set according to the Message Delivery Stop Time. The SCEF shall include the location information based on the local configuration if the location information is not provided in the HTTP PATCH or HTTP PUT request message.

Upon successful modification of MBMS bearer, the SCEF shall respond to the SCS/AS with a 200 OK success message indicating that previous group message delivery subscription is successfully updated or with a 204 No Content success message if no content in the HTTP PUT or PATCH response message body.

If the SCEF receives the response with an error code from the BM-SC for the modification of MBMS bearer, the SCEF shall not update the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

###### 4.4.7.2.3.5 Cancellation of previous submitted group message delivery

If the SCS/AS determines that deletion of previous accepted Group Message Delivery Request is required, the SCS/AS shall send an HTTP DELETE request message to the SCEF.

Upon receipt of the HTTP DELETE request from the SCS/AS to delete the previous group message delivery, the SCEF shall check whether the SCS/AS is authenticated and authorized to delete an existing group message delivery subscription. If the authorization is successful, the SCEF shall initiate the Delete Session procedure as defined in clause 4.4.5.4 of 3GPP TS 29.116 [37] with the difference that the SCEF acts as a Content Provider.

Upon successful deletion of MBMS bearer, the SCEF shall respond to the SCS/AS with a 204 No Content message indicating that submitted group message delivery is successfully deleted.

### 4.4.8 Procedures for Reporting of Network Status

#### 4.4.8.1 General

These procedures are used by an SCS/AS to perform reporting of network status via the T8 interface in one time or continuous reporting cases. The SCEF uses the reporting procedures based on the network status information from one or more RCAF(s). These procedures can also be used by the SCS/AS to indicate the removal of a previously subscribed reporting request.

#### 4.4.8.2 Network Status Reporting Subscription

In order to create a new subscription to request for notifications on network status, the SCS/AS shall send an HTTP POST request message to the SCEF on the "Network Status Reporting Subscriptions" resource. The body of the HTTP POST request shall include a Notification destination address and Location area information, and may include the time duration and threshold(s).

Upon receiving the HTTP POST request message from the SCS/AS, the SCEF shall check:

- if the SCS/AS is authorized to perform the request. If not, the SCEF shall respond to the SCS/AS with an HTTP "401 Unauthorized" status code.

- if the SCS/AS has exceeded its quota of submitting requests. If so the SCEF shall respond to the SCS/AS with an HTTP "403 Forbidden" status code and may indicate the failure reason "QUOTA\_EXCEEDED" (i.e. the quota exceeded) within the "cause" attribute of the ProblemDetails data structure in the HTTP POST response.

- if the SCS/AS has exceeded its rate of submitting requests. If so the SCEF shall respond to the SCS/AS with an HTTP "429 Too Many Requests" status code in the HTTP POST response.

After the SCEF authorized the HTTP request message, the SCEF shall create an "Individual Network Status Reporting Subscription" resource which represents the subscription, addressed by a URI that contains the SCS/AS identity and an SCEF-created subscription identifier, and shall respond to the SCS/AS with an HTTP "201 Created" status code, including a Location header field containing the URI for the created resource, to acknowledge to the SCS/AS the successful subscription creation. The SCS/AS shall use the URI received in the Location header in subsequent requests to the SCEF to refer to this network status reporting subscription. Then, the SCEF shall trigger the network status reporting procedure with the RCAF over Ns interface as defined in 3GPP TS 29.153 [30].

In order to update an existing subscription of continuous network status reporting, the SCS/AS shall send an HTTP PUT request message to the SCEF on the "Individual Network Status Reporting Subscription" resource, using the URI received in the response to the request that has created the network status reporting subscription resource. After receiving the HTTP PUT request message, the SCEF shall send an HTTP PUT response to the SCS/AS with an HTTP "200 OK" status code including a representation of the updated "Individual Network Status Reporting Subscription" resource in the response body, or a "204 No Content" status code. Then, the SCEF shall apply the requested updatesand interact with the RCAF as defined in 3GPP TS 29.153 [30].

If the "PatchUpdate" feature defined in clause 5.9.4 is supported, in order to partially modify an existing subscription of continuous network status reporting, the SCS/AS shall send an HTTP PATCH request message to the SCEF on the "Individual Network Status Reporting Subscription" resource, using the URI received in the response to the request that has created the network status reporting subscription resource. The request body shall contain the NetStatusRepSubsPatch data structure including only the attributes that shall be updated. After receiving the HTTP PATCH request message, the SCEF shall send an HTTP response to the SCS/AS with an HTTP "200 OK" status code including a representation of the modified "Individual Network Status Reporting Subscription" resource in the response body, or a "204 No Content" status code. Then, the SCEF shall apply the requested changes and interact with the RCAF as defined in 3GPP TS 29.153 [30].

NOTE: In order to update an existing subscription, the SCEF needs to send a cancellation to the previously associated RCAF(s) to remove the related SCEF instructions and then send a new request with updated parameters.

In order to remove an existing subscription of continuous network status reporting, the SCS/AS shall send an HTTP DELETE request message to the SCEF on the "Individual Network Status Reporting Subscription" resource, using the URI received in the response to the request that has created the network status reporting subscription resource. Upon reception of the HTTP DELETE request message, the SCEF shall send an HTTP DELETE response to the SCS/AS with an HTTP "204 No Content" status code. Then, the SCEF shall interact with the RCAF to terminate the continuous reporting of network status as defined in 3GPP TS 29.153 [30].

#### 4.4.8.3 Network Status Reporting Notification

After receiving reports from all the involved RCAF(s) as defined in 3GPP TS 29.153 [30], the SCEF shall send an HTTP POST message to the SCS/AS using the identified destination URL, which is provided by the SCS/AS during the network status reporting subscription. The body of HTTP POST message shall include the NSI.

### 4.4.9 Procedures for Communication Pattern Parameters Provisioning

One or more set of CP parameters may be provisioned by the SCS/AS for a single UE or a group of UEs.

In order to create resources for one or more CP parameter set(s), the SCS/AS shall send an HTTP POST message to the SCEF for the "CP Provisioning Subscriptions" resource, including one or more new provisioned CP parameter set(s). The body of HTTP POST message shall include External Identifier or MSISDN for a single UE or External Group ID for a group of UEs, SCS/AS Identifier and one or more set of CP information associated with CP parameter set Id(s).

After receiving the HTTP POST message, the SCEF shall check if the SCS/AS is authorised. The SCEF may also check if the number of CP parameter sets(s) reaches the limitation based on operator policy or configuration.

After validation, the SCEF shall for each received CP parameter set Id, assign an SCEF Reference ID which may be derived from the CP parameter set Id, and send Update CP Parameter Request message to the HSS for delivering the CP parameter set(s) as specified in 3GPP TS 29.336 [11].

After receiving result from the HSS, if the result is successful, the SCEF shall create a resource "Individual CP Provisioning Subscription" and the corresponding sub-resources "Individual CP Set Provisioning" each represents a successfully provisioned CP parameter set indicated by the HSS and respond to the SCS/AS with a "201 Created" including Location header field containing the URI for the created subscription resource "Individual CP Provisioning Subscription" and the sub-resource(s) "Individual CP Set Provisioning" corresponding to each successful CP parameter set within the "self" attribute in the "cpParameterSet" attribute; otherwise, the SCEF shall not create any resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6. If not all CP parameters sets are provisioned successfully (i.e. the HSS indicates failure for some or all CP parameter sets and/or the SCEF does not accept the CP parameter provisioning (e.g. one or more CP Set Identifiers in the request are already present in existing subscriptions)), the SCEF shall also include CP report(s) within attribute "cpReports" with a list of failed CP Set Identifier(s) and the corresponding failure code as specified in table 5.10.2.3.5-1 in the body of the HTTP response.

In order to add new CP parameter set(s), update and/or remove the existing CP parameter set(s) for one or more CP parameter set Id(s), the SCS/AS may send an HTTP PUT message to the SCEF for the "Individual CP Provisioning Subscription" resource requesting to add new CP parameter set(s) by creating new resource(s), change some created properties (e.g. Validity Time) of the existing resource(s), and/or remove some or entire properties of the existing resource(s). After receiving the HTTP PUT message, the SCEF shall send the CP parameter changes to the HSS as specified in 3GPP TS 29.336 [11]. After receiving the response from the HSS with a successful code, if the HSS indicates all CP parameter sets or some CP parameter sets are provisioned successfully, the SCEF shall create or update the corresponding sub-resource(s) "Individual CP Set Provisioning" each represents a successfully provisioned CP parameter set indicated by the HSS and send an HTTP response to the SCS/AS with a "200 OK" status code and include a list of successful CP parameter set(s) in the body of the HTTP response, or a "204 No Content" status code. Otherwise, the SCEF shall not create or update the resource(s) and shall send an HTTP response to the SCS/AS with a corresponding failure code as described in clause 5.2.6. If not all CP parameters sets are provisioned successfully (i.e. the HSS indicates failure for some or all CP parameter sets and/or the SCEF does not accept the CP parameter provisioning (e.g. one or more CP Set Identifiers in the request are already present in existing subscriptions)), the SCEF shall also include CP report(s) within attribute "cpReports" with a list of failed CP Set Identifier(s) and the corresponding failure code as specified in table 5.10.2.3.5-1 in the body of the HTTP response.

The SCS/AS may send a HTTP PUT message to the SCEF for the "Individual CP Set Provisioning" resource requesting to replace an individual resource identified by the CP parameter set Id. The body of the HTTP PUT message shall include set of CP information. After receiving such request, the SCEF shall interact with the HSS as specified in 3GPP TS 29.336 [11]. After receiving the response from the HSS with a successful code, the SCEF shall update the resource and send an HTTP response to the SCS/AS with a "200 OK" status code or a "204 No Content" status code; otherwise, the SCEF shall not update the resource and shall send an HTTP response to the SCS/AS with a corresponding failure code as described in clause 5.2.6. If the provisioning of the CP set fails (i.e. the HSS returns failure for the CP set or the SCEF does not accept the CP set provisioning), the SCEF shall reject the request with a corresponding status code, and include the attribute "cpReports" with the corresponding failure code as specified in table 5.10.2.3.5-1 and the CP Set Identifier for which the provisioning has failed.

The SCS/AS may send an HTTP DELETE message to the SCEF requesting to delete an individual CP set resource "Individual CP Set Provisioning". After receiving such request, the SCEF shall determine the SCEF Reference ID for Deletion associated with the CP parameter set Id, and interact with the HSS as specified in 3GPP TS 29.336 [11]. After receiving the response from the HSS, the SCEF shall delete the addressed resource and send an HTTP response to the SCS/AS with a "204 No Content" status code.

The SCS/AS may send an HTTP DELETE message to the SCEF requesting to delete an individual subscription resource "Individual CP Provisioning Subscription". After receiving such request, the SCEF shall determine the SCEF Reference ID (s) for Deletion associated with the CP parameter set Id(s) and interact with the HSS as specified in 3GPP TS 29.336 [11]. After receiving the response from the HSS, the SCEF shall delete the addressed resource and its sub-resources addressed by "Individual CP Set Provisioning" and send an HTTP response to the SCS/AS with a "204 No Content" status code.

### 4.4.10 Procedures for PFD Management

The PFDs associated with application identifier(s) may be created, updated or removed by the third party SCS/AS as defined in 3GPP TS 23.682 [2].

In order to create PFDs resources for one or more external Application Identifier(s), the SCS/AS shall send an HTTP POST message to the request URI of the resource "PFD Management Transactions" including one or more set of PFDs for external Application Identifier(s). The body of the HTTP POST message shall include external Application Identifier(s) and PFDs associated with its PFD Identifier(s), an Allowed Delay may be included for the external Application Identifier(s) as well.

After receiving the HTTP POST message, if the SCS/AS is authorized, the SCEF shall provision the PFDs to the PFDF as defined in 3GPP TS 29.250 [26]. When receiving the response from the PFDF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code. If one or more external application identifiers are provisioned successfully, the SCEF shall create an "Individual PFD Management Transaction" resource for the request and he corresponding sub-resources "Individual Application PFD Management" each represents a successfully provisioned external application identifier. The SCEF shall respond to the SCS/AS with a 201 Created including Location header field containing the URI for the created transaction resource "Individual PFD Management Transaction" and the sub-resource(s) "Individual Application PFD Management" corresponding to each external application identifier within the "self" attribute in the "PfdData" data type, the SCEF shall also include PFD report(s) with a list of external Application Identifier(s) and result(s) in the body of the HTTP response if some application(s) are not provisioned successfully (i.e. the PFDF returns failure and/or the SCEF does not accept the PFD provisioning (e.g. one or more external Application Identifiers in the request are already present in existing transactions)).

In order to update the PFDs for an existing individual transaction, the SCS/AS shall send an HTTP PUT message to URI of the resource "Individual PFD Management Transaction" including one or more set of PFDs for external Application Identifier(s). After receiving the HTTP PUT message, the SCEF shall make the change and send the change to the PFDF (i.e. add/update/remove PFDs) as defined in 3GPP TS 29.250 [26]. After receiving the response from the PFDF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code. The SCEF shall create or update the corresponding sub-resource(s) "Individual Application PFD Management" each represents a successfully provisioned external application identifier, and also include PFD report(s) with a list of external Application Identifier(s) and result(s) in the body of the HTTP response if some application(s) are not provisioned successfully (i.e. the PFDF returns failure and/or the SCEF does not accept the PFD provisioning (e.g. one or more external Application Identifiers in the request are already present in existing transactions)).

NOTE 1: When the PUT for "Individual PFD Management Transaction" is received in the SCEF, SCEF can use partial update or full update towards the PFDF.

If the "PatchUpdate" feature defined in clause 5.11.4 is supported, in order to partially modify an existing PFD Management Transaction, the SCS/AS shall send an HTTP PATCH request message to the SCEF on the "Individual PFD Management Transaction" resource, using the URI received in the response to the request that has created the concerned PFD Management Transaction resource. The request body shall contain the PfdManagementPatch data structure including only the attributes that shall be updated. After receiving the HTTP PATCH request, the SCEF shall apply the requested modifications and interact with the concerned PFDF to add/update/remove PFD(s) as defined in 3GPP TS 29.250 [26]. After receiving the response of the PFDF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code. The SCEF shall then create or update the corresponding "Individual Application PFD Management" sub-resource(s), with each represents a successfully provisioned external application identifier. If some application(s) are not provisioned successfully (i.e. the PFDF returns a failure and/or the SCEF does not accept the PFD provisioning (e.g. one or more external Application Identifiers in the request are already present in existing transactions)), the SCEF shall also include PFD report(s) containing a list of external Application Identifier(s) and result(s) in the body of the HTTP response.

In order to remove the PFDs for an existing individual transaction, the SCS/AS shall send an HTTP DELETE message to the URI of the resource "Individual PFD Management Transaction". After receiving such request, the SCEF shall delete the "Individual PFD Management Transaction" resource and its "Individual Application PFD Management" sub-resouce(s), and shall interact with the PFDF as defined in 3GPP TS 29.250 [26]. After receiving the response from the PFDF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code.

For the POST message to the resource "PFD Management Transactions" or the PUT message to the resource "Individual PFD Management Transaction", if the provisioning of all application(s) fails (i.e. the PFDF returns failure and/or the SCEF does not accept the PFD provisioning), the SCEF shall respond with 500 Internal Server Error status code, and include the attribute "pfdReports" with the corresponding failure reason as specified in table 5.11.2.2.3-1 and the external Application Identifier(s) for which the provisioning has failed.

In order to update the PFDs for an existing external Application Identifier, the SCS/AS shall send an HTTP PUT message to the resource "Individual Application PFD Management" to update the full set of PFDs of an existing resource. After receiving the HTTP PUT message, the SCEF shall make the change and send the change to the PFDF (i.e. add/update/remove PFDs) as defined in 3GPP TS 29.250 [26]. After receiving the response from the PFDF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code.

NOTE 2: When the PUT for "Individual Application PFD Management" is received in the SCEF, SCEF can use partial update or full update towards the PFDF.

In order to update the PFDs for an existing external Application Identifier, the SCS/AS may also send an HTTP PATCH message to URI of the resource "Individual Application PFD Management" to partially update PFDs. After receiving the HTTP PATCH message, the SCEF shall make the change and send the change to the PFDF (i.e. add/update/remove PFDs) as defined in 3GPP TS 29.250 [26]. After receiving the response from the PFDF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code.

In order to remove the PFDs for an existing individual application, the SCS/AS shall send an HTTP DELETE message to the resource "Individual Application PFD Management". After receiving such request, the SCEF shall delete the resource and interact with the PFDF as defined in 3GPP TS 29.250 [26]. After receiving the response from the PFDF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code.

For the PUT/PATCH message to the resource "Individual Application PFD Management", if the provisioning of the application fails (i.e. the PFDF returns failure or the SCEF does not accept the PFD provisioning), the SCEF shall reject the request with a corresponding status code, and include the attribute "pfdReports" with the corresponding failure code as specified in table 5.11.2.2.3-1 and the external Application Identifier for which the provisioning has failed.

If the SCEF receives PFD management notification including the PFD failure report from the PFDF (as defined in 3GPP TS 29.250 [26]) and if the feature PfdMgmtNotification is supported, the SCEF shall notify the SCS/AS with an HTTP POST message, identified by the notification destination URI received during the PFD provisioning, to notify the failure result for the PFD management by including the PfdReport data type in the body of the message. Within the PfdReport data type, the SCEF shall include the impacted application id(s) within the "externalAppIds" attribute, the "failureCode" attribute set to "PARTIAL\_FAILURE". In addition, if the SCEF receives the location area(s) of PCEF/TDF(s) which are unable to enforce the PFD(s) from the PFDF, the SCEF shall include the location area(s) within the "locationArea" attribute of the PFD report(s). After receiving the HTTP POST message, the SCS/AS shall send a HTTP response with "204 No Content" status code.

NOTE 3: How the SCS/AS reacts to the failed PFD provisioning is left to implementation.

NOTE 4: The SCEF maps the 3GPP network area(s) to the geographic area(s) or civic address(es) if the 3GPP network area(s) is not allowed to be exposed to the 3rd party according to the operator policy.

### 4.4.11 Procedures for Enhanced Coverage Restriction Control

The procedures are used by an SCS/AS to query the status of, or to configure the enhanced coverage restriction for a UE via the T8 interface as defined in 3GPP TS 23.682 [2].

In order to query the current status of enhanced coverage restriction, the SCS/AS shall send an HTTP POST message to the SCEF using the query custom operation as defined in clause 5.12.13.2. The body of the HTTP POST message shall include External Identifier or MSISDN.

In order to configure the enhanced coverage restriction, the SCS/AS shall send an HTTP POST message to the SCEF using the configure custom operation as defined in clause 5.12.13.3. The body of the HTTP POST message shall include External Identifier or MSISDN and the Enhanced Coverage Restriction setting (i.e. allowed-PLMN-List or restricted-PLMN-List).

Upon receiving the HTTP POST message from the SCS/AS, the SCEF shall check:

- if the SCS/AS is authorized to perform the request. If not the SCEF shall respond to the SCS/AS with a status code set to 401 Unauthorized.

- if the request is malformed. If it is malformed, the SCEF shall respond to the SCS/AS with a status code set to 400 Bad Request.

- if the SCS/AS has exceeded its quota of submitting requests. If so the SCEF shall respond to the SCS/AS with a status code set to 403 Forbidden and may indicate the failure reason "QUOTA\_EXCEEDED" (i.e. the quota exceeded) within the "cause" attribute of the "ProblemDetails" structure in the HTTP POST response.

- if the SCS/AS has exceeded its rate of submitting requests. If so the SCEF shall respond to the SCS/AS with a status code set to 429 Too Many Requests in the HTTP POST response.

The SCEF shall send a Configuration Information Request to the HSS to query or configure the setting of Enhanced Coverage Restriction as defined in 3GPP TS 29.336 [11].

Upon receipt of the response from the HSS, the SCEF shall send an HTTP response to the SCS/AS with a 200 OK message for query or configure custom operation and include the Enhanced Coverage Restriction Data from HSS into the HTTP response.

If the SCEF receives a response with an error code from the HSS, the SCEF shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

### 4.4.12 Procedures for Network Parameter Configuration

#### 4.4.12.1 General

The procedures are used by an SCS/AS to request that the network consider setting the suggested network parameter values which can influence certain aspects of UE/network behaviour. The procedures are applicable for an individual UE or a group of UEs.

In order to create a new network parameter configuration to configure suggested network parameters, the SCS/AS shall send an HTTP POST request message to the SCEF to the resource "NP Configurations". The body of the HTTP request message shall include External Identifier or MSISDN or External Group Identifier, SCS/AS Identifier, and may include Maximum Latency, Maximum Response Time and Suggested Number of Downlink Packets and Group Reporting Guard Time, wherein, the External Identifier or MSISDN indicates the configuration for an individual UE and the External Group Identifier indicates for a group of UEs. If the External Group Identifier is included, the SCS/AS shall provide the Notification Destination Address in the request.

NOTE: The Notification Delivery as described in clause 5.2.5 is not supported for individual UE configuration case.

In order to update an existing Network Parameter Configuration, the SCS/AS may send an HTTP PUT message to the resource "Individual NP Configuration" requesting the SCEF to replace all properties in the existing resource.

The SCS/AS may also use an HTTP PATCH message to request to change some properties in the existing resource.

Upon receipt of the HTTP POST, PUT or PATCH message, if the SCS/AS is authorized to perform the request, the SCEF shall check whether the Maximum Latency, Maximum Response Time and/or Suggested Number of Downlink Packets in the HTTP request body are within the range defined by operator policies, if one or more of these parameters are not within the range, the SCEF shall:

- either reject the request message by sending an HTTP response to the SCS/AS with a status code set to "403 Forbidden" , in which it may indicate the "PARAMETER\_OUT\_OF\_RANGE" application error in the "cause" attribute of the "ProblemDetails" data structure and it may also indicate which parameters are out of the range in the "invalidParams" attribute of the "ProblemDetails" structure in the response body; or

- modify the parameters which are not within the range by selecting different values which are in the range.

After validation, the SCEF shall perform the Network Parameter Configuration as described in clause 4.4.12.2 for an individual UE or in clause 4.4.12.3 for a group of UEs.

In order to delete an existing Network Parameter Configuration at the SCEF, the SCS/AS shall send an HTTP DELETE message to the corresponding resource "Individual NP Configuration" at the SCEF. The SCEF shall determine the SCEF Reference ID for deletion and interact with the HSS via S6t as defined in 3GPP TS 29.336 [11]. Upon receipt of the response from the HSS, the SCEF shall delete active resource "Individual NP Configuration" addressed by the URI and send an HTTP response to the SCS/AS with a "204 No Content" status code.

#### 4.4.12.2 Configuration Request for an individual UE

If the configuration request from the SCS/AS is for an individual UE, the SCEF shall send the Configuration Information Request command to the HSS via S6t as defined in 3GPP TS 29.336 [11].

Upon receipt of the response from the HSS, the SCEF shall,

- for the HTTP POST message, create a new resource "Individual NP Configuration" addressed by a URI that contains the SCS/AS identifier and an SCEF-created configuration identifier, and send an HTTP POST response to the SCS/AS with "201 Created" status code, the final suggested configuration parameter(s) (if modified), the indication(s) for the discarded parameter(s) (if discarded), and a location header field containing the URI for the created resource.

- for the HTTP PUT or PATCH message, update the active resource "Individual NP Configuration", and send an HTTP response to the SCS/AS with "200 OK" status code, the final suggested network parameter(s) (if modified), the indication(s) for the discarded parameter(s) (if discarded), or a "204 No Content" status code.

If the SCEF receives a response with an error code from the HSS, the SCEF shall not create or update the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

#### 4.4.12.3 Configuration Request for a group of UEs

If the configuration request from the SCS/AS is for a group of UEs, the SCS/AS shall provide the Notification Destination Address, the SCEF shall send the Configuration Information Request command to the HSS via S6t as defined in 3GPP TS 29.336 [11].

Upon receipt of the successful response indicating that group processing is in progress from the HSS before beginning the processing of individual UEs, the SCEF shall,

- for the HTTP POST message, create a resource "Individual NP Configuration" addressed by a URI that contains the SCS/AS identity and an SCEF-created configuration identifier. The SCEF shall send an HTTP POST response to the SCS/AS including a location header field containing the URI for the created resource and a "201 Created" status code to acknowledge the SCS/AS of the successful group processing request.

- for the HTTP PUT or PATCH message, update the resource "Individual NP Configuration" addressed by the requested URL, and shall send "200 OK" status code or a "204 No Content" status code to acknowledge the SCS/AS of the successful group processing request in the HTTP response message.

If the SCEF receives a response with an error code from the HSS, the SCEF shall not create or update the resource and shall respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

Upon receipt of the processing result of the individual UEs from the HSS, the SCEF shall send an HTTP POST request message with a reference to the related network parameter configuration and a list of processing result for the group members to the SCS/AS.

The SCS/AS shall send an HTTP response to acknowledge the SCEF about the handling result of the received request.

#### 4.4.12.4 Notification of applied parameter configuration

If the Enhanced\_param\_config feature is supported and the SCEF receives currently applied parameter configuration from the HSS, the SCEF shall notify the SCS/AS by the HTTP POST message including the parameter changes in the "appliedParam" attribute.

### 4.4.13 Procedures for setting up an AS session with required QoS

This procedure is used to set up an AS session with required QoS for the service as defined in 3GPP TS 23.682 [2].

For initial AS session creation, the SCS/AS shall send an HTTP POST message to the SCEF for the "AS Session with Required QoS Subscriptions" resource. The body of HTTP POST message shall include SCS/AS Identifier, UE IP address, IP Flow description, QoS reference and notification destination address. And it may also include time period and/or traffic volume for sponsored data connectivity purpose. If the feature AppId is supported, either the Flow description or an external Application Identifier shall be included.

After receiving the HTTP POST message, the SCEF shall authorize the request and may check if the total number of requested QoS reference has exceeded the limit for the SCS/AS. If the authorization is successful, the SCEF shall map the SCS/AS Identifier to AF Application Identifier if the external Application Identifier is not provided and only one AF Application Identifier is mapped, and if required, map the SCS/AS Identifier to ASP Identity and Sponsor Identity.

NOTE 1: Before the QoS reference is mapped to Rx parameters, the SCEF can perform a mapping from the name space of the 3rd party SCS/AS to the name space of the operator.

NOTE 2: The QoS reference referring to pre-defined QoS information in the SCEF can be mapped to media component descriptions (e.g. bandwidth, media type) according to SLA.

If the authorization performed by the SCEF is successful, then the SCEF shall act as an AF to interact with the PCRF via the Rx interface as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13] and trigger a PCRF initiated IP-CAN Session Modification. Based on local configuration, the SCEF may also request to be notified about the transmission resource status, i.e. INDICATION\_OF\_SUCCESSFUL\_RESOURCES\_ALLOCATION, INDICATION\_OF\_RELEASE\_OF\_BEARER, INDICATION\_OF\_FAILED\_RESOURCES\_ALLOCATION, and optionally INDICATION\_OF\_LOSS\_OF\_BEARER and INDICATION\_OF\_RECOVERY\_OF\_BEARER. If the time period and/or traffic volume are received from the AF, the SCEF should subscribe to the PCRF on the USAGE\_REPORT event.

If the "enNB" feature is supported, the SCEF may explicitly receive a list of user plane event(s) that the SCS/AS requests to subscribe to. The SCEF shall subscribe to the corresponding PCRF event(s) (e.g. INDICATION\_OF\_SUCCESSFUL\_RESOURCE\_ALLOCATION) for the received event(s) (e.g. SUCCESSFUL\_RESOURCES\_ALLOCATION), except for the SESSION\_TERMINATION event.

NOTE 3: The PCRF does not need explicit subscription in order to notify Rx session termination.

The SCEF, after receiving the AAA message or HTTP 201 Created message over the Rx interface from the PCRF with successful result code, shall create a resource "Individual AS Session with Required QoS Subscription" which represents AS session, addressed by a URI that contains the SCS/AS identity and an SCEF-created AS session identifier, and shall respond to the SCS/AS with a 201 Created message, including the result in the body of the HTTP response and a Location header field containing the URI for the created resource. The SCS/AS shall use the URI received in the Location header in subsequent requests to the SCEF to refer to this AS session. Otherwise, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code and include the result in the body of the HTTP response. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not create the resource and respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

In order to update the established AS session, the SCS/AS may send an HTTP PUT message to the SCEF for the "Individual AS Session with Required QoS Subscription" resource requesting to replace all properties (e.g. new usage threshold, Flow Description or external Application Identifier) in the existing resource, addressed by the URI received in the response to the request that has created the resource. The UE IP or MAC address shall remain unchanged from previously provided values. After receiving such message, the SCEF shall make the change (e.g. if the usage threshold within the "usageThreshold" attribute is included in the HTTP PUT request and the accumulated usage report for the previously provided usage threshold is not received yet, the SCEF shall completely replace the previously provided one), and interact with the PCRF to modify the Rx session (as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]). After receiving the response with successful result code from the PCRF, the SCEF shall replace all properties of the existing resource, send an HTTP response to the SCS/AS with a "200 OK"status code, and include the result in the body of the HTTP response or a "204 No Content" status code. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not update the resource and respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

The SCS/AS may also send an HTTP PATCH message to the SCEF for the "Individual AS Session with Required QoS Subscription" resource requesting to change some created properties (e.g. new usage threshold, Flow Description or external Application Identifier, updated list of user plane event(s) if the "enNB" feature is supported). After receiving the HTTP PATCH message, the SCEF shall make the change (e.g. if the usage threshold within the "usageThreshold" attribute is included in the HTTP PATCH request and the accumulated usage report for the previously provided usage threshold is not received yet, the SCEF shall completely replace the previously provided one), and interact with the PCRF to modify the Rx session (as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]). After receiving the response from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a "200 OK"status code and include the result in the body of the HTTP response, or a "204 No Content" status code.

NOTE 4: The SCS/AS can assume a successful resource allocation upon receipt of the POST/PUT/PATCH response, until the FAILED\_RESOURCES\_ALLOCATION event is received.

NOTE 5: The SCS/AS can update the list of user plane event(s) only for one time specific events, i.e. INDICATION\_OF\_SUCCESSFUL\_RESOURCES\_ALLOCATION, INDICATION\_OF\_FAILED\_RESOURCES\_ALLOCATION and USAGE\_REPORT events, as specified in clause 5.3.13 of 3GPP TS 29.214 [10].

If the SCEF receives a traffic plane notification (e.g. the usage threshold is reached or transmission resource lost), or if the SCEF gets informed that the Rx session is terminated (e.g. due to a release of PDN connection), the SCEF shall send an HTTP POST message including the notified event (e.g. session terminated) and the accumulated usage (if received from the PCRF) to the callback URI "notificationUri" provided by the SCS/AS during the creation of individual AS Session with Required QoS Subscription. The SCS/AS shall respond with an HTTP response to confirm the received notification.

In order to remove the established AS session, the SCS/AS shall send an HTTP DELETE message to the SCEF for the "Individual AS Session with Required QoS Subscription" resource. After receiving the HTTP DELETE message, the SCEF shall remove all properties and interact with the PCRF to terminate the Rx session (as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]). After receiving the response from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code and include the accumulated usage (if received from the PCRF).

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

#### 4.4.14.1 General

The procedures are used by the SCEF to send the MSISDN-less MO-SMS to the SCS/AS via T8 interface.

#### 4.4.14.2 Delivery of MSISDN-less MO SMS

If the SCEF receives an MSISDN-less MO-SMS via T4 including an destination SME address (long/short code of the SCS/AS), the SCEF will use the IMSI of the UE and application port ID received over T4 to query the HSS/HLR for an external ID, and the SCEF shall then determine the notification destination URL of an SCS/AS based on configured information on the mapping of SME addresses to destination URLs. The SCEF shall send to the determined destination URL an HTTP POST request that shall include an MsisdnLessMoSmsNotification data type with:

- the short message transfer protocol data unit as received on the T4 interface.

- the Application Port as received on the T4 interface, and

- the external identifier of the UE that send the SMS, as received from the HSS/HLR.

NOTE: The Notification Delivery using Websocket (see clause 5.2.5.4) and the Notification Test Event (see clause 5.2.5.3) are not supported for the present API.

### 4.4.15 Procedures for RACS Parameter Provisioning

The procedures are used by an SCS/AS to request that the network to provision manufacturer specific UE radio capability information.

In order to create a new parameter provisioning, the SCS/AS shall send an HTTP POST request message to the SCEF to the resource "RACS Parameter Provisionings". The body of the HTTP POST request message shall include a list of RACS IDs, and for each provided RACS ID, its radio capability parameters and the related UE model(s) IMEI-TAC value(s).

In order to fully replace an existing RACS Parameter Provisioning, the SCS/AS may send an HTTP PUT message to the resource "Individual RACS Parameter Provisioning" requesting the SCEF to change all properties in the existing resource. The body of the HTTP PUT request message shall include a list of RACS IDs, and for each provided RACS ID, its radio capability parameters and the related UE model(s) IMEI-TAC value(s).

In order to partial update an existing RACS Parameter Provisioning, the SCS/AS may send an HTTP PATCH message to the resource "Individual RACS Parameter Provisioning" requesting the SCEF to change some properties in the existing resource.

Upon receipt of the HTTP POST, PUT or PATCH message, if the SCS/AS is authorized to perform the request, the SCEF shall interact with the UCMF as described in 3GPP TS 29.675 [61]. After receiving the response from the UCMF, if at least one RACS ID is succesfully provisioned, the SCEF shall create or update the resource "Individual RACS Parameter Provisioning" and respond with 201 Created or 200 OK to the SCS/AS respectively with the successfully provisioned RACS information or 204 No Content if the updates or replacement is successful with no content in the PATCH or PUT response message body, the SCEF may include RACS report(s) within attribute "racsReports" with a list of RACS ID(s) and the corresponding failure code for which the provisioning has failed as specified in table 5.16.2.2.3-1 in the body of the HTTP response. Otherwise, the SCEF shall send an HTTP response to the SCS/AS with a corresponding failure code as described in clause 5.16.5. If all the RACS IDs failed to be provisioned succeessfully, the SCEF may send a "500 Internal Server Error" HTTP response and may include in the response body failure reports as specified in clause 5.16.3.

In order to delete an existing RACS Parameter Provisioning at the SCEF, the SCS/AS shall send an HTTP DELETE message to the corresponding resource "Individual RACS Parameter Provisioning" at the SCEF. Upon receipt of the DELETE request message, the SCEF shall interact with the UCMF as described in 3GPP TS 29.675 [61]. After receiving the response from the UCMF, the SCEF shall remove the resource and respond with 204 No Content to the SCS/AS.

# 5 T8 APIs

## 5.1 Introduction

The T8 APIs are a set of APIs defining the related procedures and resources for the interaction between the SCEF and the SCS/AS.

Tables 5.1-1 summarizes the APIs defined in this specification.

Table 5.1-1: API Descriptions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Service Name | Clause defined | Description | OpenAPI Specification File | API Name | Annex |
| MonitoringEvent | 5.3 | Event Monitoring API | TS29122\_MonitoringEvent.yaml | 3gpp-monitoring-event | A.3 |
| ResourceManagementOfBdt | 5.4 | Resource Management of Background Data Transfer (BDT) API | TS29122\_ResourceManagementOfBdt.yaml | 3gpp-bdt | A.4 |
| ChargeableParty | 5.5 | Chargeable Party API | TS29122\_ChargeableParty.yaml | 3gpp-chargeable-party | A.5 |
| NIDD | 5.6 | Non-IP Data Delivery (NIDD) API | TS29122\_NIDD.yaml | 3gpp-nidd | A.6 |
| DeviceTriggering | 5.7 | Device Triggering API | TS29122\_DeviceTriggering.yaml | 3gpp-device-triggering | A.7 |
| GMDviaMBMSbyMB2 | 5.8.2 | Group Message Delivery via MBMS by MB2 API | TS29122\_GMDviaMBMSbyMB2.yaml | 3gpp-group-message-delivery-mb2 | A.8.1 |
| GMDviaMBMSbyxMB | 5.8.3 | Group Message Delivery via MBMS by xMB | TS29122\_GMDviaMBMSbyxMB.yaml | 3gpp-group-message-delivery-xmb | A.8.2 |
| ReportingNetworkStatus | 5.9 | Network Status Reporting API | TS29122\_ReportingNetworkStatus.yaml | 3gpp-network-status-reporting | A.9 |
| CpProvisioning | 5.10 | Communication Patterns (CP) Parameters Provisioning API | TS29122\_CpProvisioning.yaml | 3gpp-cp-parameter-provisioning | A.10 |
| PfdManagement | 5.11 | Packet Flow Description (PFD) Management API | TS29122\_PfdManagement.yaml | 3gpp-pfd-management | A.11 |
| ECRControl | 5.12 | Enhanced Coverage Restriction Control API | TS29122\_ECRControl.yaml | 3gpp-ecr-control | A.12 |
| NpConfiguration | 5.13 | Network Parameter Configuration API | TS29122\_NpConfiguration.yaml | 3gpp-network-parameter-configuration | A.13 |
| AsSessionWithQoS | 5.14 | Application Server (AS) Session with QoS API | TS29122\_AsSessionWithQoS.yaml | 3gpp-as-session-with-qos | A.14 |
| MsisdnLessMoSms | 5.15 | MSISDN-less Mobile-Originated SMS API | TS29122\_MsisdnLessMoSms.yaml | 3gpp-msisdn-less-mo-sms | A.15 |
| RacsParameterProvisioning | 5.16 | RACS (Radio Capability Signaling) Parameter Provisioning API | TS29122\_RacsParameterProvisioning.yaml | 3gpp-racs-parameter-provisioning | A.16 |

## 5.2 Information applicable to several APIs

### 5.2.1 Data Types

#### 5.2.1.1 Introduction

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 [27] can also be referenced from data structures defined in the subsequent clauses.

NOTE: As a convention, data types in the present specification are written with an upper-case letter in the beginning. Parameters are written with a lower-case letter in the beginning. As an exception, data types that are also defined in OpenAPI Specification [27] can use a lower-case case letter in the beginning for consistency.

Table 5.2.1.1-1 lists these common data types.

Table 5.2.1.1-1: Common Data Types applicable to several T8 APIs

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| AccumulatedUsage | 5.2.1.2.7 | Represents an accumulated usage. |  |
| Acknowledgement | 5.2.1.2.4 | Represents a successful acknowledgement of a notification. |  |
| Bandwidth | 5.2.1.3.2 | Represents an integer indicating a bandwidth in bits per second. |  |
| BdtReferenceId | 5.2.1.3.2 | Represents a BDT Reference ID. |  |
| Binary | 5.2.1.3.2 | String with format "binary" as defined in the OpenAPI Specification. |  |
| Bytes | 5.2.1.3.2 | String with format "byte" as defined in the OpenAPI Specification. |  |
| ConfigResult | 5.2.1.2.15 | Represents one configuration processing result for a group's members. |  |
| DateTime | 5.2.1.3.2 | String with format "date-time" as defined in OpenAPI Specification. |  |
| DateTimeRm | 5.2.1.3.2 | Represents the same as the DateTime data type, but with the "nullable: true" property. |  |
| DateTimeRo | 5.2.1.3.2 | Represents the same as the DateTime data type, but with the "readOnly=true" property. |  |
| DayOfWeek | 5.2.1.3.2 | Integer between 1 and 7 denoting a weekday. 1 shall indicate Monday, and the subsequent weekdays shall be indicated with the next higher numbers. 7 shall indicate Sunday. |  |
| DurationMin | 5.2.1.3.2 | Unsigned integer identifying a period of time in units of minutes. |  |
| DurationSec | 5.2.1.3.2 | Unsigned integer identifying a period of time in units of seconds. |  |
| DurationSecRm | 5.2.1.3.2 | Represents the same as the DurationSec data type, but with the "nullable: true" property. |  |
| DurationSecRo | 5.2.1.3.2 | Represents the same as the DurationSec data type, but with the "readOnly=true" property. |  |
| Event | 5.2.1.3.3 | Represents a bearer event. |  |
| EventReport | 5.2.1.2.6 | Represents an event report. |  |
| EthFlowInfo | 5.2.1.2.18 | Represents flow Ethernet flow information |  |
| ExternalGroupId | 5.2.1.3.2 | Represents an external group identifier. |  |
| ExternalId | 5.2.1.3.2 | Represents an external identifier. |  |
| FlowInfo | 5.2.1.2.8 | Represents IP flow information. |  |
| InvalidParam | 5.2.1.2.13 | Represents the description of invalid parameters, for a request rejected due to invalid parameters. |  |
| Ipv4Addr | 5.2.1.3.2 | Represents an IPv4 address. |  |
| Ipv4AddrRo | 5.2.1.3.2 | Represents the same as the Ipv4Addr data type, but with the "readOnly=true" property. |  |
| Ipv6Addr | 5.2.1.3.2 | Represents an IPv6 address. |  |
| Ipv6AddrRo | 5.2.1.3.2 | Represents the same as the Ipv6Addr data type, but with the "readOnly=true" property. |  |
| Link | 5.2.1.3.2 | Represents a link towards a referenced resource. |  |
| LinkRm | 5.2.1.3.2 | Represents the same as the Link data type, but with the "nullable: true" property. |  |
| LocationArea | 5.2.1.2.11 | Represents a user location area. |  |
| LocationArea5G | 5.2.1.2.17 | Represents a user location area when the UE is attached to 5G. |  |
| Mcc | 5.2.1.3.2 | Represents a Mobile Country Code. |  |
| Mnc | 5.2.1.3.2 | Represents a Mobile Network Code. |  |
| Msisdn | 5.2.1.3.2 | Represents an MSISDN. |  |
| NotificationData | 5.2.1.2.5 | Represents the information to be conveyed in a bearer level event(s) notification. |  |
| PlmnId | 5.2.1.2.14 | Represents the identifier of a PLMN. |  |
| Port | 5.2.1.3.2 | Unsigned integer with valid values between 0 and 65535 representing a port. |  |
| PortRo | 5.2.1.3.2 | Represents the same as the Port data type, but with the "readOnly=true" property. |  |
| ProblemDetails | 5.2.1.2.12 | Represents additional information and details on an error response. |  |
| ResourceId | 5.2.1.3.2 | Represents an identifier of a resource within a resource URI. |  |
| ResultReason | 5.2.1.3.4 | Represents a failure result reason. |  |
| ScsAsId | 5.2.1.3.2 | Represents an SCS/AS identifier. |  |
| SponsorInformation | 5.2.1.2.1 | Represents a sponsor information. |  |
| TestNotification | 5.2.1.2.9 | Represents a notification that can be sent to test whether a chosen notification mechanism works. |  |
| TimeOfDay | 5.2.1.3.2 | Represents a time in a day. |  |
| TimeWindow | 5.2.1.2.3 | Represents a time window identified by a start time and a stop time. |  |
| Uri | 5.2.1.3.2 | Represents a URI. |  |
| UsageThreshold | 5.2.1.2.2 | Represents a usage threshold. |  |
| UsageThresholdRm | 5.2.1.2.16 | Represents the same as the UsageThreshold data type but with the "nullable: true" property. |  |
| Volume | 5.2.1.3.2 | Unsigned integer identifying a volume in units of bytes. |  |
| VolumeRm | 5.2.1.3.2 | Represents the same as the Volume data type, but with the "nullable: true" property. |  |
| WebsockNotifConfig | 5.2.1.2.10 | Represents the configuration information for the delivery of notifications over Websockets. |  |

#### 5.2.1.2 Referenced structured data types

##### 5.2.1.2.1 Type: SponsorInformation

This type represents a sponsor information. It shall comply with the provisions defined in table 5.2.1.2.1-1.

Table 5.2.1.2.1-1: Definition of the SponsorInformation data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| sponsorId | string | 1 | It indicates Sponsor ID. |
| aspId | string | 1 | It indicates Application Service Provider ID. |

##### 5.2.1.2.2 Type: UsageThreshold

This type represents a usage threshold. It shall comply with the provisions defined in table 5.2.1.2.2-1.

Only one of DownlinkVolume, UplinkVolume and TotalVolume shall be provided. If the server supports both duration and volume, then the first threshold that has been reached will apply.

Table 5.2.1.2.2-1: Definition of the UsageThreshold data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| duration | DurationSec | 0..1 | Indicates the length of time in seconds |
| totalVolume | Volume | 0..1 | Total data octets for both downlink and uplink |
| downlinkVolume | Volume | 0..1 | Downlink data octets |
| uplinkVolume | Volume | 0..1 | Uplink data octets |

##### 5.2.1.2.3 Type: TimeWindow

This type represents a start time and a stop time of a time window. It shall comply with the provisions defined in table 5.2.1.2.3-1.

Table 5.2.1.2.3-1: Definition of the TimeWindow data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| startTime | DateTime | 1 | Indicates the absolute start time of the time window |
| stopTime | DateTime | 1 | Indicates the absolute stop time of the time window |

##### 5.2.1.2.4 Type: Acknowledgement

This type represents a successful acknowledgement for a notification.

Table 5.2.1.2.4-1: Definition of the Acknowledgement data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| details | string | 1 | A human-readable explanation specific to this successful acknowledgement |

##### 5.2.1.2.5 Type: NotificationData

This type represents the parameters which shall be notify the SCS/AS for bearer level event(s).

Table 5.2.1.2.5-1: Definition of the NotificationData data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| transaction | Link | 1 | Link to the transaction resource to which this notification is related. |
| eventReports | array(EventReport) | 1..N | Contains the reported event and applicable information |

##### 5.2.1.2.6 Type: EventReport

This type represents an event report. It shall comply with the provisions defined in table 5.2.1.2.6-1.

Table 5.2.1.2.6-1: Definition of the EventReport data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| event | Event | 1 | Indicates the event reported by the SCEF. |
| accumulatedUsage | AccumulatedUsage | 0..1 | Contains the applicable information corresponding to the event. |
| flowIds | array(integer) | 0..N | Identifies the IP flows that were sent during event subscription |

##### 5.2.1.2.7 Type: AccumulatedUsage

This type represents an accumulated usage. It shall comply with the provisions defined in table 5.2.1.2.7-1.

Table 5.2.1.2.7-1: Definition of the AccumulatedUsage data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| duration | DurationSec | 0..1 | Indicates the length of time in seconds |
| totalVolume | Volume | 0..1 | Total data octets for both downlink and uplink |
| downlinkVolume | Volume | 0..1 | Downlink data octets |
| uplinkVolume | Volume | 0..1 | Uplink data octets |

##### 5.2.1.2.8 Type: FlowInfo

This type represents flow information. It shall comply with the provisions defined in table 5.2.1.2.8-1.

Table 5.2.1.2.8-1: Definition of the FlowInfo data type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| flowId | integer | 1 | Indicates the IP flow. |  |
| flowDescriptions | array(string) | 0..2 | Indicates the packet filters of the IP flow.  Refer to clause 5.3.8 of 3GPP TS 29.214 [10] for encoding. It shall contain UL and/or DL IP flow description. |  |
| tosTC | TosTrafficClass | 0..1 | Type of service or Traffic Class. |  |

NOTE: The "tosTC" attribute can be included when another packet filter attribute is needed to differentiate between packet flows. For example, packet flows encapsulated and encrypted by a tunnelling protocol can be differentiated by the ToS/TC value of the outer header if appropriately set by the application. To use ToS/TC for service data flow detection, network configuration by the operator (and additionally by the 3rd party Service Provider when the transport network is not fully within the operator control) needs to ensure there is no ToS/TC re-marking applied along the path from the application to the PSA UPF and the specific ToS/TC values are managed properly to avoid potential collision with other usage (e.g., paging policy differentiation).

##### 5.2.1.2.9 Type: TestNotification

This type represents a notification that can be sent to test whether a chosen notification mechanism works. It shall be supported if the feature "Notification\_test\_event", as defined for APIs that use notifications, is supported.

Table 5.2.1.2.9-1: Definition of the TestNotification data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscription | Link | 1 | Link of the subscription resource to which the notification is related. |

##### 5.2.1.2.10 Type: WebsockNotifConfig

This type represents configuration for the delivery of notifications over Websockets. It shall be supported if the feature "Notification\_websocket", as defined for APIs that use notifications, is supported.

Table 5.2.1.2.10-1: Definition of the WebsockNotifConfig data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| websocketUri | Link | 0..1 | Set by the SCEF to indicate to the SCS/AS the Websocket URI to be used for delivering notifications.  (NOTE 1) |
| requestWebsocketUri | boolean | 0..1 | Set by the SCS/AS to indicate that the Websocket delivery is requested.  (NOTE 2) |
| NOTE 1: A Websocket URI should use the scheme "wss" (Websocket Secure) for encrypted delivery and may use the scheme "ws" (Websocket) for unencrypted delivery. If the WebsockNotifConfig data type is used in an HTTP response, this attribute shall be present. If the WebsockNotifConfig data type is used in an HTTP request, this attribute shall not be set by the SCS/AS in a request to create a resource, and shall not be modified by the SCS/AS in a request to modify a resource.  NOTE 2: In a request to create or update a resource, this attribute shall be set to true by the SCS/AS to request the SCEF to provide a Websocket URI for the delivery of notifications, and shall be absent otherwise. In any HTTP response, this attribute shall retain the value that was provided upon resource creation or update. | | | |

##### 5.2.1.2.11 Type: LocationArea

This data type represents the user location area which is sent from the SCS/AS to the SCEF.

Table 5.2.1.2.11-1: Definition of the LocationArea data Type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| cellIds | array(string) | 0..N | Indicates a list of Cell Global Identities of the user which identifies the cell the UE is registered. |
| enodeBIds | array(string) | 0..N | Indicates a list of eNodeB identities in which the UE is currently located. |
| routingAreaIds | array(string) | 0..N | Identifies a list of Routing Area Identities of the user where the UE is located. |
| trackingAreaIds | array(string) | 0..N | Identifies a list of Tracking Area Identities of the user where the UE is located. |
| geographicAreas | array(GeographicArea) | 0..N | Identifies a list of geographic area of the user where the UE is located. |
| civicAddresses | array(CivicAddress) | 0..N | Identifies a list of civic addresses of the user where the UE is located. |

##### 5.2.1.2.12 Type: ProblemDetails

Table 5.2.1.2.12-1: Definition of the ProblemDetails data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| type | Uri | 0..1 | A URI reference according to IETF RFC 3986 [6] that identifies the problem type. |
| title | string | 0..1 | A short, human-readable summary of the problem type. It should not change from occurrence to occurrence of the problem. |
| status | integer | 0..1 | The HTTP status code for this occurrence of the problem. |
| detail | string | 0..1 | A human-readable explanation specific to this occurrence of the problem. |
| instance | Uri | 0..1 | A URI reference that identifies the specific occurrence of the problem. |
| cause | string | 0..1 | A machine-readable application error cause specific to this occurrence of the problem  This IE should be present and provide application-related error information, if available. |
| invalidParams | array(InvalidParam) | 0..N | Description of invalid parameters, for a request rejected due to invalid parameters. |
| supportedFeatures | SupportedFeatures | 0..1 | Features supported by the server (SCEF or SCS/AS).  When present, this IE shall indicate the features supported by the server; if the server supports no features, this IE shall be set to the character "0". |
| NOTE 1: See IETF RFC 9457 [8] for detailed information and guidance for each attribute.  NOTE 2: Additional attributes may be defined per API. | | | |

##### 5.2.1.2.13 Type: InvalidParam

Table 5.2.1.2.13-1: Definition of the InvalidParam data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| param | string | 1 | Attribute's name encoded as a JSON Pointer, or header's name. |
| reason | string | 0..1 | A human-readable reason, e.g. "must be a positive integer". |

##### 5.2.1.2.14 Type: PlmnId

Table 5.2.1.2.14-1: Definition of the PlmnId data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| mcc | Mcc | 1 | Mobile Country Code |
| mnc | Mnc | 1 | Mobile Network Code |

##### 5.2.1.2.15 Type: ConfigResult

This type represents one configuration processing result for the group members.

Table 5.2.1.2.15-1: Definition of the ConfigResult data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| externalIds | array(ExternalId) | 0..N | Each element indicates an external identifier of the UE.  (NOTE) |
| msisdns | array(Msisdn) | 0..N | Each element identifies the MS internal PSTN/ISDN number allocated for the UE  (NOTE) |
| resultReason | ResultReason | 1 | Identifies the configuration failure reason for the group members. |
| NOTE: Either "externalId" or "msisdn" shall be included for a group member. | | | |

##### 5.2.1.2.16 Type: UsageThresholdRm

This type represents a usage threshold which is defined in clause 5.2.1.2.2 but defined with "nullable: true" property so it can be removed in "JSON Merge Patch", as defined in IETF RFC 7396 [39]. It shall comply with the provisions defined in table 5.2.1.2.16-1.

Only one of "downlinkVolume", "uplinkVolume" and "totalVolume" shall be provided. Duration and volume are also removable in "JSON Merge Patch". If the server supports both duration and volume, then the first threshold that has been reached will apply.

Table 5.2.1.2.16-1: Definition of the UsageThresholdRm data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| duration | DurationSecRm | 0..1 | Indicates the length of time in seconds |
| totalVolume | VolumeRm | 0..1 | Total data octets for both downlink and uplink |
| downlinkVolume | VolumeRm | 0..1 | Downlink data octets |
| uplinkVolume | VolumeRm | 0..1 | Uplink data octets |

##### 5.2.1.2.17 Type: LocationArea5G

This data type represents the user location area which is sent from the AF to the NEF.

Table 5.2.1.2.17-1: Definition of the LocationArea5G data Type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| geographicAreas | array(GeographicArea) | 0..N | Identifies a list of geographic area of the user where the UE is located. |
| civicAddresses | array(CivicAddress) | 0..N | Identifies a list of civic addresses of the user where the UE is located. |
| nwAreaInfo | NetworkAreaInfo | 0..1 | This IE represents the network area information of the user where the UE is located. |

##### 5.2.1.2.18 Type: EthFlowInfo

This type represents Ethernet flow information. It shall comply with the provisions defined in table 5.2.1.2.18-1.

Table 5.2.1.2.18-1: Definition of the EthFlowInfo data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| flowId | integer | 1 | Indicates the Ethernet flow. |
| ethFlowDescriptions | array(EthFlowDescription) | 0..2 | Indicates the packet filters of the Ethernet flow.  Refer to clause 5.6.2.17 of 3GPP TS 29.514 [52] for encoding of each Ethernet flow. It shall contain UL and/or DL Ethernet flow description. |

#### 5.2.1.3 Referenced Simple data types and enumerations

##### 5.2.1.3.1 Introduction

This clause defines simple data types and enumerations that are referenced from data structures.

##### 5.2.1.3.2 Simple data types

The reused datatypes defined in OpenAPI Specification [27] listed in table 5.2.1.3.2-1 and the simple data types defined in table 5.2.1.3.2-2 apply to several T8 APIs.

Table 5.2.1.3.2-1: Reused OpenAPI data types

|  |  |
| --- | --- |
| Type name | Description |
| boolean | As defined in OpenAPI Specification [27], i.e. either value "true" or value "false" as defined in IETF RFC 7159 [5]. |
| integer | As defined in OpenAPI Specification [27]. |
| number | As defined in OpenAPI Specification [27]. |
| string | As defined in OpenAPI Specification [27]. |
| NOTE: Data type names defined in OpenAPI Specification [27] do not follow the convention to start with capital letters otherwise used in this specification. | |

Table 5.2.1.3.2-2: Simple data types applicable to several APIs

|  |  |
| --- | --- |
| Type name | Description |
| Bandwidth | Integer indicating a bandwidth in bits per second. |
| BdtReferenceId | String identifying a BDT Reference ID as defined in clause 5.3.3 of 3GPP TS 29.154 [9]. |
| Binary | String with format "binary" as defined in OpenAPI Specification [27]. |
| Bytes | String with format "byte" as defined in OpenAPI Specification [27], i.e, base64-encoded characters. |
| DayOfWeek | Integer between and including 1 and 7 denoting a weekday. "1" shall indicate "Monday", and the subsequent weekdays shall be indicated with the next higher numbers. "7" shall indicate "Sunday". |
| DateTime | String with format "date-time" as defined in OpenAPI Specification [27]. |
| DateTimeRm | String with format "date-time" as defined in OpenAPI [27] with "nullable: true" property. |
| DateTimeRo | String with format "date-time" as defined in OpenAPI [27] with "readOnly: true" property. |
| DurationSec | Unsigned integer identifying a period of time in units of seconds. |
| DurationSecRm | Unsigned integer identifying a period of time in units of seconds with "nullable: true" property. |
| DurationSecRo | Unsigned integer identifying a period of time in units of seconds with "readOnly: true" property. |
| DurationMin | Unsigned integer identifying a period of time in units of minutes. |
| ExternalId | String containing a local identifier followed by "@" and a domain identifier. Both the local identifier and the domain identifier shall be encoded as strings that do not contain any "@" characters. See clause 4.6.2 of 3GPP TS 23.682 [2] for more information. |
| ExternalGroupId | String containing a local identifier followed by "@" and a domain identifier. Both the local identifier and the domain identifier shall be encoded as strings that do not contain any "@" characters. See clauses 4.6.2 and 4.6.3 of 3GPP TS 23.682 [2] for more information. |
| Ipv4Addr | String identifying an Ipv4 address formatted in the "dotted decimal" notation as defined in IETF RFC 1166 [28]. |
| Ipv6Addr | String identifying an Ipv6 address formatted according to clause 4 in IETF RFC 5952 [29]. The mixed Ipv4 Ipv6 notation according to clause 5 of IETF RFC 5952 [29] shall not be used. |
| Ipv4AddrRo | String identifying an Ipv4 address formatted in the "dotted decimal" notation as defined in IETF RFC 1166 [28], with "readOnly: true" property. |
| Ipv6AddrRo | String identifying an Ipv6 address formatted according to clause 4 in IETF RFC 5952 [29], with "readOnly: true" property. The mixed Ipv4 Ipv6 notation according to clause 5 of IETF RFC 5952 [29] shall not be used. |
| Link | String formatted according to IETF RFC 3986 [7] identifying a referenced resource. |
| LinkRm | String formatted according to IETF RFC 3986 [7] identifying a referenced resource, but with the "nullable: true" property. |
| Mcc | String encoding a Mobile Country Code part of the PLMN, comprising 3 digits, as defined in 3GPP TS 38.413 [54]. |
| Mnc | String encoding a Mobile Network Code part of the PLMN, comprising 2 or 3 digits, as defined in 3GPP TS 38.413 [54]. |
| Msisdn | String formatted according to clause 3.3 of 3GPP TS 23.003 [14] that describes an MSISDN. |
| Port | Unsigned integer with valid values between 0 and 65535. |
| PortRo | Unsigned integer with valid values between 0 and 65535, with "readOnly: true" property. |
| ResourceId | String chosen by the SCEF to serve as an identifier in a resource URI. |
| ScsAsId | String that identifies an SCS/AS. |
| TimeOfDay | String with format "partial-time" or "full-time" as defined in clause 5.6 of IETF RFC 3339 [15].  Examples: "20:15:00", "20:15:00-08:00" (for 8 hours behind UTC). |
| Uri | String providing an URI formatted according to IETF RFC 3986 [7]. |
| Volume | Unsigned integer identifying a volume in units of bytes. |
| VolumeRm | Unsigned integer identifying a volume in units of bytes with "nullable: true" property. |

##### 5.2.1.3.3 Enumeration: Event

The enumeration Event represents event reported by the SCEF.

Table 5.2.1.3.3-1: Enumeration Event

|  |  |
| --- | --- |
| Enumeration value | Description |
| SESSION\_TERMINATION | Indicates that Rx session is terminated. |
| LOSS\_OF\_BEARER | Indicates a loss of a bearer. (NOTE 2) |
| RECOVERY\_OF\_BEARER | Indicates a recovery of a bearer. (NOTE 2) |
| RELEASE\_OF\_BEARER | Indicates a release of a bearer. (NOTE 2) |
| USAGE\_REPORT | Indicates the usage report event. |
| FAILED\_RESOURCES\_ALLOCATION | Indicates the resource allocation is failed. |
| SUCCESSFUL\_RESOURCES\_ALLOCATION | Indicates the resource allocation is successful. |
| NOTE 1: The "enNB" feature defined in clause 5.5.4 supports both subscription and notification for SUCCESSFUL\_RESOURCES\_ALLOCATION event, and explicit subscription for all the events.  NOTE 2: The "LOSS\_OF\_BEARER", RECOVERY\_OF\_BEARER, and RELEASE\_OF\_BEARER only apply to 4G. | |

##### 5.2.1.3.4 Enumeration: ResultReason

The enumeration ResultReason represents a failure result reason.

Table 5.2.1.3.4-1: Enumeration ResultReason

|  |  |
| --- | --- |
| Enumeration value | Description |
| ROAMING\_NOT\_ALLOWED | Identifies the configuration parameters are not allowed by roaming agreement. |
| OTHER\_REASON | Identifies the configuration parameters are not configured due to other reason. |

#### 5.2.1.4 Conventions for documenting structured data types

The structured data types shall represent an object (see IETF RFC 8259 [40]). The structured data types shall contain attributes that are simple data types, structured data types, arrays (see below), maps (see below) or enumerations.

An array (see IETF RFC 8259 [40]) shall represent a list of values without keys and with significance in the order of sequence. All values shall be of the same type.

A map shall represent an object (see IETF RFC 8259 [40]) with a list of key-value pairs (with no significance in the order of sequence), where all keys are of type string and shall be unique identifiers assigned by the application rather than by the schema, and where all values shall be of the same type.

NOTE 1: Maps are supported by the OpenAPI specification [27] as described at https://swagger.io/docs/specification/data-models/dictionaries/. Maps can enable a faster lookup of elements identified by some key in huge data structures compared to arrays that contain the key within the elements. Maps can also be used instead of arrays to modify individual elements when modification instructions of the PATCH method are compliant to IETF RFC 7396 [39].

Each structured data type shall be specified in a separate clause as illustrated in table 5.2.1.4-1.

Table 5.2.1.4-1: Definition of type <Data type>

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| <*attribute name*> | "*<type>*" or "array*(<type>*)" or "map*(<type>*)" | "0..1", "1", or "*M*..*N*", | <only if applicable> |

**Attribute name**: Name of attributes that belong to the specified data type.

**Data type**: Data type of the attribute. If the data type is indicated as "*<type>*", the attribute shall be of data type *<type>.* If the data type is indicated as "array(*<type>*)", the attribute shall be an array (see IETF RFC 8259 [40]) that contains elements of data type *<type>*. If the data type is indicated as "map (*<type>*)", the attribute shall be an object (see IETF RFC 8259 [40]) encoding a map (see OpenAPI specification [27]) that contains as values elements of data type *<type>*. *<type>* can either be "integer", "number", "string" or "boolean" (as defined in the OpenAPI specification [27]), or a data type defined in a 3GPP specification.

**Cardinality**: Defines the allowed number of occurrence of data type <type>. A cardinality of "M..N", is only allowed for data types "array(<type>)" and "map(<type>)" and indicates the number of elements within the array or map; the values M and N can either be the characters "M" and "N", respectively, or integer numbers with M being greater than or equal 0, and N being greater than 1 and M, For data type "<type>", the cardinality shall be set to "0..1" or "1". A lower boundary of "0" for the cardinality also indicates that the attribute is optional. A lower boundary of "0" for the cardinality indicates that the attribute is optional.

NOTE 2: The "0..N" implies the array or map type of the attribute may be optional. If the attribute is present, the minimum number of elements is described in openAPI file.

**Description**: Describes the meaning and use of the attribute and may contain normative statements.

### 5.2.2 Usage of HTTP

#### 5.2.2.1 General

For T8 APIs, support of HTTP/1.1 (IETF RFC 9112 [16], IETF RFC 9110 [17], IETF RFC 9111 [20]) over TLS is mandatory and support of HTTP/2 (IETF RFC 9113 [22]) over TLS is recommended. TLS shall be used as specified in clause 5.5 of 3GPP TS 33.187 [35]. An SCS/AS desiring to use HTTP/2 shall use the HTTP upgrade mechanism to negotiate applicable HTTP version as described in IETF RFC 9113 [22].

#### 5.2.2.2 Usage of the HTTP PATCH method

The HTTP PATCH method, as defined in IETF RFC 5789 [38], allows for a partial update of previously sent data, e.g. resources. For a complete replacement of previously sent data, the HTTP PUT method is used. It is defined separately for each resource whether the HTTP PUT and/or the HTTP PATCH are applicable.

If the HTTP PATCH method is used:

- if no modification of individual elements within an array needs to be supported, the JSON bodies within the PATCH request shall be encoded according to "JSON Merge Patch", as defined in IETF RFC 7396 [39]; or

- if a modification of individual elements within an array needs to be supported, the "JSON Patch" encoding of changes defined in IETF RFC 6902 [67] shall be used.

### 5.2.3 Content type

The bodies of HTTP request and successful HTTP responses shall be encoded in JSON format (see IETF RFC 8259 [5]).

The MIME media type that shall be used within the related Content-Type header field is "application/json", as defined in IETF RFC 8259 [5].

JSON object used in the HTTP PATCH request shall be encoded according to:

- "JSON Merge Patch" and shall be signalled by the content type "application/merge-patch+json", as defined in IETF RFC 7396 [39]; or

- "JSON Patch" and shall be signalled by the content type "application/json-patch+json", as defined in IETF RFC 6902 [67].

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 9457 [8].

NOTE: This release only supports the content type JSON.

### 5.2.4 URI structure

#### 5.2.4.1 Resource URI structure

Resources are either individual resources, or structured resources that can contain child resources. It is recommended to design each resource following one of the archetypes provided in the Annex C of 3GPP TS 29.501 [49].

All API URIs of T8 APIs shall be:

**{apiRoot}/<apiName>/<apiVersion>**

"apiRoot" is configured by means outside the scope of the present document. "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 not backward compatible changes. Otherwise, the supported feature mechanism defined in clause 5.2.7 can instead be used to negotiate extensions.

NOTE 2: A different root structure can be used when the Resource URI is preconfigured in the SCS/AS.

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>**

The naming conventions defined in clause 5.1.3 of 3GPP TS 29.501 [49] shall apply.

#### 5.2.4.2 Custom operations URI structure

The URI of a custom operation which is associated with a resource shall have the following structure:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>/<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 "apiSpecificSuffixes" are as defined in clause 5.2.4.1 and "custOpName" represents the name of the custom operation as defined in clause 5.1.3.2 of 3GPP TS 29.501 [49].

#### 5.2.4.3 Callback URI structure

The purpose of the callback URI is to enable an HTTP client (the SCS/AS or SCEF) to provide the URI to be used by an HTTP server (the SCEF or SCS/AS) to send notifications or callback requests.

The callback URI shall be in the form of an absolute URI as defined in clause 4.3 of IETF RFC 3986 [7], including an authority, and excluding any query component, any fragment component and any userinfo subcomponent.

Therefore, a callback URI consists of the following components, specified with ABNF syntax (see IETF RFC 5234 [69]):

URI = scheme ":" "//" host [ ":" port ] / path

Where 'host' is either an FQDN or an IP address and the 'path' is a path to an HTTP client (the SCS/AS or SCEF) resource.

### 5.2.5 Notifications

#### 5.2.5.1 General

The SCEF and SCS/AS shall support the delivery of Notifications using a separate HTTP connection towards an address assigned by the SCS/AS, as described in clause 5.2.5.2.

An SCEF and SCS/AS may support testing a notification connection as described in clause 5.2.5.3. An SCEF and SCS/AS may support the delivery of Notification using Websocket (IETF RFC 6455 [32]) as described in clause 5.2.5.4.

#### 5.2.5.2 Notification Delivery using a separate HTTP connection

If a delivery of notifications is required for an API, the SCS/AS shall provide a notification destination URI, which designates to the SCEF where the SCEF shall send the HTTP Notifications. This URI is provided within an attribute (e.g. "notificationDestination", "notifUri", "notificationUri") defined in the data types that are passed in a request to create a resource that represents a subscription to notifications, unless it is specified for that API that a preconfigured destination address is used.

The SCS/AS may provide the same notification destination URI for several subscriptions, and the SCEF should then use the same HTTP connection to deliver related notifications.

The SCEF shall take the role of the HTTP client on the HTTP connection for the delivery of Notifications. Clause 5.2.2 shall also apply for this HTTP connection with the exception that an SCEF (rather than an SCS/AS) desiring to use HTTP/2 shall use the HTTP upgrade mechanism to negotiate applicable HTTP version.

#### 5.2.5.3 Notification Test Event

If the optional "Notification\_test\_event" feature is supported, the SCS/AS may test whether notifications can be received by subscribing to the notification of a test event by providing a "requestTestNotification" attribute set to "true" in the HTTP request to create or update a subscription for notifications. In any other HTTP request or response, this attribute shall retain the value that was provided upon subscription resource creation.

Upon receiving the "requestTestNotification" attribute as part of a subscription creation or update request, the SCEF shall send immediately after establishing the notification delivery mechanism a test notification containing a body formatted according to the "TestNotification" data type as defined in clause 5.2.1.2.12. If the SCS/AS does not receive the test notification within a configured time, the SCS/AS knows that the notification delivery with the selected method is not possible and may take corrective actions.

#### 5.2.5.4 Notification Delivery using Websocket

The procedures in the present clause only apply if SCS/AS and SCEF support the "Notification\_websocket" feature. If the feature "Notification\_websocket" is supported, then the feature "Notification\_test\_event" shall also be supported.

If a delivery of notifications is required for an API and the SCS/AS does not know from previous interactions with the SCEF whether delivery of notifications over a separate HTTP connection works, the SCS/AS should initially request the SCEF to try to establish a separate HTTP connection for notification delivery according to clause 5.2.5.2 by providing a URI to the SCEF designating where to send HTTP Notifications, and shall also subscribe to the notification of a test event as in clause 5.2.5.3.

If the SCS/AS does not receive the requested notification of the test event during a configured period after the subscription, the SCS/AS may configure the subscription to request the SCEF to provide a URI for an HTTP connection to upgrade to Websocket, setting the "requestWebsocketUri" attribute to "true" as specified in clause 5.2.1.2.13. The SCS/AS may also request the SCEF to provide a URI in a new subscription creation request, and should in this case terminate the original subscription.

NOTE 1: If the SCS/AS has requested the delivery of notifications to a separate entity, it needs to be informed by that separate entity about the receipt of the test notification. That communication between the separate entity and the SCS/AS is out of scope of the present document.

When the SCEF receives a subscription creation or update request to use Websockets to deliver notifications (i.e. with the "requestWebsocketUri" attribute set to "true"), it shall assign a Websocket URI where to receive a Websocket connection establishment and provide this URI in the "websocketUri" attribute in the response, as defined in clause 5.1.2.1.13. Once such Websocket URI has been assigned for a particular subscription resource, subsequent update requests to this resource that ask for the assignment of a new Websocket URI for that subscription shall be rejected by the SCEF.

Upon the reception of the Websocket URI from the SCEF in the "websocketUri" attribute, as specified in clause 5.2.1.2.13-1, in the subscription creation or subscription update response, the SCS/AS or a separate entity that is intended to receive the notification shall establish an HTTP connection towards that URI and shall upgrade that connection to the Websocket protocol (IETF RFC 6455 [32]) using the HTTP upgrade mechanism defined in IETF RFC 9110 [17].

NOTE 2: For delivery of Notifications to a separate entity, the SCS/AS needs to provide the Websocket URI to that separate entity. That communication between the SCS/AS and the separate entity is out of scope of the present document.

The following framing of the request and response shall be used when delivering a notification or acknowledging its delivery through Websockets.

NOTE 3: The framing is aligned as much as possible with HTTP delivery in order to simplify implementations.

To deliver a notification towards the SCS/AS, the SCEF shall embed the following structure in a separate Websocket data frame with 0x2 (Binary) opcode in the following order:

1) The string "3GPP-WS-Notif-Seq:", followed by a blank, followed by a four-byte sequence number, encoded as decimal number in ASCII, followed by CRLF

2) The following HTTP headers in any order, with the syntax and semantics as defined in IETF RFC 9110 [17]: Content-Type (mandatory), Content-Encoding (optional), Content-Length (mandatory). Every HTTP header line shall be ended by CRLF.

3) CRLF to end the headers section.

4) The content of the notification, as defined in the individual APIs.

NOTE 4: The content is the same as the one that would be used if delivering the notification as defined in clause 5.2.5.3.

To acknowledge the reception of a notification message towards the SCEF, the SCS/AS shall embed the following structure in a separate Websocket data frame with 0x2 (Binary) opcode in the following order:

1) The string "3GPP-WS-Notif-Seq:", followed by a blank, followed by the four-byte sequence number of the notification to be confirmed, encoded as decimal number in ASCII, followed by CRLF.

2) The HTTP status code (e.g. 204) and status message (e.g. No Content) as defined for HTTP delivery of the notification in the individual APIs, separated by a single blank character, and ended by CRLF.

3) Conditionally, as defined in IETF RFC 9110 [17], the following HTTP headers in any order: Content-Type, Content-Encoding, and Content-Length. Every HTTP header line shall be ended by CRLF.

4) CRLF to end the headers section.

5) The content of the response, if applicable based on the status code and the HTTP headers, as defined in IETF RFC 9110 [17].

NOTE 5: The status code, the status message and the content (if applicable), are the same as if delivering the notification as defined in clause 5.2.5.3.

Use of CRLF is defined in IETF RFC 9110 [17].

The SCEF need not wait for the confirmation of each notification before delivering the next notification. The SCEF shall determine whether a notification has been delivered successfully by correlating the sent notification with the received acknowledgement by checking the sequence numbers of both for equality. The SCEF may re-send a notification, using the same sequence number, if it has not received an acknowledgement with a matching sequence number after a configurable time-out. The SCS/AS shall consider notifications with the same sequence number that arrive within a configurable time interval as duplicates.

The SCS/AS should send periodic Websocket "PING" frames to keep the connection alive.

NOTE 6: the TCP layer will handle a possible fragmentation and reassembly of large messages.

The security related clause 6 shall also apply for the HTTP connection that is upgraded to Websocket.

### 5.2.6 Error handling

Table 5.2.6-1 lists response bodies that are applicable to all APIs and as responses for all requests in the present specification unless otherwise specified. The HTTP client shall mandatorily support the processing of the status code for all the applicable methods, when received in a HTTP response message. In such cases the HTTP client shall also support the handling of the "ProblemDetails" JSON object with the Content-Type header field set to the value "application/problem+json", if the corresponding API definition in the current specification does not specify another response body for the corresponding status code.

Table 5.2.6-1: Response bodies supported for responses to all requests.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Response body | Data type | Cardinality | Response  Codes  (NOTE 1) | Remarks  (NOTE 2, NOTE 4) | Applied Methods |
| ProblemDetails | 1 | 400 Bad Request | Incorrect parameters were passed in the request. | GET, POST PUT, PATCH, DELETE |
| ProblemDetails | 1 | 401 Unauthorized | The client is not authorized as described in IETF RFC 9110 [17]. | GET, POST, PUT, PATCH, DELETE |
| ProblemDetails | 1 | 403 Forbidden | This represents the case when the server is able to understand the request but unable to fulfil the request due to errors (e.g. the requested parameters are out of range).  More information may be provided in the "invalidParams" attribute of the "ProblemDetails" structure.  (NOTE 3) | GET, POST, PUT, PATCH, DELETE |
| ProblemDetails | 1 | 404 Not Found | The resource URI was incorrect, for instance because of a wrong "scsAsId" field. | GET, POST, PUT, PATCH, DELETE |
| ProblemDetails | 1 | 406 Not Acceptable | The content format provided in the "Accept" header is not acceptable by the server. | GET |
| ProblemDetails | 1 | 411 Length Required | The code indicates that the server refuses to accept the request without a Content-Length header field. | POST, PUT, PATCH |
| ProblemDetails | 1 | 413 Content Too Large | **If the received HTTP request contains content larger than the server is able to process, the NF shall reject the HTTP request.** | POST, PUT, PATCH |
| ProblemDetails | 1 | 415 Unsupported Media Type | The code indicates that the resource is in a format which is not supported by the server for the method. | POST, PUT, PATCH |
| ProblemDetails | 1 | 429 Too Many Requests | The code indicates that due to excessive traffic which, if continued over time, may lead to (or may increase) an overload situation.  The HTTP header field "Retry-After" may be added in the response to indicate how long the client has to wait before making a new request. | GET, POST, PUT, PATCH, DELETE |
| ProblemDetails | 1 | 500 Internal Server Error | The server encountered an unexpected condition that prevented it from fulfilling the request. | GET, POST, PUT, PATCH, DELETE |
| ProblemDetails | 1 | 503 Service Unavailable | The server is unable to handle the request. | GET, POST, PUT, PATCH, DELETE |
| NOTE 1: In addition to the above response codes, the SCEF can also send other valid HTTP response codes, if applicable. The list of all valid HTTP response codes can be found in HTTP Status Code Registry at IANA [6].  NOTE 2: The MIME media type that shall be used within the related Content-Type header field is "application/problem+json", as defined in IETF RFC 9457 [8].  NOTE 3: The information about which provided parameters are out of range shall be provided in the "invalidParams" attribute of the "ProblemDetails" structure for the API of network parameter configuration.  NOTE 4: More information may be provided in the "detail" attribute of the "ProblemDetails" structure. | | | | | |

The protocol and application errors in clause 5.2.7.2 of 3GPP TS 29.500 [44] are applicable for above status codes for the APIs defined in the present specification. Specific errors are contained in the related API definition for each API.

### 5.2.7 Feature negotiation

The procedures in clause 6.6.2 of 3GPP TS 29.500 [44] shall be applicable for the APIs defined in the present specification with the difference that the SCEF should not register any feature for northbound APIs in the NRF.

The supported features are negotiated separately for each API. For each of the APIs defined in the present specification, the applicable list of features is contained in the related API definition.

### 5.2.8 HTTP custom headers

#### 5.2.8.1 General

This clause lists reused HTTP custom headers and defines any new HTTP custom headers introduced by this specification.

#### 5.2.8.2 Reused HTTP custom headers

Table 5.2.8.2-1: Reused HTTP custom headers

|  |  |  |
| --- | --- | --- |
| Name | Reference | Description |
|  |  |  |

5.2.8.3 Optional HTTP custom headers

##### 5.2.8.3.1 General

The Northbound APIs defined in this specification may support the HTTP custom headers specified in Table 5.2.8.3.1-1 below. A description of each custom header and the normative requirements related to when to include them are also provided in Table 5.2.8.3.1-1.

**Table 5.2.8.3.1-1: Optional HTTP custom headers**

|  |  |  |
| --- | --- | --- |
| Name | Reference | Description |
| Nb-Api-Sender-Timestamp | clause 5.2.8.3.2 | This header may be used to indicate the date and time (with a millisecond granularity) at which an HTTP request or response is originated. This may be used e.g. for measuring signalling delays in Northbound interfaces. |
| Nb-Api-Max-Rsp-Time | clause 5.2.8.3.3 | This header may be used in a HTTP request to indicate the duration during which the HTTP client waits for a response. |
| Nb-Api-Lci | clause 5.2.8.3.4 | This header may be used by a SCEF to send Load Control Information (LCI) to the sending entity (e.g. SCS/AS, AF). |
| Nb-Api-Oci | clause 5.2.8.3.5 | This header may be used by an overloaded SCEF in an API response message, or in a notification request message to signal Overload Control Information (OCI) to the sending entity (e.g. SCS/AS, AF).  This header may also be used by an overloaded sending entity (e.g. SCS/AS, AF) in a notification response or in an API request to signal Overload Control Information (OCI) to the SCEF. |

5.2.8.3.2 Nbi-Api-Sender-Timestamp

The provisions of clause 5.2.3.3.2 of 3GPP TS 29.500 [44] also apply to this header.

NOTE: Any provisions that are specific to 5G SBI APIs (e.g. related to the support of Indirect Communication models) are however not applicable for Northbound APIs.

5.2.8.3.3 Nb-Api-Max-Rsp-Time

The provisions of clause 5.2.3.3.3 of 3GPP TS 29.500 [44] also apply to this header.

NOTE: Any provisions that are specific to 5G SBI APIs (e.g. related to the support of Indirect Communication models) are however not applicable for Northbound APIs.

5.2.8.3.4 Nbi-Api-Lci

The header contains a comma-delimited list (see IETF RFC 9110 [17]) of Load Control Information (LCI). See clause 5.2.11.

The encoding of the header follows the ABNF as defined in IETF RFC 9110 [17].

Nb-Api-Lci = "Nb-Api-Lci:" 1#(RWS timestamp ";" RWS lcMetric ")

timestamp = "Timestamp:" RWS DQUOTE date-time DQUOTE

Mandatory parameter. The date-time type is specified in IETF RFC 5322 [66] and clause 7.1.1.1 of IETF RFC 9110 [17]. It indicates the timestamp associated with the load control information.

lcMetric = "Load-Metric:" RWS (DIGIT / %x31-39 DIGIT / "100") "%"

Mandatory parameter. Load-Metric is up to 3 digits long decimal string and the value range shall be from 0 to 100.

EXAMPLE: Load Control Information:

Nbi-Api-Lci: Timestamp: "Tue, 04 Feb 2021 08:50:28 GMT"; Load-Metric: 50%

5.2.8.3.5 Nb-Api-Oci

The header contains a comma-delimited list of Overload Control Information (OCI). See clause 5.2.11.

The encoding of the header follows the ABNF as defined in IETF RFC 9110 [17].

Nb-Api-Oci = "Nb-Api-Oci:" 1#(RWS timestamp ";" RWS validityPeriod ";" RWS olcMetric ")

timestamp = "Timestamp:" RWS DQUOTE date-time DQUOTE

Mandatory parameter. The date-time type is specified in IETF RFC 5322 [66] and clause 7.1.1.1 of IETF RFC 9110 [17]. It indicates the timestamp at which the overload control information was generated.

validityPeriod = "Period-of-Validity:" RWS 1\*DIGIT "s"

Mandatory parameter. Period of validity is a timer that is measured in seconds. Once the timer expires, the OCI becomes invalid.

olcMetric = "Overload-Reduction-Metric:" RWS (DIGIT / %x31-39 DIGIT / "100") "%"

Mandatory parameter. Overload-Reduction-Metric up to 3 digits long decimal string and the value range shall be from 0 to 100.

EXAMPLE: Overload Control Information:

Nbi-Api-Oci: Timestamp: "Tue, 04 Feb 2021 08:50:28 GMT"; Period-of-Validity: 90s; Overload-Reduction-Metric: 25%

### 5.2.9 Conventions for Open API specification files

#### 5.2.9.1 General

T8 Open API specification files shall comply with the OpenAPI specification [27] and with the present clause.

Each API shall be described in one Open API specification file. In addition, 3GPP specifications may contain Open API specification file with common data types.

For the purpose of referencing (see clause 5.2.9.6), it is assumed that each Open API specification file contained in a 3GPP specification is stored as separate physical, that all Open API specification files are stored in the same directory on the local server, and that the files are named according to the conventions in clause 5.2.9.6.

#### 5.2.9.2 Formatting of OpenAPI files

The following guidelines shall be used when documenting OpenAPI files:

- OpenAPI specifications shall be documented using YAML format (see YAML 1.2 [41]). For specific restrictions on the usage of YAML in OpenAPI, see OpenAPI Specification [27].

- The style used for the specification shall be "PL" (Programming Language).

- The different scopes in the YAML data structures representing collections (objects, arrays…) shall use an indentation of two white spaces.

- Comments may be added by following the standard YAML syntax ("#").

- Tabs shall not be used in OpenAPI specification files (e.g. within description fields).

- "Unbreakable" spaces (UTF-8 'NO-BREAK SPACE' (U+00A0)) shall not be used in OpenAPI specification files (e.g. within description fields). Only "normal" spaces (UTF-8 'SPACE' (U+0020)) shall be allowed.

- Trailing spaces (i.e. white spaces at the end of a line) should not be used in OpenAPI specification files.

#### 5.2.9.3 Structured data types

The OpenAPI file shall contain a definition in the components/schemas section defining a schema with the name of the structured data type as key.

The schema shall contain:

- "type: object";

- "description: *<description>*", where *<description>* is the description of the data type in the table defining the structured data type. The "description" attribute should be provided for all data types, specially if they are frequently reused from the same or other OpenAPI specification files; the "description" attribute shall always be provided for data types defined as maps, with a clear indication of the values (strings) used as key of the map;

- if any attributes in the structured data type are marked as mandatory via a minimum cardinality greater than "0", a "required" keyword listing those attributes; and

- a "properties" keyword containing for each attribute in the structured data type an entry with the attribute name as key and:

1. if the data type is "*<type>*":

a. if the data type of the attribute is "string", "number", "integer", or "boolean", a type definition using that data type as value ("type: *<data type>*"); or

b. otherwise a reference to the data type schema for the data type *<data type>* of the attribute, i.e. "$ref: '#/components/schemas/*<data type>*'" if that data type schema is contained in the same OpenAPI file and "$ref: '*<filename>*#/components/schemas/*<data type>*'" if that data type schema is contained in file *<filename>* in the same directory on the same server;

2. if the data type is "array*(<type>*)":

a. a type definition "type: array";

b. an "items:" definition containing:

i). if the data type of the attribute is "string", "number", "integer", or "boolean", a type definition using that data type as value ("type: *<data type>*"); or

ii). otherwise a reference to the data type schema for the data type *<data type>* of the attribute, i.e. "$ref: '#/components/schemas/*<data type>*'" if that data type schema is contained in the same OpenAPI file and "$ref: '*<filename>*#/components/schemas/*<data type>*'" if that data type schema is contained in file *<filename>* in the same directory on the same server;

c. if the cardinality contained an integer value *<m>* as lower boundary, "minItems: *<m>*"; and

d. if the cardinality contained an integer value *<n>* as upper boundary, "maxItems: *<n>*";

3. if the data type is "map*(<type>*)":

a. a type definition "type: object";

b. an "additionalProperties:" definition containing:

i). if the data type of the attribute is "string", "number", "integer", or "boolean", a type definition using that data type as value ("type: *<data type>*"); or

ii). otherwise a reference to the data type schema for the data type *<data type>* of the attribute, i.e. "$ref: '#/components/schemas/*<data type>*'" if that data type schema is contained in the same OpenAPI file and "$ref: '*<filename>*#/components/schemas/*<data type>*'" if that data type schema is contained in file *<filename>* in the same directory on the same server;

c. if the cardinality contained an integer value *<m>* as lower boundary, "min Properties: *<m>*"; and

d. if the cardinality contained an integer value *<n>* as upper boundary, "max Properties: *<n>*"; and

4. "description: *<description>*", where *<description>* is the description of the attribute in the table defining the structured data type; the "description" attribute shall always be provided for attributes defined as maps, with a clear indication of the values (strings) used as key of the map.

NOTE 1: An omission of the "minProperties", and "maxProperties" keywords indicates that no lower or upper boundaries respectively, for the number of properties in an object are defined. An omission of the "minItems", and "maxItems" keywords indicates that no lower or upper boundaries, respectively, for the number of items in an array are defined.

NOTE 2: The "0..N" implies the array or map type of the attribute may be optional. If the attribute is present, the minimum number of elements is described in openAPI file.

Example:

Table 5.2.9.3-1: Definition of type ExampleStructuredType

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| exSimple | ExSimple | 1 | exSimple attribute description |
| exArrayElements | array(string) | 1..10 | exArrayElements attribute description |
| exMapElements | map(ExStructure) | 1..N | exMapElements attribute description, indicating the values of the map key |

The data structure in table 5.2.9.3-1 is described in an OpenAPI file as follows:

components:

schemas:

ExampleStructuredType:

type: object

description: ExampleStructuredType data type description

required:

- exSimple

- exMapElements

properties:

exSimple:

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

exArrayElements:

type: array

items:

type: string

minItems: 1

maxItems: 10

description: exArrayElements attribute description

exMapElements:

type: object

additionalProperties:

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

minProperties: 1

description: exMapElements attribute description, indicating the values of the map key

NOTE 3: Object schema definitions should not have property names in the "required" attribute for which a corresponding property definition does not exist.

#### 5.2.9.4 Info

The Open API specification file of an API shall contain an "info" field with the title and version as defined in clause 4.3 of 3GPP TS 29.501 [49].

#### 5.2.9.5 Servers

As defined in clause 5.2.4, the base URI of an API consists of **{apiRoot}/<apiName>/<apiVersion>**. It shall be encoded in the corresponding Open API specification file as "servers" field with **{apiRoot}** as variable.

Example:

servers:

- url: '{apiRoot}/3gpp-yyyy/v1'

variables:

apiRoot:

default: https://demohost.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

#### 5.2.9.6 References to other 3GPP-defined Open API specification files

For the purpose of referencing, it shall be assumed that each Open API specification file contained in a 3GPP specification is stored as separate physical file, that all Open API specification files are stored in the same directory on the local server, and that the files are named according to the following convention: The file name shall consist of (in the order below):

- the 3GPP specification number in the format "Tsxxyyy";

- an "\_" character;

- if the OpenAPI specification file contains an API definition, the API name as defined for corresponding base URL parts (see clause 4.4) of that API.

- if the OpenAPI specification file contains a definition of CommonData, the string "CommonData"; and

- the string ".yaml".

Examples:

Reference to Data Type "Xxx" defined in the same file

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

Reference to Data Type "Xxx" defined as Common Data in 3GPP TS 29.122:

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

Reference to Data Type "Xxx" defined within API "Nxxx\_Yyy" in 3GPP TS ab.cde:

$ref: 'Tsabcde\_Nxxx\_Yyy.yaml#/components/schemas/Xxx'

#### 5.2.9.7 Server-initiated communication

If an API contains notifications as described in clause 5.2.5, it should be described as "callback" in Open API specification files.

Example:

paths:

/subscriptions:

post:

requestBody:

required: true

content:

application/json:

schema:

type: object

properties:

callbackUrl: # Callback URL

type: string

format: uri

responses:

'201':

description: Success

callbacks:

myNotification: # arbitrary name

'{$request.body#/callbackUrl}': # refers The callback URL in the POST

post:

requestBody: # Contents of the callback message

required: true

content:

application/json:

schema:

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

responses: # Expected responses to the callback message

'200':

description: xxx

#### 5.2.9.8 Describing the body of HTTP PATCH requests

##### 5.2.9.8.1 General

As described in clause 5.2.2.2, the bodies of HTTP PATCH requests either use a "JSON Merge Patch" encoding as defined in IETF RFC 7396 [39], or a "JSON Patch" encoding as defined in IETF RFC 6902 [67].

It is possible to allow both encodings in an OpenAPI Specification [27] offering both schemas as alternative contents.

##### 5.2.9.8.2 JSON Merge Patch

In the OpenAPI file, the content field key of the Request Body Object shall contain "application/merge-patch+json". The content field value is a Media Type Object identifying the applicable patch body Schema Object. The patch body Schema Object may contain structured data types derived from the data types used in the schema to describe a complete representation of the resource in such a manner that attributes that are allowed to be modified are listed in the "properties" validation keyword.

NOTE 1: A derived structured data type is beneficial if the data types used to describe a complete representation of the resource contains mandatory attributes, if attributes are allowed to be removed by the PATCH operation, or if a checking by the OpenAPI tooling that only allowed modifications are done via the "additionalProperties: false" keyword is desired. It also provides a clear description in the OpenAPI file to developers which modifications need to be supported.

As an alternative, the data types used in the schema to describe a complete representation of the resource may be used if any attributes that are allowed to be removed are marked as "nullable: true" in that schema.

Any attributes that are allowed to be removed shall be marked as "nullable: true" in the patch body Schema Object.

The "additionalProperties: false" keyword may be set.

NOTE 2: The "additionalProperties: false" keyword enables the OpenAPI tooling to check that only allowed modifications are done. Extensions of the object in future releases are still possible under the assumption that the supported features mechanism is used to negotiate the usage of any new attribute prior to the PATCH invocation. If new optional attributes are expected to be introduced without corresponding supported feature or if PATCH can be used as first operation in an API, the usage of the "additionalProperties: false" keyword is not appropriate.

##### 5.2.9.8.3 JSON PATCH

In the OpenAPI file, the content field key of the Request Body Object shall contain "application/json-patch+json". The content field value is a Media Type Object identifying the applicable patch body. It may contain a mutually exclusive list (using the "oneOf" keyword) of all allowed modifications as <path, op, value> tuples, where "path" is a string containing a JSON Pointer value referring to a JSON object that is allowed to be modified, "op" is an enumeration of allowed JSON PATCH operations on the JSON object identified by "path" and "value" representing the schema/type of the value that will be updated or added at the JSON object identified by "path". In addition, an open alternative containing an object with no properties may be added using the "anyOf" keyword.

NOTE 1: A mutually exclusive list provides a clear description in the OpenAPI specification file to developers which modifications need to be supported. This is of particular interest if only a limited number of modifications need to be supported. If no open alternative is included, the OpenAPI tooling will also check that only allowed modifications are done.

NOTE 2: The open alternative allows for extensions of the PATCH in scenarios where new optional attributes are expected to be introduced without corresponding supported feature or if PATCH can be used as first operation in an API.

#### 5.2.9.9 Error Responses

As described in clause 5.2.6, T8 APIs use valid HTTP response codes as error codes in HTTP responses and may include a "ProblemDetails" data structure specified in clause 5.2.1.2.12 or an application-specific data structure.

Clause 5.2.6 specifies HTTP status code per HTTP method. OpenAPI files should include at least the status codes in that table.

For the purpose of referencing, HTTP error responses with "ProblemDetails" data structure are specified as part of the CommonData OpenAPI file in Annex A.2.

Example:

In the example below, the 400, and 500 and default error response descriptions are referenced.

Paths:

/users:

get:

responses:

'200':

content:

application/json

schema:

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

'400':

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

'500':

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

default:

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

The following definitions provided in Annex A.2 are used in that example:

components:

responses:

'400':

description: Bad request

content:

application/problem+json:

schema:

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

'500':

description: Internal Server Error

content:

application/problem+json:

schema:

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

default:

description: Generic Error

#### 5.2.9.10 Enumerations

For enumerations, the OpenAPI file shall contain a definition in the components/schemas section defining a schema with the name of the enumeration as key.

The naming conventions defined in clause 5.1.4 of 3GPP TS 29.501 [49] shall apply.

The schema:

- shall contain the "anyOf" keyword listing as alternatives:

1. the "type: string" keyword and the "enum" keyword with a list of all defined values for the enumeration; and

2. the "type: string" keyword and the "description" keyword with a description stating that the string is only provided for extensibility and is not used to encode contents defined in the present version of the specification, and

- should contain a description field, containing the overall meaning and purpose of the enumeration; additionally, this field may contain a list of the defined values of the enumeration together with explanations of those values.

NOTE: The "enum" keyword restricts the permissible values of the string to the enumerated ones. This can lead to extensibility problems when new values need to be introduced.

Example:

ExampleEnumeration represents xxx, and it is used to indicate yyy or zzz; it complies with the provisions defined in table 5.2.9.10-1.

Table 5.2.9.10-1: Enumeration ExampleEnumeration

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| ONE | Value ONE description |  |
| TWO | Value TWO description |  |

The data structure in table 5.2.9.10-1 is described in an OpenAPI file as follows:

components:

schemas:

ExampleEnumeration:

anyOf:

- type: string

enum:

- ONE

- TWO

- 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: |

ExampleEnumeration represents xxx, and it is used to indicate yyy or zzz;

it complies with the provisions defined in table 5.2.9.10-1 of 3GPP TS ab.cde.

Possible values are:

- ONE: Value ONE description

- TWO: Value TWO description

#### 5.2.9.11 Read only attribute

Each OpenAPI specification should include "readOnly: true" for those attributes that are only provided by the SCEF in the HTTP response message to prevent the SCS/AS from provisioning those attributes which is not expected, if the write and read operations (e.g. POST request and response) share the same data type which contains those attributes.

Example:

NiddStatus:

anyOf:

- type: string

enum:

- ACTIVE

- TERMINATED\_UE\_NOT\_AUTHORIZED

- TERMINATED

- 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

- ACTIVE: The NIDD configuration is active.

- TERMINATED\_UE\_NOT\_AUTHORIZED: The NIDD configuration was terminated because the UE´s authorisation was revoked.

- TERMINATED: The NIDD configuration was terminated.

readOnly: true

#### 5.2.9.12 externalDocs

Each OpenAPI specification shall provide in an "externalDoc" field the reference to the 3GPP TS describing the API, as illustrated below.

Example:

externalDocs

description: 3GPP TS 29.122 V15.1.0 T8 reference point for Northbound APIs

url: http://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/

#### 5.2.9.13 Operation identifiers

Service operations defined in an OpenAPI specification file should be assigned an Operation ID.

EXAMPLE:

get:

operationId: ReadInfo

summary: Read Information.

tags:

- Information (Document)

parameters:

- name: infoType

in: path

description: Requested information Type

required: true

schema:

type: string

(…)

#### 5.2.9.14 Usage of the "tags" field

In an OpenAPI specification, all HTTP operations belonging to the same resource should include a "tags" field containing a same value, briefly describing that resource (e.g. using the name of the resource and its archetype). This results in all operations being grouped by the User Interface of OpenAPI tools, which helps with readability of the API documentation.

EXAMPLE:

openapi: 3.0.0

(...)

paths:

**/subscriptions/{subscriptionId}**:

**get**:

summary: Retrieve an existing Individual subscription resource.

operationId: GetIndSubsc

tags:

- **Individual Subscription (Document)**

(...)

**put**:

summary: Request the update of an existing Individual Subscription resource.

operationId: UpdateIndSubsc

tags:

- **Individual Subscription (Document)**

(...)

**patch**:

summary: Request the modification of an existing Individual Subscription resource.

operationId: ModifyIndSubsc

tags:

- **Individual Subscription (Document)**

(...)

### 5.2.10 Redirection handling

An HTTP request may be redirected to a different target entity.

Upon receipt of an HTTP request from the SCS/AS, when the SCEF redirects the HTTP request to a different target SCEF, the URI of the target SCEF towards which the request is redirected shall be given by the Location header field of the "307 Temporary Redirect" or "308 Permanent Redirect" response. The SCS/AS should then send the HTTP request towards the new target SCEF.

Upon receipt of a notification/callback request from the SCEF, when the SCS/AS redirects the notification/callback request to a different target SCS/AS, the URI of the target SCS/AS towards which the notification/callback request is redirected shall be given by the Location header field of the "307 Temporary Redirect" or "308 Permanent Redirect" response. The SCEF should then send the HTTP request towards the new target SCS/AS.

### 5.2.11 Support of Load and Overload Control

The Load Control mechanisms defined in clause 6.3 of 3GPP TS 29.500 [44] may be supported by T8 APIs with the following differences:

- The "Load Control based on load signalled via the NRF" mechanism defined in clause 6.3.2 of 3GPP TS 29.500 [44] shall not be supported; and

- The "Load Control based on LCI Header" mechanism defined in clause 6.3.3 of 3GPP TS 29.500 [44] may be supported with the following differences:

- The Load Control "scope" and all the related provisions are not applicable;

- The "NF Service Consumer" corresponds to the sending entity (e.g. SCEF, SCS/AS, AF) of the message in T8 APIs and the "NF Service Producer" corresponds to the receiving entity (e.g. SCEF, SCS/AS, AF) of the message in T8 APIs;

- The provisions related to the SCP (Service Communication Proxy) and SEPP (Security Edge Protection Proxy) entities are not applicable; and

- The "3gpp-Sbi-Lci" custom HTTP header corresponds to the "Nbi-Api-Lci" custom HTTP header defined in clause 5.2.8.3.4 for T8 APIs.

- The provisions and mechanisms using the NRF (i.e. 5GC NF Repository Function) are not applicable.

The Overload Control mechanisms defined in clause 6.4 of 3GPP TS 29.500 [44] may be supported by T8 APIs with the following differences:

- The "Overload Control based on HTTP status codes" mechanism defined in clause 6.4.2 of 3GPP TS 29.500 [44] may be supported with the following differences:

- The "NF Service Consumer" corresponds to the sending entity (e.g. SCEF, SCS/AS, AF) of the message in T8 APIs and the "NF Service Producer" corresponds to the receiving entity (e.g. SCEF, SCS/AS, AF) of the message in T8 APIs;

and

- The "Overload Control based on OCI Header" mechanism defined in clause 6.4.3 of 3GPP TS 29.500 [44] may be supported with the following differences:

- The Overload Control "scope" and all the related provisions are not applicable;

- The "NF Service Consumer" corresponds to the sending entity (e.g. SCEF, SCS/AS, AF) of the message in T8 APIs and the "NF Service Producer" corresponds to the receiving entity (e.g. SCEF, SCS/AS, AF) of the message in T8 APIs;

- The provisions related to the SCP (Service Communication Proxy) and SEPP (Security Edge Protection Proxy) entities are not applicable; and

- The "3gpp-Sbi-Oci" custom HTTP header corresponds to the "Nbi-Api-Oci" custom HTTP header defined in clause 5.2.8.3.5 for T8 APIs.

- The provisions and mechanisms using the NRF (i.e. 5GC NF Repository Function) are not applicable.

### 5.2.12 Query parameters

The query component in a URI contains non-hierarchical data that, along with data in the path component, enables to filter the resources identified within the scope of the URI's scheme to a subset of the resources matching the query parameters. The query component is indicated by the first question mark ("?") character and terminated by a number sign ("#") character or by the end of the URI. The syntax of the query component is specified in IETF RFC 3986 [7].

When a server receives a request with a query component, it shall parse the query string in order to identify the filters. The first question mark is used to be a separator and is not part of the query string. A query string is composed of a series of "key=value" pairs, separated by "&". If one query parameter contains more than one value, i.e. an array of data elements, then the values shall be separated by comma (",").

The behaviour of the server when receiving an HTTP/2 method with a query parameter which is of type array, and only some of the members in the array can be matched, depends on each API and the behaviour shall be clearly described.

When multiple query parameters are defined for a method on the resource, the logical 'AND' is the default logical relationship between the query parameters for this resource. If a different logical relationship between multiple query parameters is specified for a method on a resource in an API, then this logical relationship override the default logical relationship for this specific method on the concerned resource in that API. If multiple query parameters are defined for a method on a resource in an API, but there is no need to specify any logical relationship between these query parameters, the concerned API shall explicitly state how to handle multiple query parameters.

### 5.2.13 Vendor-specific extensions

#### 5.2.13.1 General

The vendor specific extensions specified in the below clauses are mechanisms for the APIs to re-use. The applicability of these mechanisms for specific 3GPP Northbound and application layer APIs is specified in the respective API specifications.

#### 5.2.13.2 Vendor-specific extensions to the data model

Vendor-specific extensions for information elements may be generally supported in the 3GPP northbound and application layer APIs by reusing the same vendor-specific extensions mechanism defined for 5GC APIs in clause 6.6.3 of 3GPP TS 29.500 [44].

In the 3GPP northbound and application layer APIs, the vendor may alternatively be identified by setting the placeholder "nnnnn" in the vendor-specific member name to a domain name registered to the vendor, or a URN from the URN space managed by the vendor.

NOTE: The global uniqueness of the domain name or URN, when used to set the placeholder "nnnnn" in the vendor-specific member name, has to be guaranteed.

An example for the IANA-assigned enterprise code to identify the vendor is:

EXAMPLE 1: The vendor-specific member name for vendor "3GPP" based on IANA enterprise number would be:

"vendorSpecific-010415": {

...

}

Examples for the additional alternatives to identify the vendor are:

EXAMPLE 2: The vendor-specific member name for vendor "3GPP" based on domain name would be:

"vendorSpecific-3gpp.org": {

  ...

}

EXAMPLE 3: The vendor-specific member name for vendor "3GPP" based on URN would be:

"vendorSpecific-urn:3gpp:example": {

  ...

}

NOTE: The preferred naming scheme (for the "nnnnn" placeholder) for vendor-specific member names is the one based on the IANA-assigned enterprise code defined in clause 6.6.3 of 3GPP TS 29.500 [44].

#### 5.2.13.3 Vendor-specific query parameters

Vendor-specific extensions to the query component of an HTTP request may be supported in the 3GPP northbound and application layer APIs by allowing the provisioning of vendor-specific query parameters in order to support additional vendor-specific filtering criteria. Whether an operation (e.g. using the HTTP GET method) on a specific resource of a 3GPP northbound or application layer API shall support the processing of vendor-specific query parameters shall be explicitly specified (within the corresponding resource or custom operation definition clauses) in the definition of this API operation in the technical specification where it is defined. This pattern applies to querying resources of "collection" or "store" archetype.

A vendor-specific query parameter shall be encoded as follows:

- The query parameter name shall start with "vend-spec" followed by the actual name of the query parameter, i.e. "vend-spec-<query parameter name>".

- The query parameter value shall be encoded as a JSON object containing two attributes as defined in Table 5.2.13.2-1, wherein:

- the "target" attribute is a JSON pointer (as per RFC 6901 [70]) towards the targeted attribute in the targeted resource representation; and

- the "value" attribute contains the actual value of the query parameter that is to be used for filtering and shall hence be encoded in the same way as the attribute in the resource representation that it targets.

Table 5.2.13.2-1: Vendor-specific query parameter value content definition

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| target | String | M | 1 | Contains the JSON pointer (as per RFC 6901 [70]) to the attribute in the resource representation that the provided vendor-specific query parameter is targeting. |  |
| value | <Any simple or structured data structure> | M | 1 | Contains the vendor-specific query parameter value. |  |

EXAMPLE 1: Assuming that vendor-specific query parameters are supported for the MonitoringEvent API, if an authorized service consumer wants to retrieve the representations of the "Individual Monitoring Event Subscription" resources that contain a specific value (e.g. 6) for the "maximumNumberOfReports" attribute, then it can send a GET request using the following vendor-specific query parameter:

GET {apiRoot}/3gpp-monitoring-event/v1/{scsAsId}/subscriptions?**vend-spec-max-reports={"target": "/maximumNumberOfReports", value: "6"}**

EXAMPLE 2: Assuming that vendor-specific query parameters are supported for the MonitoringEvent API, if within the representations of the “Individual Monitoring Event Subscription” resources, a vendor-specific extension to the data model is provided by an AF via the "vendorSpecific-010415" attribute as specified in clause 5.2.13.1 and contains additional/alternative target location accuracy values within the "addAccuracy" attribute, and an authorized service consumer wants to retrieve the representations of those "Individual Monitoring Event Subscription" resources that contain a specific value for the "addAccuracy" attribute, then it can send a GET request using the following vendor-specific query parameter:

GET {apiRoot}/3gpp-monitoring-event/v1/{scsAsId}/subscriptions?**vend-spec-accuracy={"target": "/vendorSpecific-010415/addAccuracy", value: "CELL\_OR\_TA"}**

## 5.3 MonitoringEvent API

### 5.3.1 Overview

The MonitoringEvent API is a RESTful API that allows the SCS/AS to subscribe to notifications about specific events in 3GPP networks. It also allows the SCEF to report the event by sending notifications to the authorised users when the corresponding event is detected. The API also allows the SCEF to indicate the removal of a previously configured monitoring request. The MonitoringEvent API defines a set of data models, resources and the related procedures for the creation and management of monitoring event subscriptions. The corresponding JSON schema for the representation of the resources and operations defined by the MonitoringEvent API is provided in its complete form in Annex A.3.

### 5.3.2 Data model

#### 5.3.2.1 Resource data types

##### 5.3.2.1.1 Introduction

This clause defines data structures to be used in resource representations, including subscription resources.

Table 5.3.2.1.1-1 specifies data types re-used by the MonitoringEvent API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the MonitoringEvent API.

Table 5.3.2.1.1-1: MonitoringEvent API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| CivicAddress | 3GPP TS 29.572 [42] | Civic address. |
| CodeWord | 3GPP TS 29.515 [65] | Code word. |
| DlDataDeliveryStatus | 3GPP TS 29.571 [45] | Traffic Descriptor of source of downlink data notifications. |
| DddTrafficDescriptor | 3GPP TS 29.571 [45] | Traffic Descriptor of source of downlink data. |
| Dnn | 3GPP TS 29.571 [45] | Identifies a DNN. |
| Fqdn | 3GPP TS 29.571 [45] | Identifies a FQDN. |
| GeographicArea | 3GPP TS 29.572 [42] | Identifies the geographical information of the user(s). |
| Gpsi | 3GPP TS 29.571 [45] | Represents a GPSI. |
| IpAddr | 3GPP TS 29.571 [45] | UE IP Address. |
| LocationQoS | 3GPP TS 29.572 [42] | Requested location QoS. |
| LdrType | 3GPP TS 29.572 [42] | Location deferred requested event type. |
| MinorLocationQoS | 3GPP TS 29.572 [42] | Minor Location QoS. |
| VelocityRequested | 3GPP TS 29.572 [42] | Velocity of the target UE requested. |
| AgeOfLocationEstimate | 3GPP TS 29.572 [42] | Age of the location estimate for change of location type or motion type of Location deferred report. |
| AccuracyFulfilmentIndicator | 3GPP TS 29.572 [42] | The indication whether the obtained location estimate satisfies the requested QoS or not. |
| VelocityEstimate | 3GPP TS 29.572 [42] | UE velocity, if requested and available. |
| LinearDistance | 3GPP TS 29.572 [42] | This IE shall be present and set to true if a location estimate is required for motion event report. |
| NetworkAreaInfo | 3GPP TS 29.554 [50] | Identifies a network area information. |
| PatchItem | 3GPP TS 29.571 [45] | Contains the list of changes to be made to a resource according to the JSON PATCH format specified in IETF RFC 6902 [67]. |
| PduSessionInformation | 3GPP TS 29.523 [70] | Represents PDU session identification information. |
| PositioningMethod | 3GPP TS 29.572 [42] | Identifies the positioning method used to obtain the location estimate of the UE. |
| SACEventStatus | 3GPP TS 29.571 [45] | Contains the network slice status information related to network slice admission control. |
| SACInfo | 3GPP TS 29.571 [45] | Represents network slice admission control information to control the triggering of notifications or convey network slice status information. |
| Snssai | 3GPP TS 29.571 [45] | Contains a S-NSSAI. |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.3.4-1. |
| ServiceIdentiy | 3GPP TS 29.515 [65] | Service identity. |
| SupportedGADShapes | 3GPP TS 29.572 [42] | Supported Geographical Area Description shapes. |
| MacAddr48 | 3GPP TS 29.571 [45] | MAC Address. |
| UcPurpose | 3GPP TS 29.503 [63] | Represents the purpose of a user consent. |
| Uinteger | 3GPP TS 29.571 [45] | Represents an unsigned Integer. |
| Uri | 5.2.1.3.2 | Represents a URI. |
| UserLocation | 3GPP TS 29.571 [6] | Represents a user location. |
| RangingSlResult | 3GPP TS 29.572 [42] | Indicates result type for ranging and sidelink positioning |
| RelatedUE | 3GPP TS 29.572 [42] | Indicates information for related UE for ranging and sidelink positioning |

Table 5.3.2.1.1-2 specifies the data types defined for the MonitoringEvent API.

Table 5.3.2.1.1-2: MonitoringEvent API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| Accuracy | 5.3.2.4.7 | Represents a desired granularity of accuracy for the requested location information. | Location\_notification,  eLCS, EDGEAPP |
| ApiCapabilityInfo | 5.3.2.3.9 | Represents the availability information of supported API. | API\_support\_capability\_notification |
| AppliedParameterConfiguration | 5.3.2.3.8 | Represents the parameter configuration applied in the network. | Enhanced\_param\_config |
| AssociationType | 5.3.2.4.6 | Represents an IMEI or IMEISV to IMSI association. | Change\_of\_IMSI\_IMEI\_association\_notification |
| ConsentRevocNotif | 5.3.2.3.12 | Represents the user consent revocation information conveyed in a user consent revocation notification. | UserConsentRevocation |
| ConsentRevoked | 5.3.2.3.13 | Represents the information related to revoked user consent(s). | UserConsentRevocation |
| FailureCause | 5.3.2.3.6 | Represents the reason of communication failure. | Communication\_failure\_notification |
| GroupMembListChanges | 5.3.2.3.13 | Represents information on the change(s) to a group's members list. | GMEC |
| IdleStatusInfo | 5.3.2.3.3 | Represents the information relevant to when the UE transitions into idle mode. | Ue-reachability\_notification,  Availability\_after\_DDN\_failure\_notification |
| InterfaceIndication | 5.3.2.4.10 | Represents the network entity used for data delivery towards the SCS/AS. | Pdn\_connectivity\_status |
| LocationFailureCause | 5.3.2.4.11 | Represents the cause of location/positioning failure. | eLCS |
| LocationInfo | 5.3.2.3.5 | Represents the user location information. | Location\_notification, eLCS |
| LocationType | 5.3.2.4.5 | Represents a location type. | Location\_notification, Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G,  eLCS |
| MonitoringEventReport | 5.3.2.3.2 | Represents an event monitoring report. |  |
| MonitoringEventReports | 5.3.2.3.10 | Represents one or multiple event monitoring report(s). | enNB |
| MonitoringEventSubscription | 5.3.2.1.2 | Represents a subscription to event(s) monitoring. |  |
| MonitoringNotification | 5.3.2.2.2 | Represents an event monitoring notification. |  |
| MonitoringType | 5.3.2.4.3 | Represents a monitoring event type. |  |
| PdnConnectionInformation | 5.3.2.3.7 | Represents the PDN connection information of the UE. | Pdn\_connectivity\_status |
| PdnConnectionStatus | 5.3.2.4.8 | Represents the PDN connection status. | Pdn\_connectivity\_status |
| PdnType | 5.3.2.4.9 | Represents a PDN connection type. |  |
| ReachabilityType | 5.3.2.4.4 | Represents a reachability type. | Ue-reachability\_notification |
| SACRepFormat | 5.3.2.4.13 | Represents the NSAC reporting format. | NSAC |
| SubType | 5.3.2.4.12 | Represents a subscription type. | UAV |
| UavPolicy | 5.3.2.3.11 | Represents the policy information included in the UAV presence monitoring request. | UAV |
| UePerLocationReport | 5.3.2.3.4 | Represents the number of UEs found at the indicated location. | Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G |
| UpCumEvtRep | 5.3.2.3.18 | Represents the cumulative event report for events reported via user plane. | eLCS\_en |
| UpLocRepAddrAfRm | 5.3.2.3.17 | Represents the user plane addressing information. | eLCS\_en |
| RangeDirection | 5.3.2.3.14 | Represents the range and direction between two points. | Ranging\_SL |
| TwodrelativeLocation | 5.3.2.3.15 | Represents 2D local co-ordinates with origin corresponding to another known point. | Ranging\_SL |
| ThreedrelativeLocation | 5.3.2.3.16 | Represents 3D local co-ordinates with origin corresponding to another known point. | Ranging\_SL |

##### 5.3.2.1.2 Type: MonitoringEventSubscription

This type represents a subscription to monitoring an event. The same structure is used in the subscription request and subscription response.

Table 5.3.2.1.2-1: Definition of type MonitoringEventSubscription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 3) |
| self | Link | 0..1 | Link to the resource "Individual Monitoring Event Subscription". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| mtcProviderId | string | 0..1 | Identifies the MTC Service Provider and/or MTC Application. (NOTE 7) |  |
| appIds | array(string) | 0..N | Identifies the Application Identifier(s). (NOTE 16) | AppDetection\_5G |
| externalId | ExternalId | 0..1 | Identifies a user as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  This attribute may also be present in a monitoring event subscription response message, if the "UEId\_retrieval" feature is supported and the corresponding request message includes the "ueIpAddr" attribute or the "ueMacAddr" attribute.  (NOTE 1) (NOTE 5) |  |
| msisdn | Msisdn | 0..1 | Identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 1) (NOTE 5) |  |
| addedExternalIds | array(ExternalId) | 0..N | Indicates addition of the external Identifier(s) within the active group. | Partial\_group\_modification |
| addedMsisdns | array(Msisdn) | 0..N | Indicates addition of the MSISDN(s) within the active group. | Partial\_group\_modification |
| excludedExternalIds | array(ExternalId) | 0..N | Indicates cancellation of the external Identifier(s) within the active group. | Partial\_group\_modification |
| excludedMsisdns | array(Msisdn) | 0..N | Indicates cancellation of the MSISDN(s) within the active group. | Partial\_group\_modification |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 1) (NOTE 6) |  |
| addExtGroupIds | array(ExternalGroupId) | 0..N | Identifies user groups as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 1) (NOTE 6) | Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G |
| ipv4Addr | Ipv4Addr | 0..1 | Identifies the Ipv4 address.  (NOTE 1) | Location\_notification,  Communication\_failure\_notification |
| ipv6Addr | Ipv6Addr | 0..1 | Identifies the Ipv6 address.  (NOTE 1) | Location\_notification,  Communication\_failure\_notification |
| dnn | Dnn | 0..1 | Identifies a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. (NOTE 8) (NOTE 16) | Session\_Management\_Enhancement, UEId\_retrieval, AppDetection\_5G |
| notificationDestination | Link | 1 | An URI of a notification destination that T8 message shall be delivered to. |  |
| requestTestNotification | boolean | 0..1 | Set to "true" by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3.  Set to "false" by the SCS/AS indicates not request SCEF to send a test notification  Default "false" if omitted. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 5.2.5.4. | Notification\_websocket |
| monitoringType | MonitoringType | 1 | Enumeration of monitoring type. Refer to clause 5.3.2.4.3. |  |
| maximumNumberOfReports | integer | 0..1 | Identifies the maximum number of event reports to be generated by the HSS, MME/SGSN as specified in clause 5.6.0 of 3GPP TS 23.682 [2].  (NOTE 2, NOTE 9, NOTE 13)  If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to (or contains) the "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS" values, this attribute may also be provided with a value of 1 to indicate that one-time reporting of the network slice status information is requested by the AF. |  |
| monitorExpireTime | DateTime | 0..1 | Identifies the absolute time at which the related monitoring event request is considered to expire, as specified in clause 5.6.0 of 3GPP TS 23.682 [2].  When the "monitoringType" attribute (or the "addnMonTypes" attribute) is set to either "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS", this attribute shall be absent in the response to a one-time reporting monitoring subscription request.  (NOTE 2) |  |
| repPeriod | DurationSec | 0..1 | Identifies the periodic time for the event reports. (NOTE 8, NOTE 9, NOTE 13)  If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS", this attribute may be provided. When provided, it also indicates that periodic reporting of the network slice status information is requested by the AF. |  |
| groupReportGuardTime | DurationSec | 0..1 | Identifies the time for which the SCEF can aggregate the monitoring event reports detected by the UEs in a group and report them together to the SCS/AS, as specified in clause 5.6.0 of 3GPP TS 23.682 [2]. |  |
| maximumDetectionTime | DurationSec | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOSS\_OF\_CONNECTIVITY", this parameter may be included to identify the maximum period of time after which the UE is considered to be unreachable. | Loss\_of\_connectivity\_notification |
| reachabilityType | ReachabilityType | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "UE\_REACHABILITY", this parameter shall be included to identify whether the request is for "Reachability for SMS" or "Reachability for Data". | Ue-reachability\_notification |
| maximumLatency | DurationSec | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "UE\_REACHABILITY", this parameter may be included to identify the maximum delay acceptable for downlink data transfers. | Ue-reachability\_notification |
| maximumResponseTime | DurationSec | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "UE\_REACHABILITY", this parameter may be included to identify the length of time for which the UE stays reachable to allow the SCS/AS to reliably deliver the required downlink data. | Ue-reachability\_notification |
| suggestedNumberOfDlPackets | integer | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "UE\_REACHABILITY", this parameter may be included to identify the number of packets that the serving gateway shall buffer in case that the UE is not reachable. | Ue-reachability-notification |
| idleStatusIndication | boolean | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "UE\_REACHABILITY" or "AVAILABILITY\_AFTER\_DDN\_FAILURE", this parameter may be included to indicate the notification of when a UE, for which PSM is enabled, transitions into idle mode.  - "true": indicate enabling of notification  - "false": indicate no need to notify  Default: "false" if omitted. | Ue-reachability\_notification,  Availability\_after\_DDN\_failure\_notification,  Availability\_after\_DDN\_failure\_notification\_enhancement |
| locationType | LocationType | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING" or "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter shall be included to identify whether the request is for Current Location, Initial Location or Last known Location.  (NOTE 4) | Location\_notification, Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G,  eLCS |
| accuracy | Accuracy | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to identify the desired level of accuracy of the requested location information, as described in clause 4.9.2 of 3GPP TS 23.682 [2]. (NOTE 10, NOTE 11)  For 5G, if the eLCS feature is not supported, the default value is "TA\_RA". | Location\_notification,  eLCS |
| minimumReportInterval | DurationSec | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to identify a minimum time interval between Location Reporting notifications.  If the "ldrType" attribute is present and set to "ENTERING\_INTO\_AREA". "LEAVING\_FROM\_AREA", "BEING\_INSIDE\_AREA" or "MOTION", this attribute shall not be included if the maximumNumberOfReports attribute is present and set to one time event. | Location\_notification,  eLCS |
| maxRptExpireIntvl | DurationSec | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to identify a maximum time interval between Location Reporting notifications.  If the "ldrType" attribute is present and set to "ENTERING\_INTO\_AREA". "LEAVING\_FROM\_AREA", "BEING\_INSIDE\_AREA" or "MOTION", this attribute shall not be included if the maximumNumberOfReports attribute is present and set to one time event. | eLCS |
| samplingInterval | DurationSec | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to identify the maximum time interval between consecutive evaluations by a UE of a trigger event. | eLCS |
| reportingLocEstInd | boolean | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to indicate whether event reporting requires the location information.  Set to "true", indiates the location estimation information shall be included in event reporting.  Set to "false", indicates the location estimation information shall not be included in event reporting.  Default: "false" if omitted. | eLCS |
| linearDistance | LinearDistance | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to indicate the linear(straight line) distance threshold for motion event reporting. | eLCS |
| locQoS | LocationQoS | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to indicate the expected location QoS requirement for an immediate MT-LR or deferred MT-LR.  The "Multiple QoS Class" (i.e. the "lcsQosClass" attribute within the LocationQoS data structure is set to "MULTIPLE\_QOS") shall only be used when the "MUTIQOS" feature is supported.  (NOTE 10) | eLCS, MULTIQOS |
| svcId | ServiceIdentity | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to indicate the service identity of AF. | eLCS |
| ldrType | LdrType | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to indicate the event type for a deferred MT-LR. | eLCS |
| velocityRequested | VelocityRequested | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to indicate if the velocity of the target UE is requested or not. | eLCS |
| maxAgeOfLocEst | AgeOfLocationEstimate | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to indicate acceptable maximum age of location estimate. | eLCS |
| locTimeWindow | TimeWindow | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to indicate the starting time and ending time for a deferred MT-LR. | eLCS |
| supportedGADShapes | array(SupportedGADShapes) | 0..N | Supported Geographical Area Description shapes. | eLCS |
| codeWord | CodeWord | 0..1 | Code word. | eLCS |
| upLocRepIndAf | boolean | 0..1 | If the "LOCATION\_REPORTING" value is set in either the "monitoringType" attribute or the "addnMonTypes" attribute, this attribute may be included to convey the indication of location reporting over user plane.  When present, this attribute shall be set as follows:  "true": the location reporting over user plane is required.  "false": the location reporting over user plane is not required.  Default: "false" if omitted. | eLCS\_en |
| upLocRepAddrAf | UpLocRepAddrAfRm | 0..1 | If the "upLocRepIndAf" attribute is present and set to "true", this attribute may be present to convey the AF's user plane addressing information to be used for location reporting over user plane. | eLCS\_en |
| associationType | AssociationType | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION", this parameter shall be included to identify whether the change of IMSI-IMEI or IMSI-IMEISV association shall be detected. | Change\_of\_IMSI\_IMEI\_association\_notification |
| plmnIndication | boolean | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "ROAMING\_STATUS", this parameter may be included to indicate the notification of UE's Serving PLMN ID.  - "true": The value shall be used to indicate enabling of notification;  - "false": The value shall be used to indicate disabling of notification.  Default: "false" if omitted. | Roaming\_status\_notification |
| locationArea | LocationArea | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter may be included to indicate the area within which the SCS/AS requests the number of UEs.  If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "AREA\_OF\_INTEREST", this parameter shall be included to indicate the area within which the SCS/AS requests the presence status of a specific UAV. | Number\_of\_UEs\_in\_an\_area\_notification, UAV |
| locationArea5G | LocationArea5G | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter may be included to indicate the area within which the AF requests the number of UEs.  If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "LOCATION\_REPORTING", this parameter may be included to indicate the area within which the AF requests the area event of the target UE. (NOTE 12)  If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "AREA\_OF\_INTEREST", this parameter shall be included to indicate the area within which the AF requests the presence status of a specific UAV. | Number\_of\_UEs\_in\_an\_area\_notification\_5G, eLCS, UAV |
| dddTraDescriptors | array(DddTrafficDescriptor) | 0..N | The traffic descriptor(s) of the downlink data source. May be included for event "DOWNLINK\_DATA\_DELIVERY\_STATUS" or "AVAILABILITY\_AFTER\_DDN\_FAILURE". | Downlink\_data\_delivery\_status\_5G,  Availability\_after\_DDN\_failure\_notification\_enhancement |
| dddStati | array(DlDataDeliveryStatus) | 0..N | May be included for event "DOWNLINK\_DATA\_DELIVERY\_STATUS". The subscribed stati (delivered, transmitted, buffered) for the event. If omitted all stati are subscribed. | Downlink\_data\_delivery\_status\_5G |
| monitoringEventReport | MonitoringEventReport | 0..1 | Identifies a monitoring event report which is sent from the SCEF to the SCS/AS. |  |
| apiNames | array(string) | 0..N | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "API\_SUPPORT\_CAPABILITY", this parameter may be included. Each element identifies the name of an API.  It shall set as {apiName} part of the URI structure for each T8 or N33 API as defined in the present specification or 3GPP TS 29.522 [62], respectively.  This allows the SCS/AS to request the capability change for its interested APIs. If it is omitted, the SCS/AS requests to be notified for capability change for all APIs the SCEF+NEF supports. | API\_support\_capability\_notification |
| tgtNsThreshold | SACInfo | 0..1 | Indicates the monitoring threshold value, for the network slice identified by the "snssai" attirbute, upon which event notification(s) are triggered.  This attribute may be provided if the "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS". When provided, it also indicates that threshold based reporting of the network slice status information is requested by the AF.  (NOTE 13) | NSAC |
| nsRepFormat | SACRepFormat | 0..1 | Indicates the requested NSAC reporting format, i.e. "PERCENTAGE" or "NUMERICAL".  It shall be provided only if the "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS" and periodic reporting is requested (i.e. the "repPeriod" attribute is provided instead of the "tgtNsThreshold" attribute) or one-time reporting is requested (i.e. the "maximumNumberOfReports" attribute is provided with a value of 1). | NSAC |
| afServiceId | string | 0..1 | Contains the identifier of a service on behalf of which the AF is sending the request.  It may be provided by an untrusted AF and only if the "monitoringType" attribute (or the "addnMonTypes" attribute) is set to either "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS".  (NOTE 15) | NSAC |
| snssai | Snssai | 0..1 | Indicates the S-NSSAI that the event monitoring subscription is targeting.  This attribute may be provided if the "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS".  This attribute may also be provided if the "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "PDN\_CONNECTIVITY\_STATUS" or "DOWNLINK\_DATA\_DELIVERY\_STATUS".  (NOTE 8) (NOTE 15) (NOTE 16) | NSAC, Session\_Management\_Enhancement, UEId\_retrieval, AppDetection\_5G |
| immediateRep | boolean | 0..1 | Indicates that immediate reporting is requested or not.  - "true": indicate an immediate reporting is requested.  - "false": indicate an immediate reporting is not requested.  Default value: "false" if omitted.  This attribute may be included if the "monitoringType" attribute (or the "addnMonTypes" attribute) is set to either "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS" when the "NSAC" feature is supported.  (NOTE 13)  This attribute may also be included if the SCS/AS requires immediate reporting of the subscribed event(s) when the "enNB1\_5G" feature is supported.  (NOTE 4) | NSAC,  enNB1\_5G |
| uavPolicy | UavPolicy | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "AREA\_OF\_INTEREST", this parameter may be included to indicate the 3GPP network to take corresponding action. | UAV |
| subType | SubType | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter may be included to indicate the subscription type to be listed in the Event report.  (NOTE 14) | UAV |
| sesEstInd | boolean | 0..1 | If "monitoringType" attribute (or the "addnMonTypes" attribute) is set to "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter may be included.  If set to “true”, it indicates that only UE’s with “PDU session established for DNN(s) subject to aerial service” are to be listed in the Event report.  If set to "false", it indicates that UE’s with "PDU session established for DNN(s) subject to aerial service" are not to be listed in the Event report.  Default: "false" if omitted.  (NOTE 14) | UAV |
| addnMonTypes | array(MonitoringType) | 0..N | Represents additional monitoring types.  (NOTE 17) | enNB |
| addnMonEventReports | array(MonitoringEventReport) | 0..N | Additional monitoring event reports.  May only be provided if the "addnMonTypes" attribute is provided in the corresponding subscription creation/update request. | enNB |
| ueIpAddr | IpAddr | 0..1 | UE IP address. | UEId\_retrieval |
| ueMacAddr | MacAddr48 | 0..1 | UE MAC address. | UEId\_retrieval |
| revocationNotifUri | Uri | 0..1 | Contains the URI via which the AF desires to receive user consent revocation notifications. | UserConsentRevocation |
| reqRangingSlRes | array(RangingSlResult) | 1..N | Contains the type of result requested for ranging and sidelink positioning. | Ranging\_SL |
| relatedUEs | array(RelatedUE) | 1..N | Contains a list of the information for the related UEs for the ranging and sidelink positioning. | Ranging\_SL |
| NOTE 1: One of the properties "externalId", "msisdn", "ipv4Addr", "ipv6Addr" or "externalGroupId" shall be included for features "Location\_notification" and "Communication\_failure\_notification";. One of the properties "externalId", "msisdn" or "externalGroupId" shall be included for feature "eLCS". "ipv4Addr" or "ipv6Addr" is required for monitoring via the PCRF for an individual UE. One of the properties "externalId", "msisdn" or "externalGroupId" shall be included for features "Pdn\_connectivity\_status", "Loss\_of\_connectivity\_notification", "Ue-reachability\_notification", "Change\_of\_IMSI\_IMEI\_association\_notification", "Roaming\_status\_notification", "Availability\_after\_DDN\_failure\_notification" and "Availability\_after\_DDN\_failure\_notification\_enhancement".  The property "externalGroupId" shall be included for the "GMEC" feature to subscribe to the group member list change event reporting.  NOTE 2: Inclusion of either "maximumNumberOfReports" (with a value higher than 1) or "monitorExpireTime" makes the Monitoring Request a Continuous Monitoring Request, where the SCEF sends Notifications until either the maximum number of reports or the monitoring duration indicated by the property "monitorExpireTime" is exceeded. The "maximumNumberOfReports" with a value 1 makes the Monitoring Request a One-time Monitoring Request. At least one of "maximumNumberOfReports" or "monitorExpireTime" shall be provided.  NOTE 3: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 4: In this release, for features "Number\_of\_UEs\_in\_an\_area\_notification" and "Number\_of\_UEs\_in\_an\_area\_notification\_5G", locationType shall be set to "LAST\_KNOWN\_LOCATION". For 5G, if the "locationType" attribute sets to "LAST\_KNOWN\_LOCATION", the "maximumNumberOfReports" attribute shall set to 1 as a One-time Monitoring Request. For 5G, when the "enNB1\_5G" feature is supported and the "immediateRep" attribute is present set to "true" and outside the scope of the "NSAC" feature, then the "locationType" shall be set to "LAST\_KNOWN\_LOCATION"; when the "immediateRep" is present set to "false" and outside the scope of the "NSAC" feature, then the "locationType" shall be set to "CURRENT\_LOCATION".  NOTE 5: The property does not apply for the features "Number\_of\_UEs\_in\_an\_area\_notification" and "Number\_of\_UEs\_in\_an\_area\_notification\_5G".  NOTE 6: For the features "Number\_of\_UEs\_in\_an\_area\_notification" and "Number\_of\_UEs\_in\_an\_area\_notification\_5G", the property "externalGroupId" may be included for single group and "addExtGroupIds" may be included for multiple groups but not both.  NOTE 7: The SCEF should check received MTC provider identifier and then the SCEF may:  - override it with local configured value and send it to HSS; - send it directly to the HSS; or - reject the monitoring configuration request.  NOTE 8: This property is only applicable for the NEF.  NOTE 9: The value of the "maximumNumberOfReports" attribute sets to 1 and the "repPeriod" attribute are mutually exclusive.  NOTE 10: If the "eLCS" feature is supported, the "accuracy" attribute and "locQoS" attribute are mutually exclusive, and only the "GEO\_AREA" value is applicable for the"accuracy" attribute.  NOTE 11: The value of "TWAN\_ID" is only applicable when the monitoring subscription is via the PCRF as described in clause 4.4.2.2.4.  NOTE 12: If the "eLCS" feature is supported, only the "geographicAreas" attribute within the "locationArea5G" attribute is applicable.  NOTE 13: For the "NSAC" feature, if the "maximumNumberOfReports" attribute is provided with a value of 1, the "repPeriod" attribute and the "tgtNsThreshold" attribute shall not be provided and the "immediateRep" attribute shall be provided and set to true; otherwise, either the "repPeriod" attribute or the "tgtNsThreshold" attribute shall be provided, and if immediate reporting is requested, the "immediateRep" attribute shall be provided and set to true.  NOTE 14: For the feature "UAV", the event "Number of UEs present in a geographical area" is used, where "subType" indication and/or "sesEstInd" may be used as event filters.  NOTE 15: For the "NSAC" feature, the "snssai" and "afServiceId" attributes are mutually exclusive.  NOTE 16: For the "AppDetection\_5G" feature, AF shall provide the "appIds" attribute along with "snssai" and "dnn" attributes for subscription of application traffic detection event notification. the subscription request applies to all the UEs associated with the "snssai" and the "dnn" provided in the request.  NOTE 17: When the "enNB" feature is supported and the "addnMonTypes" attribute is present and contains at least one array element, then this attribute shall not contain an array element set to the same value as the "monitoringType" attribute. | | | | |

##### 5.3.2.1.3 Void

#### 5.3.2.2 Notification data types

##### 5.3.2.2.1 Introduction

This clause defines data structures to be used in notifications.

##### 5.3.2.2.2 Type: MonitoringNotification

This data type represents a monitoring notification which is sent from the SCEF to the SCS/AS.

Table 5.3.2.2.2-1: Definition of type MonitoringNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| subscription | Link | 1 | Link to the subscription resource to which this notification is related. |  |
| configResults | array(ConfigResult) | 0..N | Each element identifies a notification of grouping configuration result. |  |
| monitoringEventReports | array(MonitoringEventReport) | 0..N | Each element identifies a monitoring event report. |  |
| addedExternalIds | array(ExternalId) | 0..N | Identifies the added external Identifier(s) within the active group via the "externalGroupId" attribute within the MonitoringEventSubscription data type. | Partial\_group\_modification |
| addedMsisdns | array(Msisdn) | 0..N | Identifies the added MSISDN(s) within the active group via the "externalGroupId" attribute within the MonitoringEventSubscription data type. | Partial\_group\_modification |
| cancelExternalIds | array(ExternalId) | 0..N | Identifies the cancelled external Identifier(s) within the active group via the "externalGroupId" attribute within the MonitoringEventSubscription data type. | Partial\_group\_modification |
| cancelInd | Boolean | 0..1 | Indicates whether to request to cancel the corresponding monitoring subscription. Set to false or omitted otherwise. |  |
| cancelMsisdns | array(Msisdn) | 0..N | Identifies the cancelled MSISDN(s) within the active group via the "externalGroupId" attribute within the MonitoringEventSubscription data. | Partial\_group\_modification |
| appliedParam | AppliedParameterConfiguration | 0..1 | Indicates the applied parameter configuration in the network. For the attributes included in AppliedParameterConfiguration data type, the "maximumLatency" and "maximumResponseTime" attributes require the "Ue-reachability\_notification" feature support, and the "maximumDetectionTime" attribute requires the "Loss\_of\_connectivity\_notification" feature support. | Enhanced\_param\_config |
| NOTE: Properties marked with a feature as defined in subclause 5.3.4 are applicable as described in subclause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

#### 5.3.2.3 Referenced structured data types

##### 5.3.2.3.1 Introduction

This clause defines structured data types that are referenced from data structures defined in the previous clauses.

##### 5.3.2.3.2 Type: MonitoringEventReport

This data type represents a monitoring event notification which is sent from the SCEF to the SCS/AS.

Table 5.3.2.3.2-1: Definition of type MonitoringEventReport

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | Cardinality | | Description | | Applicability (NOTE 1) | |
| imeiChange | | AssociationType | | 0..1 | | If "monitoringType" is "CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION", this parameter shall be included to identify the event of change of IMSI-IMEI or IMSI-IMEISV association is detected.  Refer to 3GPP TS 29.336 [11] Clause 8.4.22. | | Change\_of\_IMSI\_IMEI\_association\_notification | |
| externalId | | ExternalId | | 0..1 | | External identifier.  This attribute may also be present in the monitoring event subscription one-time response message, if the "UEId\_retrieval" feature is supported and the corresponding request message includes the "ueIpAddr" attribute or the "ueMacAddr" attribute.  (NOTE 2) | |  | |
| appId | | string | | 0..1 | | Represents the detected application. | | AppDetection\_5G | |
| pduSessInfo | | PduSessionInformation | | 0..1 | | Represents PDU session information related to the observed event.  If "monitoringType" is "APPLICATION\_START" and/or "APPLICATION\_STOP", this parameter may be included to indicate the Application traffic detection details. | | AppDetection\_5G | |
| idleStatusInfo | | IdleStatusInfo | | 0..1 | | If "idleStatusIndication" in the "MonitoringEventSubscription"sets to "true", this parameter shall be included to indicate the information when the UE transitions into idle mode. | | Ue-reachability\_notification,  Availability\_after\_DDN\_failure\_notification | |
| locationInfo | | LocationInfo | | 0..1 | | If "monitoringType" is "LOCATION\_REPORTING", this parameter shall be included to indicate the user location related information. | | Location\_notification, eLCS | |
| locFailureCause | | LocationFailureCause | | 0..1 | | Indicates the location positioning failure cause. | | eLCS | |
| lossOfConnectReason | | integer | | 0..1 | | If "monitoringType" is "LOSS\_OF\_CONNECTIVITY", this parameter shall be included if available to identify the reason why loss of connectivity is reported.  Refer to 3GPP TS 29.336 [11] Clause 8.4.58. | | Loss\_of\_connectivity\_notification | |
| unavailPerDur | | DurationSec | | 0..1 | | If "monitoringType" is "LOSS\_OF\_CONNECTIVITY", then this parameter shall be included if available to identify the UE’s Unavailability Period Duration. | | Loss\_of\_connectivity\_notification\_5G | |
| maxUEAvailabilityTime | | DateTime | | 0..1 | | If "monitoringType" is "UE\_REACHABILITY", this parameter may be included to identify the timestamp until which a UE using a power saving mechanism is expected to be reachable for SM delivery.  Refer to Clause 5.3.3.22 of 3GPP TS 29.338 [34]. | | Ue-reachability\_notification | |
| msisdn | | Msisdn | | 0..1 | | Identifies the MS internal PSTN/ISDN number.  (NOTE 2) | |  | |
| monitoringType | | MonitoringType | | 1 | | Identifies the type of monitoring type as defined in clause 5.3.2.4.3. | |  | |
| uePerLocationReport | | UePerLocationReport | | 0..1 | | If "monitoringType" is "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter shall be included to indicate the number of UEs found at the location.  If "subType" indicates "AERIAL\_UE" subscription type, this parameter shall be included to indicate the number of UAV’s found at the location. | | Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G | |
| plmnId | | PlmnId | | 0..1 | | If "monitoringType" is "ROAMING\_STATUS" and "plmnIIndication" in the "MonitoringEventSubscription" sets to "true", this parameter shall be included to indicate the UE's serving PLMN. | | Roaming\_status\_notification | |
| reachabilityType | | ReachabilityType | | 0..1 | | If "monitoringType" is "UE\_REACHABILITY", this parameter shall be included to identify the reachability of the UE.  Refer to 3GPP TS 29.336 [11] Clause 8.4.20. | | Ue-reachability\_notification | |
| roamingStatus | | boolean | | 0..1 | | If "monitoringType" is "ROAMING\_STATUS", this parameter shall be set to "true" if the new serving PLMN is different from the HPLMN. Set to false or omitted otherwise. | | Roaming\_status\_notification | |
| failureCause | | FailureCause | | 0..1 | | If "monitoringType" is "COMMUNICATION\_FAILURE", this parameter shall be included to indicate the reason of communication failure. | | Communication\_failure\_notification | |
| eventTime | | DateTime | | 0..1 | | Identifies when the event is detected or received.  Shall be included for each group of UEs. | |  | |
| pdnConnInfoList | | array(PdnConnectionInformation) | | 0..N | | If "monitoringType" is "PDN\_CONNECTIVITY\_STATUS", this parameter shall be included to indicate the PDN connection details. | | Pdn\_connectivity\_status | |
| dddStatus | | DlDataDeliveryStatus | | 0..1 | | If "monitoringType" is "DOWNLINK\_DATA\_DELIVERY\_STATUS", this parameter shall be included to identify the downlink data delivery status detected by the network. | | Downlink\_data\_delivery\_status\_5G | |
| dddTrafDescriptor | | DddTrafficDescriptor | | 0..1 | | If "monitoringType" is "DOWNLINK\_DATA\_DELIVERY\_STATUS", this parameter shall be included to identify the downlink data descriptor impacted by the downlink data delivery status change. | | Downlink\_data\_delivery\_status\_5G | |
| maxWaitTime | | DateTime | | 0..1 | | If "monitoringType" is "DOWNLINK\_DATA\_DELIVERY\_STATUS", this parameter may be included to identify the time before which the data will be buffered. | | Downlink\_data\_delivery\_status\_5G | |
| apiCaps | | array(ApiCapabilityInfo) | | 0..N | | If "monitoringType" is "API\_SUPPORT\_CAPABILITY", this parameter shall be included to indicate the availability of all APIs supported by the serving network or the availability of interested APIs, indicated by the "apiNames" attribute in "MonitoringEventSubscription", supported by the serving network.  If no API is supported by the serving network, an empty apiCaps shall be provided. | | API\_support\_capability\_notification | |
| nSStatusInfo | | SACEventStatus | | 0..1 | | If the "monitoringType" attribute is set to "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS", this parameter shall be included to indicate the current network slice status information for the concerned network slice.  (NOTE 3) | | NSAC | |
| afServiceId | | string | | 0..1 | | Contains the identifier of the service to which the NSAC reporting is related.  It shall be provided only if it is present in the related NSAC subscription request and the "monitoringType" attribute is set to either "NUM\_OF\_REGD\_UES" or "NUM\_OF\_ESTD\_PDU\_SESSIONS". | | NSAC | |
| servLevelDevId | | string | | 0..1 | | If "monitoringType" is "AREA\_OF\_INTEREST" or "NUMBER\_OF\_UES\_IN\_AN\_AREA" and "subType" indicate "AERIAL\_UE", this parameter may be included to identify the UAV. | | UAV | |
| uavPresInd | | boolean | | 0..1 | | If "monitoringType" is "AREA\_OF\_INTEREST", this parameter shall be set to true if the specified UAV is in the monitoring area. Set to false or omitted otherwise. | | UAV | |
| groupMembListChanges | | GroupMembListChanges | | 0..1 | | Contains information on the change(s) to the group member list.  This attribute shall be present only if the "monitoringType" attribute is set to "GROUP\_MEMBER\_LIST\_CHANGE". | | GMEC | |
| NOTE 1: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: Identifies the user for which the event occurred. At least one of the properties shall be included.  NOTE 3: If the "eNSAC" feature is supported, the "SACEventStatus" data type shall include an indication to report either the current number of registered UEs or the current number of UEs with at least one PDU session/PDN connection. | | | | | | | | | |

##### 5.3.2.3.3 Type: IdleStatusInfo

This data type represents the information when the UE transitions into idle mode. It is sent from the SCEF to the SCS/AS.

Table 5.3.2.3.3-1: Definition of type IdleStatusInfo

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| activeTime | DurationSec | 0..1 | Identifies the active time granted to the UE. It shall be present if the idle status indication is requested by the SCS/AS with "idleStatusIndication" in the "monitoringEventSubscription" sets to "true". |
| edrxCycleLength | number | 0..1 | Identifies the power saving interval in unit of seconds. It shall be present if the idle status indication is requested by the SCS/AS with "idleStatusIndication" in the "monitoringEventSubscription" sets to "true". |
| suggestedNumberOfDlPackets | integer | 0..1 | Identifies the number of packets shall be buffered in the serving gateway. It shall be present if the idle status indication is requested by the SCS/AS with "idleStatusIndication" in the "monitoringEventSubscription" sets to "true". |
| idleStatusTimestamp | DateTime | 0..1 | Identifies the timestamp at which the UE transitions into idle mode. It shall be present if the idle status indication is requested by the SCS/AS with "idleStatusIndication" in the "monitoringEventSubscription" sets to "true". |
| periodicAUTimer | DurationSec | 0..1 | Identifies the subscribed periodic RAU/TAU timer value. It shall be present if the idle status indication is requested by the SCS/AS with "idleStatusIndication" in the "monitoringEventSubscription" sets to "true". |

##### 5.3.2.3.4 Type: UePerLocationReport

This data type represents the number of UEs found at the indicated location information. It is sent from the SCEF to the SCS/AS.

Table 5.3.2.3.4-1: Definition of type UePerLocationReport

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| ueCount | integer | 1 | Identifies the number of UEs. |
| externalIds | array(ExternalId) | 0..N | Each element uniquely identifies a user.  (NOTE) |
| msisdns | array(Msisdn) | 0..N | Each element identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE) |
| servLevelDevIds | array(string) | 0..N | Each element uniquely identifies a UAV. |
| NOTE: The property shall be included if received from the MME(s)/SGSN(s). | | | |

##### 5.3.2.3.5 Type: LocationInfo

This data type represents the user location information which is sent from the SCEF to the SCS/AS.

Table 5.3.2.3.5-1: Definition of LocationInfo data Type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| ageOfLocationInfo | DurationMin | 0..1 | Indicates the elapsed time since the last network contact of the UE.  Refer to the Age-Of-Location-Information AVP as defined in clause 7.3.126 of 3GPP TS 29.272 [33]. |  |
| cellId | string | 0..1 | Indicates the Cell Global Identification of the user which identifies the cell the UE is registered.  Refer to the Cell-Global-Identity AVP or E-UTRAN-Cell-Global-Identity AVP as defined in clause 7.3.119 or clause 7.3.117 of 3GPP TS 29.272 [33]. (NOTE 2) |  |
| enodeBId | string | 0..1 | Indicates the eNodeB in which the UE is currently located.  Refer to the eNodeB-ID AVP or Extended-eNodeB-ID AVP as defined in clause 7.3.198 or clause 7.3.218 of 3GPP TS 29.272 [33]. |  |
| routingAreaId | string | 0..1 | Identifies the Routing Area Identity of the user where the UE is located.  Refer to the Routing-Area-Identity AVP as defined in clause 7.3.120 of 3GPP TS 29.272 [33]. |  |
| trackingAreaId | string | 0..1 | Identifies the Tracking Area Identity of the user where the UE is located.  Refer to the Tracking-Area-Identity AVP as defined in clause 7.3.118 of 3GPP TS 29.272 [33]. (NOTE 3) |  |
| plmnId | string | 0..1 | Identifies the PLMN Identity of the user where the UE is located.  Refer to the Visited-PLMN-Id AVP as defined in clause 7.3.9 of 3GPP TS 29.272 [33]. |  |
| twanId | string | 0..1 | Identifies the TWAN Identity of the user where the UE is located. |  |
| userLocation | UserLocation | 0..1 | Contains UE location information. (NOTE 4) | enNB1 |
| geographicArea | GeographicArea | 0..1 | Identifies a geographic area of the user where the UE is located. |  |
| civicAddress | CivicAddress | 0..1 | The civic address of the target UE. | eLCS |
| positionMethod | PositioningMethod | 0..1 | Identifies the positioning method used to obtain the location estimate of the UE, if it is available at the LCS server and if needed. | eLCS, Ranging\_SL |
| qosFulfilInd | AccuracyFulfilmentIndicator | 0..1 | Represents whether the requested accuracy is fulfilled or not.  (NOTE 1) | eLCS, Ranging\_SL |
| ueVelocity | VelocityEstimate | 0..1 | UE velocity, if requested and available | eLCS, Ranging\_SL |
| ldrType | LdrType | 0..1 | The IE may be included to indicate the type of event that triggers event notification. | eLCS |
| achievedQos | MinorLocationQoS | 0..1 | When present, this IE shall contain the achieved Location QoS Accuracy of the estimated location.  This IE shall be present if received. | MULTIQOS |
| relatedApplicationlayerId | ApplicationlayerId | 0..1 | Identifies the application layer ID of the related UE for ranging and sidelink positioning, such as located UE, reference UE, etc. | Ranging\_SL |
| rangeDirection | RangeDirection | 0..1 | Identifies a range and direction from a point A to a point B, comprising a range from point A to point B, an azimuth direction from point A to point B and an elevation direction from point A to point B. | Ranging\_SL |
| twodrelativeLocation | TwodrelativeLocation | 0..1 | Identifies a relative 2D location with uncertainty ellipse, characterised by a point described in 2D local co-ordinates with origin corresponding to another known point, distances r1 and r2 and an angle of orientation A. | Ranging\_SL |
| threedrelativeLocation | ThreedrelativeLocation | 0..1 | Identifies a relative 3D location with uncertainty ellipsoid, characterised by a point described in 3D local co-ordinates with origin corresponding to another known point, distances r1 (the "semi-major uncertainty"), r2 (the "semi-minor uncertainty") and r3 (the "vertical uncertainty") and an angle of orientation A (the "angle of the major axis"). | Ranging\_SL |
| relativeVelocity | VelocityEstimate | 0..1 | UE velocity relative to the UE identified with relatedApplicationlayerId. | Ranging\_SL |
| upCumEvtRep | UpCumEvtRep | 0..1 | Contains the cumulative event report for events reported via user plane. | eLCS\_en |
| NOTE 1: For the eLCS feature, if "reportingLocEstInd" attribute is set to false or omitted during the monitoring event request, the location estimation information shall not be included. Otherwise, if the "reportingLocEstInd" attribute is set to true, and  - if the "qosFulfilInd" attribute is set to "REQUESTED\_ACCURACY\_FULFILLED", the location estimate information may be included if the "lcsQosClass" attribute within the "locQoS" attribute is set to "BEST\_EFFORT"; or  - if the "qosFulfilInd" attribute is set to "REQUESTED\_ACCURACY\_NOT\_FULFILLED", the location estimate shall not be included if the "lcsQosClass" attribute within "locQoS" attribute is set to "ASSURED".  NOTE 2: For NEF, the context of the property shall refer to the Ecgi or Ncgi data type as defined in clause 5.4.4.5 or clause 5.4.4.6 of 3GPP TS 29.571 [45].  NOTE 3: For NEF, the context of the property shall refer to the Tai data type as defined in clause 5.4.4 of 3GPP TS 29.571 [45]].  NOTE 4: When the enNB1 feature is supported, the "userLocation" attribute may be provided instead of the "ageOfLocationInfo", "cellId", "enodeBId", "routingAreaId", "trackingAreaId", "plmnId" and "twanId" attributes, when applicable. | | | | |

##### 5.3.2.3.6 Type: FailureCause

This data type represents the reason of communication failure. It shall comply with the provisions defined in table 5.3.2.3.6-1.

Table 5.3.2.3.6-1: Definition of type FailureCause

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| bssgpCause | integer | 0..1 | Identifies a non-transparent copy of the BSSGP cause code.  Refer to 3GPP TS 29.128 [12]. |
| causeType | integer | 0..1 | Identify the type of the S1AP-Cause.  Refer to 3GPP TS 29.128 [12]. |
| gmmCause | integer | 0..1 | Identifies a non-transparent copy of the GMM cause code.  Refer to 3GPP TS 29.128 [12]. |
| ranapCause | integer | 0..1 | Identifies a non-transparent copy of the RANAP cause code.  Refer to 3GPP TS 29.128 [12]. |
| ranNasCause | string | 0..1 | Indicates RAN and/or NAS release cause code information, TWAN release cause code information or untrusted WLAN release cause code information.  Refer to 3GPP TS 29.214 [10].  (NOTE) |
| s1ApCause | integer | 0..1 | Identifies a non-transparent copy of the S1AP cause code.  Refer to 3GPP TS 29.128 [12]. |
| smCause | integer | 0..1 | Identifies a non-transparent copy of the SM cause code.  Refer to 3GPP TS 29.128 [12]. |
| NOTE: If this property is provided in the "FailureCause" type, then other properties shall not be provided. | | | |

##### 5.3.2.3.7 Type: PdnConnectionInformation

This data type represents the PDN connection information of the UE.

Table 5.3.2.3.7-1: Definition of type PdnConnectionInformation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| status | PdnConnectionStatus | 1 | Identifies the PDN connection status. |  |
| apn | string | 0..1 | Identifies the APN, it is depending on the SCEF local configuration whether or not this attribute is sent to the SCS/AS. |  |
| pdnType | PdnType | 1 | PDN type |  |
| interfaceInd | InterfaceIndication | 0..1 | Identifies the 3GPP network function used to communicate with the SCS/AS for non-IP PDN type. |  |
| ipv4Addr | Ipv4Addr | 0..1 | Identifies the UE Ipv4 address. |  |
| ipv6Addrs | array(Ipv6Addr) | 0..N | Identifies the UE Ipv6 address.  (NOTE 2) |  |
| macAddrs | array(MacAddr48) | 0..N | Identifies the UE MAC address(es) which is only available for the immediate report. |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.5.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: ipv6 prefix is included in this attribute if ipv6 full address is not available. | | | | |

##### 5.3.2.3.8 Type: AppliedParameterConfiguration

This data type represents the applied parameter configuration in the network.

Table 5.3.2.3.8-1: Definition of type AppliedParameterConfiguration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| externalIds | array(ExternalId) | 0..N | Each element uniquely identifies a user. (NOTE) |  |
| msisdns | array(Msisdn) | 0..N | Each element identifies the MS internal PSTN/ISDN number allocated for a UE. (NOTE) |  |
| maximumLatency | DurationSec | 0..1 | This parameter may be included to identify the maximum delay acceptable for downlink data transfers, which is applied in the network. |  |
| maximumResponseTime | DurationSec | 0..1 | This parameter may be included to identify the length of time for which the UE stays reachable to allow the SCS/AS to reliably deliver the required downlink data, which is applied in the network. |  |
| maximumDetectionTime | DurationSec | 0..1 | This parameter may be included to identify the maximum period of time after which the UE is considered to be unreachable, which is applied in the network. |  |
| NOTE: If both are omitted, it means the change applies for the whole configuration (i.e. a single UE or a group of UEs). | | | | |

##### 5.3.2.3.9 Type: ApiCapabilityInfo

This data type represents the availability information of a supported API.

Table 5.3.2.3.9-1: Definition of type ApiCapabilityInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| apiName | string | 1 | Identifies the name of an available API provided by the SCEF+NEF.  It shall set as {apiName} part of the URI structure for each T8 or N33 API as defined in the present specification or 3GPP TS 29.522 [62], respectively. |  |
| suppFeat | SupportedFeatures | 1 | Indicates all the features supported by the API in the serving network, which provided by the SCEF+NEF. |  |

##### 5.3.2.3.10 Type: MonitoringEventReports

Table 5.3.2.3.10-1: Definition of type MonitoringEventReports

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| **m**onitoringEventReports | array(MonitoringEventReport) | 1..N | Contains a set of event monitoring reports. |  |
| NOTE: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

##### 5.3.2.3.11 Type: UavPolicy

This data type represents the policy information included in the UAV presence monitoring request.

Table 5.3.2.3.11-1: Definition of type UavPolicy

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| uavMoveInd | boolean | 1 | Indicates the UAV moves in or moves out of the Area of Interest. Set to true if the UAV moves in the Area of Interest. Set to false if the UAV moves out of the Area of Interest. |  |
| revokeInd | boolean | 1 | Indicates whether the connectivity between UAV and UAV controller shall be revoked. If set to true, the connectivity between UAV and UAV controller shall be revoked. Set to false otherwise. |  |

##### 5.3.2.3.11 Type: ConsentRevocNotif

Table 5.3.2.3.11-1: Definition of type ConsentRevocNotif

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| subscriptionId | string | 1 | Contains the identifier of the subscription to which the notification is related. |  |
| consentsRevoked | array(ConsentRevoked) | 1..N | Indicates the revoked user consents. |  |

##### 5.3.2.3.12 Type: ConsentRevoked

Table 5.3.2.3.12-1: Definition of type ConsentRevoked

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| ucPurpose | UcPurpose | 1 | Identifies the purpose of the revoked user consent. |  |
| externalId | ExternalId | 0..1 | Indicates the user(s) for which user consent was revoked.  (NOTE) |  |
| msisdn | Msisdn | 0..1 | Indicates the MSISDN(s) of the users for which user consent was revoked.  (NOTE) |  |
| NOTE: One of the "externalId", or "msisdn" attributes shall be present. | | | | |

##### 5.3.2.3.13 Type: GroupMembListChanges

Table 5.3.2.3.13-1: Definition of type GroupMembListChanges

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| addedUEs | array(Gpsi) | 1..N | Identifies the UE(s) added to the group. |  |
| removedUEs | array(Gpsi) | 1..N | Indentifies the UE(s) removed from the group. |  |
| NOTE: At least one of the "addedUEs" attributes and the "removedUEs" attribute shall be provided. | | | | |

##### 5.3.2.3.14 Type: RangeDirection

Table 5.3.2.3.14-1: Definition of type RangeDirection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| range | number | 1 | Identifies the distance from point A to point B. |  |
| azimuthDirection | Angle | 1 | Indentifies the azimuth direction from point A to point B. |  |
| elevationDirection | Angle | 1 | Indentifies the elevation direction from point A to point B. |  |

##### 5.3.2.3.15 Type: TwodrelativeLocation

Table 5.3.2.3.15-1: Definition of type TwodrelativeLocation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| semiMinor | Uncertainty | 1 | Indicates the semi-major axis of the uncertainty ellipse. |  |
| semiMajor | Uncertainty | 1 | Indicates the semi-minor axis of the uncertainty ellipse. |  |
| orientationAngle | Angle | 1 | Indentifies the angle of orientation A. |  |

##### 5.3.2.3.16 Type: ThreedrelativeLocation

Table 5.3.2.3.16-1: Definition of type ThreedrelativeLocation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| semiMinor | Uncertainty | 1 | Indicates the semi-major axis of the uncertainty ellipse. |  |
| semiMajor | Uncertainty | 1 | Indicates the semi-minor axis of the uncertainty ellipse. |  |
| verticalUncertainty | Uncertainty | 1 | Indicates the vertical uncertainty. |  |
| orientationAngle | Angle | 1 | Indentifies the angle of orientation A. |  |

##### 5.3.2.3.17 Type: UpLocRepAddrAfRm

Table 5.3.2.3.17-1: Definition of type UpLocRepAddrAfRm

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| ipv4Addrs | array(Ipv4Addr) | 1..N | Contains the IPv4 address(es) of the target.  (NOTE) |  |
| ipv6Addrs | array(Ipv6Addr) | 1..N | Contains the IPv6 address(es) of the target.  (NOTE) |  |
| fqdn | Fqdn | 0..1 | Contains the FQDN of the target.  (NOTE) |  |
| NOTE: At least one of these attributes shall be present. | | | | |

##### 5.3.2.3.18 Type: UpCumEvtRep

Table 5.3.2.3.18-1: Definition of type UpCumEvtRep

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| upLocRepStat | Uinteger | 0..1 | Contains the number of location event reports transferred over user plane since the last cumulative event report was sent. |  |

#### 5.3.2.4 Referenced simple data types and enumerations

##### 5.3.2.4.1 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 5.2.1 can be referenced.

##### 5.3.2.4.2 Simple data types

The simple data types defined in table 5.3.2.4.2-1 shall be supported.

Table 5.3.2.4.2-1: Simple data types

|  |  |
| --- | --- |
| Type name | Description |
|  |  |

##### 5.3.2.4.3 Enumeration: MonitoringType

The enumeration MonitoringType represents a monitoring event type. It shall comply with the provisions defined in table 5.3.2.4.3-1.

Table 5.3.2.4.3-1: Enumeration MonitoringType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE 1) |
| LOSS\_OF\_CONNECTIVITY | The SCS/AS requests to be notified when the 3GPP network detects that the UE is no longer reachable for signalling or user plane communication | Loss\_of\_connectivity\_notification |
| UE\_REACHABILITY | The SCS/AS requests to be notified when the UE becomes reachable for sending either SMS or downlink data to the UE | Ue-reachability\_notification |
| LOCATION\_REPORTING | The SCS/AS requests to be notified of the current location or the last known location of the UE | Location\_notification, eLCS |
| CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION | The SCS/AS requests to be notified when the association of an ME (IMEI(SV)) that uses a specific subscription (IMSI) is changed | Change\_of\_IMSI\_IMEI\_association\_notification |
| ROAMING\_STATUS | The SCS/AS queries the UE's current roaming status and requests to get notified when the status changes | Roaming\_status\_notification |
| COMMUNICATION\_FAILURE | The SCS/AS requests to be notified of communication failure events | Communication\_failure\_notification |
| AVAILABILITY\_AFTER\_DDN\_FAILURE | The SCS/AS requests to be notified when the UE has become available after a DDN failure | Availability\_after\_DDN\_failure\_notification, Availability\_after\_DDN\_failure\_notification\_enhancement |
| NUMBER\_OF\_UES\_IN\_AN\_AREA | The SCS/AS requests to be notified the number of UEs in a given geographic area | Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G |
| PDN\_CONNECTIVITY\_STATUS | The SCS/AS requests to be notified when the 3GPP network detects that the UE’s PDN connection is set up or torn down. | Pdn\_connectivity\_status |
| DOWNLINK\_DATA\_DELIVERY\_STATUS | The AF requests to be notified when the 3GPP network detects that the downlink data delivery status is changed. | Downlink\_data\_delivery\_status\_5G |
| API\_SUPPORT\_CAPABILITY | The SCS/AS requests to be notified of the availability of support of service APIs. | API\_support\_capability\_notification |
| NUM\_OF\_REGD\_UES | The AF requests to be notified of the current number of registered UEs for a network slice. | NSAC |
| NUM\_OF\_ESTD\_PDU\_SESSIONS | The AF requests to be notified of the current number of established PDU Sessions for a network slice. | NSAC |
| AREA\_OF\_INTEREST | The SCS/AS requests to be notified when the UAV moves in or out of the geographic area. | UAV |
| GROUP\_MEMBER\_LIST\_CHANGE | The AF requests to be notified of the changes to a group members list. | GMEC |
| APPLICATION\_START | The AF requests to be notified about the start of application traffic has been detected. | AppDetection\_5G |
| APPLICATION\_STOP | The AF requests to be notified about the stop of application traffic has been detected. | AppDetection\_5G |
| NOTE 1: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: More monitoring types can be added in the future based on stage 2. | | |

##### 5.3.2.4.4 Enumeration: ReachabilityType

The enumeration ReachabilityType represents a reachability type. It shall comply with the provisions defined in table 5.3.2.4.4-1. If reachabilityType set to "SMS", the monitoring event request from SCS/AS shall be only for one-time monitoring request.

Table 5.3.2.4.4-1: Enumeration ReachabilityType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| SMS | The SCS/AS requests to be notified when the UE becomes reachable for sending SMS to the UE | Ue-reachability\_notification |
| DATA | The SCS/AS requests to be notified when the UE becomes reachable for sending downlink data to the UE | Ue-reachability\_notification |
| NOTE: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | |

##### 5.3.2.4.5 Enumeration: LocationType

The enumeration LocationType represents a location type. It shall comply with the provisions defined in table 5.3.2.4.5-1. If locationType set to "LAST\_KNOWN\_LOCATION", the monitoring event request from SCS/AS shall be only for one-time monitoring request.

Table 5.3.2.4.5-1: Enumeration LocationType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| CURRENT\_LOCATION | The SCS/AS requests to be notified for current location | Location\_notification, eLCS |
| LAST\_KNOWN\_LOCATION | The SCS/AS requests to be notified for last known location | Location\_notification, Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G |
| CURRENT\_OR\_LAST\_KNOWN\_LOCATION | The AF requests the current or last known location. | eLCS |
| INITIAL\_LOCATION | The AF requests the initial location. | eLCS |
| NOTE: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | |

##### 5.3.2.4.6 Enumeration: AssociationType

The enumeration AssociationType represents an IMEI or IMEISV to IMSI association. It shall comply with the provisions defined in table 5.3.2.4.6-1.

Table 5.3.2.4.6-1: Enumeration AssociationType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| IMEI | The value shall be used when the change of IMSI-IMEI association shall be detected | Change\_of\_IMSI\_IMEI\_association\_notification |
| IMEISV | The value shall be used when the change of IMSI-IMEISV association shall be detected | Change\_of\_IMSI\_IMEI\_association\_notification |
| NOTE: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.3.2.4.7 Enumeration: Accuracy

The enumeration Accuracy represents a desired granularity of accuracy of the requested location information. It shall comply with the provisions defined in table 5.3.2.4.7-1.

Table 5.3.2.4.7-1: Enumeration Accuracy

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| CGI\_ECGI | The SCS/AS requests to be notified using cell level location accuracy. |  |
| ENODEB | The SCS/AS requests to be notified using eNodeB level location accuracy. |  |
| TA\_RA | The SCS/AS requests to be notified using TA/RA level location accuracy. |  |
| PLMN | The SCS/AS requests to be notified using PLMN level location accuracy. |  |
| TWAN\_ID | The SCS/AS requests to be notified using TWAN identifier level location accuracy. |  |
| GEO\_AREA | The SCS/AS requests to be notified using the geographical area accuracy. |  |
| CIVIC\_ADDR | The SCS/AS requests to be notified using the civic address accuracy. | EDGEAPP |
| NOTE 1: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.3.2.4.8 Enumeration: PdnConnectionStatus

The enumeration PdnConnectionStatus represents the PDN connection status. It shall comply with the provisions defined in table 5.3.2.4.8-1.

Table 5.3.2.4.8-1: Enumeration PdnConnectionStatus

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| CREATED | The PDN connection is created. | Pdn\_connectivity\_status |
| RELEASED | The PDN connection is released. | Pdn\_connectivity\_status |
| NOTE: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.3.2.4.9 Enumeration: PdnType

The enumeration PdnType represents the PDN connection type. It shall comply with the provisions defined in table 5.3.2.4.9-1.

Table 5.3.2.4.9-1: Enumeration PdnType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| IPV4 | PDN connection of IPv4 type |  |
| IPV6 | PDN connection of IPv6 type |  |
| IPV4V6 | PDN connection of IPv4v6 type |  |
| NON\_IP | PDN connection of non-IP type |  |
| ETHERNET | PDN connection of Ethernet type |  |
| NOTE: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.3.2.4.10 Enumeration: InterfaceIndication

The enumeration InterfaceIndication represents the network entity used for data delivery towards the SCS/AS. It shall comply with the provisions defined in table 5.3.2.4.10-1.

Table 5.3.2.4.10-1: Enumeration InterfaceIndication

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| EXPOSURE\_FUNCTION | SCEF is used for the PDN connection towards the SCS/AS. | Pdn\_connectivity\_status |
| PDN\_GATEWAY | PDN gateway is used for the PDN connection towards the SCS/AS. | Pdn\_connectivity\_status |
| NOTE: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.3.2.4.11 Enumeration: LocationFailureCause

The enumeration LocationFailureCause represents the cause of location positioning failure. It shall comply with the provisions defined in table 5.3.2.4.11-1.Table 5.3.2.4.11-1: Enumeration LocationFailureCause

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| "POSITIONING\_DENIED" | Positioning is denied. |  |
| "UNSUPPORTED\_BY\_UE" | Positioning is not supported by UE. |  |
| "NOT\_REGISTED\_UE" | UE is not registered. |  |
| "UNSPECIFIED" | Unspecified. |  |
| "REQUESTED\_AREA\_NOT\_ALLOWED" | The location request is rejected because the location area requested by the AF for area event reporting is not allowed (e.g., does not overlap with the allowed location areas for area event reporting). | eLCS\_en |

##### 5.3.2.4.12 Enumeration: SubType

The enumeration SubType represents a subscription type. It shall comply with the provisions defined in table 5.3.2.4.12-1

**Table 5.3.2.4.12-1: Enumeration SubType**

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| AERIAL\_UE | The UE has Aerial subscription. | UAV |

##### 5.3.2.4.13 Enumeration: SACRepFormat

Table 5.3.2.4.13-1: Enumeration SACRepFormat

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| "NUMERICAL" | Indicates that the NSAC reporting should be done in numerical format. |  |
| "PERCENTAGE" | Indicates that the NSAC reporting should be done in the format of a percentage. |  |

### 5.3.3 Resource structure

#### 5.3.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-monitoring-event/v1**

"apiRoot" is set as described in clause 5.2.4. "apiName" shall be set to "3gpp-monitoring-event" and "apiVersion" shall be set to "v1" for the current version defined in the present document. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.3.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| Monitoring Event Subscriptions | /{scsAsId}/subscriptions | GET | Read all or queried subscriptions for a given SCS/AS |
| POST | Create a new subscription of monitoring event |
| Individual Monitoring Event Subscription | /{scsAsId}/subscriptions/{subscriptionId} | PUT | Modify an existing subscription of monitoring event |
| PATCH | Modifies an existing subscription of monitoring event. |
| GET | Read a subscription of monitoring event |
| DELETE | Delete a subscription of monitoring event |

#### 5.3.3.2 Resource: Monitoring Event Subscriptions

##### 5.3.3.2.1 Introduction

This resource allows an SCS/AS to read all of the active monitoring event subscriptions or create a new monitoring event subscription for the SCS/AS at the SCEF.

##### 5.3.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-monitoring-event/v1/{scsAsId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.3.3.2.2-1.

Table 5.3.3.2.2-1: Resource URI variables for resource "Monitoring Event Subscriptions"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.3.3.2.3 Resource methods

###### 5.3.3.2.3.1 GET

The GET method allows to read all or queried active subscriptions for a given SCS/AS. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.3.3.2.3.1-1 and table 5.3.3.2.3.1-2.

Table 5.3.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks | Applicability |
| ip-addrs | array(IpAddr) | 0..N | The IP address(es) of the requested UE(s). (NOTE) | enNB |
| ip-domain | string | 0..1 | The IPv4 address domain identifier.  The attribute may only be provided if IPv4 address is included in the ip-addrs query parameter. | enNB |
| mac-addrs | array(MacAddr48) | 0..N | The MAC address(es) of the requested UE(s). (NOTE) | enNB |
| NOTE: Either the "ip-addrs" parameter or the "mac-addrs" parameter may be provided at the same time. If multiple elements are provided in the array data structure, then each element shall be treated as a separate query parameter. | | | | |

Table 5.3.3.2.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(MonitoringEventSubscription) | 0..N | 200 OK | The subscription information for the SCS/AS in the request URI are returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.3.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.3.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.3.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.3.3.2.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.3.3.2.3.4 POST

The POST method creates a new subscription resource to monitor an event for a given SCS/AS. The SCS/AS shall initiate the HTTP POST request message and the SCEF shall respond to the message. The SCEF shall construct the URI of the created resource.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.3.3.2.3.4-1 and table 5.3.3.2.3.4-2.

Table 5.3.3.2.3.4-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.3.3.2.3.4-2: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| MonitoringEventSubscription | 1 | Parameters to register a subscription to notifications about monitoring event with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| MonitoringEventSubscription | 1 | 201 Created | The subscription resource was created successfully.  The URI of the created resource shall be returned in the "Location" HTTP header. |
| MonitoringEventReport | 1 | 200 OK | The operation is successful, and corresponding monitoring event report is included.  This is only applicable for the one-time monitoring request if report is available in the response. |
| MonitoringEventReports | 1 | 200 OK | The operation is successful and the corresponding monitoring event report(s) are included in the response body.  This is only applicable when the enNB feature is supported, the monitoring request is a one-time reporting request and the event reports are available in the response. |
| ProblemDetails | 0..1 | 400 Bad Request | (NOTE 2) |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| ProblemDetails | 0..1 | 404 Not Found | (NOTE 2) |
| ProblemDetails | 0..1 | 500 Internal Server Error | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.3.5.3. | | | | |

Table 5.3.3.2.3.4-3: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-monitoring-event/v1/{scsAsId}/subscriptions/{subscriptionId} |

###### 5.3.3.2.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.3.3.3 Resource: Individual Monitoring Event Subscription

##### 5.3.3.3.1 Introduction

This resource allows an SCS/AS to read, update or delete an active monitoring event subscription at the SCEF.

##### 5.3.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-monitoring-event/v1/{scsAsId}/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 5.2.3.2.2-1.

Table 5.3.3.3.2-1: Resource URI variables for resource "Individual Monitoring Event Subscription"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| subscriptionId | string | Identifier of the subscription resource. The subscriptionId corresponds to the stage 2 TLTRI. |

##### 5.3.3.3.3 Resource methods

###### 5.3.3.3.3.1 GET

The GET method allows to read an active subscription resource to obtain details of the subscription. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.3.3.3.3.1-1 and table 5.3.3.3.3.1-2.

Table 5.3.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.3.3.3.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| MonitoringEventSubscription | 1 | 200 OK | The subscription information related to the request URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.3.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.3.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.3.3.3.3.2 PUT

The PUT method modifies an existing subscription resource to update the subscription. The SCS/AS shall initiate the HTTP PUT request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.3.3.3.3.2-1 and table 5.3.3.3.3.2-2.

Table 5.3.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.3.3.3.3.2-2: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| MonitoringEventSubscription | 1 | Parameters to update a subscription to notifications about monitoring event with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| MonitoringEventSubscription | 1 | 200 OK | The subscription was updated successfully and the representation of the subscription is returned. |
| none |  | 204 No Content | The subscription was updated successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2, NOTE 3) |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply.  NOTE 2: The error case is only applicable for monitoring event configuration via PCRF.  NOTE 3: Failure cases are described in clause 5.3.5.3. | | | | |

Table 5.3.3.3.3.2-3: Headers supported by the 307 Response Code on this resource

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

Table 5.3.3.3.3.2-4: Headers supported by the 308 Response Code on this resource

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

###### 5.3.3.3.3.3 PATCH

The PATCH method allows the SCS/AS to modify an existing subscription resource, in order to notify the SCEF about the partial cancellation and/or partial addition of certain UE(s) within an active group. The SCS/AS shall initiate the HTTP PATCH message request with JSON Patch format signalled by the content type "application/json-patch+json".

This method shall support request and response data structures, and response codes, as specified in the table 5.3.3.3.3.3-1.

Table 5.3.3.3.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| array(PatchItem) | 1..N | Contains the list of changes to be made to an individual subscription resource, according to the JSON PATCH format specified in IETF RFC 6902 [67]. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The resource was modified successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.3.3.3.3.3-2: 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 SCEF. |

Table 5.3.3.3.3.3-3: 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 SCEF. |

###### 5.3.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.3.3.3.3.5 DELETE

The DELETE method deletes the related resource and terminates the related monitoring subscription. The SCS/AS shall initiate the HTTP DELETE request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.3.3.3.3.5-1 and table 5.3.3.3.3.5-2.

Table 5.3.3.3.3.5-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.3.3.3.3.5-2: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The subscription was terminated successfully. |
| array(MonitoringEventReport) | 1..N | 200 OK | The subscription was terminated successfully, the monitoring event report(s) shall be included if received. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.3.3.3.3.5-3: Headers supported by the 307 Response Code on this resource

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

Table 5.3.3.3.3.5-4: Headers supported by the 308 Response Code on this resource

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

#### 5.3.3.4 Void

### 5.3.3A Notifications

#### 5.3.3A.1 General

The notifications provided by the MonitoringEvent API are specified in this clause.

Table 5.3.3A-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| Monitoring Notification | {notificationDestination} | POST | Sent from the SCEF to the SCS/AS about the notification of grouping configuration result, detected monitoring event report(s) or notify the SCS/AS to cancel a monitoring subscription |
| User Consent Revocation Notification | {revocationNotifUri} | POST | The user consent revocation notification from the NEF to the AF to inform about the revocation of user consent for one or several UE(s). |

#### 5.3.3A.2 Monitoring Notification

##### 5.3.3A.2.1 Description

The Monitoring Notification allows the SCEF to send notification about grouping configuration result, monitoring event report(s) or a monitoring subscription cancellation to the SCS/AS.

##### 5.3.3A.2.2 Target URI

The Callback URI **"{**notificationDestination**}"** shall be used with the callback URI variables defined in table 5.3.3A.2.2-1.

Table 5.3.3A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notificationDestination | Link | Callback reference provided by the SCS/AS during creation or modification of the monitoring event subscription. |

##### 5.3.3A.2.3 Standard Methods

###### 5.3.3A.2.3.1 Notification via POST

The HTTP POST method reports the notification for a monitoring subscription. The SCEF shall initiate the HTTP POST request message and the SCS/AS shall respond to the message.

This method shall support the request data structures specified in table 5.3.3A.2.3.1-1 and the response data structures and response codes specified in table 5.3.3A.2.3.1-2.

Table 5.3.3A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| MonitoringNotification | 1 | The monitoring notification provided by the SCEF. |

Table 5.3.3A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| none |  | 204 No Content | The monitoring notification is received successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.3.3A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.3.3A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.3.3A.2.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the MonitoringNotification may alternatively be delivered through the Websocket mechanism as defined in subclause 5.2.5.4.

#### 5.3.3A.3 User Consent Revocation Notification

##### 5.3.3A.3.1 Description

The User Consent Revocation Notification is used by the NEF to report the revocation of user consent for one or several UE(s) to the AF.

##### 5.3.3A.3.2 Target URI

The Callback URI **"{revocationNotifUri}"** shall be used with the the callback URI variables defined in table 5.3.3A.3.2-1.

Table 5.3.3A.3.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| revocationNotifUri | Uri | Callback reference provided by the AF during the creation or update/modification of the subscription as defined in clauses 5.3.3.2.3.4 and 5.3.3.3.3.2 or 5.3.3.3.3.3. |

##### 5.3.3A.3.3 Operation Definition

###### 5.3.3A.3.3.1 Notification via HTTP POST

This method shall support the request data structures specified in table 5.3.3A.3.3.1-1 and the response data structures and response codes specified in table 5.3.3A.3.3.1-2.

Table 5.3.3A.3.3.1-1: Data structures supported by the POST Request Body on this resource

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| ConsentRevocNotif | 1 | Contains the user consent revocation information. |

Table 5.3.3A.3.3.1-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response  codes | Description |
| n/a |  | 204 No Content | Successful case. The user consent revocation notification is successfully received. |
| n/a |  | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.  Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |
| n/a |  | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative AF where the notification should be sent.  Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [4]. |

Table 5.3.3A.3.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Description |
| Location | string | 1 | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

Table 5.3.3A.3.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Description |
| Location | string | 1 | An alternative URI representing the end point of an alternative AF towards which the notification should be redirected. |

###### 5.3.3A.3.3.2 Notification via Websocket

If supported by both the AF and the NEF and successfully negotiated, the User Consent Revocation Notification may alternatively be delivered via the Websocket mechanism, as defined in clause 5.2.5.4 of 3GPP TS 29.122 [4].

### 5.3.4 Used Features

The table below defines the features applicable to the MonitoringEvent API. Those features are negotiated as described in clause 5.2.7.

Table 5.3.4-1: Features used by MonitoringEvent API

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Feature Number | | Feature | | Description | |
| 1 | | Loss\_of\_connectivity\_notification | | The SCS/AS is notified when the 3GPP network detects that the UE is no longer reachable for signalling or user plane communication | |
| 2 | | Ue-reachability\_notification | | The SCS/AS is notified when the UE becomes reachable for sending either SMS or downlink data to the UE | |
| 3 | | Location\_notification | | The SCS/AS is notified of the current location or the last known location of the UE | |
| 4 | | Change\_of\_IMSI\_IMEI\_association\_notification | | The SCS/AS is notified when the association of an ME (IMEI(SV)) that uses a specific subscription (IMSI) is changed | |
| 5 | | Roaming\_status\_notification | | The SCS/AS is notified when the UE's roaming status changes | |
| 6 | | Communication\_failure\_notification | | The SCS/AS is notified of communication failure events | |
| 7 | | Availability\_after\_DDN\_failure\_notification | | The SCS/AS is notified when the UE has become available after a DDN failure | |
| 8 | | Number\_of\_UEs\_in\_an\_area\_notification | | The SCS/AS is notified the number of UEs present in a given geographic area  The feature supports pre-5G (e.g. 4G) requirement. | |
| 9 | | Notification\_websocket | | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. | |
| 10 | | Notification\_test\_event | | The testing of notification connection is supported according to clause 5.2.5.3. | |
| 11 | | Subscription\_modification | | Modifications of an individual subscription resource. | |
| 12 | | Number\_of\_UEs\_in\_an\_area\_notification\_5G | | The AF is notified the number of UEs present in a given geographic area.  The feature supports the 5G requirement. This feature may only be supported in 5G. | |
| 13 | | Pdn\_connectivity\_status | | The SCS/AS requests to be notified when the 3GPP network detects that the UE’s PDN connection is set up or torn down. | |
| 14 | | Downlink\_data\_delivery\_status\_5G | | The AF requests to be notified when the 3GPP network detects that the downlink data delivery status is changed. The feature is not applicable to pre-5G. | |
| 15 | | Availability\_after\_DDN\_failure\_notification\_enhancement | | The AF is notified when the UE has become available after a DDN failure and the traffic matches the packet filter provided by the AF. The feature is not applicable to pre-5G. | |
| 16 | | Enhanced\_param\_config | | This feature supports the co-existence of multiple event configurations for target UE(s) if there are parameters affecting periodic RAU/TAU timer and/or Active Time. Supporting this feature also requires the support of feature number 1 or 2. | |
| 17 | | API\_support\_capability\_notification | | The SCS/AS is notified of the availability of support of service APIs. This feature is only applicable in interworking SCEF+NEF scenario. | |
| 18 | | eLCS | | This feature supports the enhanced location exposure service (e.g. location information preciser than cell level).  The feature is not applicable to pre-5G (e.g. 4G). | |
| 19 | | NSAC | | This feature controls the support of the Network Slice Admission Control (NSAC) functionalities.  The feature is not applicable to pre-5G (e.g. 4G). | |
| 20 | | Partial\_group\_modification | | This feature supports the partial cancellation and/or partial addition to the group member(s) within the grouped event monitoring subscription. | |
| 21 | | UAV | | The SCS/AS requests to be notified of the UAV presence status in a specific geographic area. This feature is only applicable in interworking SCEF+NEF scenario, or standalone 5G scenario.  This feature requires that Number\_of\_UEs\_in\_an\_area\_notification and Number\_of\_UEs\_in\_an\_area\_notification\_5G features are also supported. | |
| 22 | | MULTIQOS | | This feature indicates the support for "Multiple QoS Class" which enables to support more than one Location QoS during LCS procedures.  This feature requires that the eLCS feature is also supported. | |
| 23 | | Session\_Management\_Enhancement | | This feature supports Session Management enhancement with requested DNN and/or S-NSSAI. This feature requires that the Pdn\_connectivity\_status feature or Downlink\_data\_delivery\_status\_5G feature is also supported. | |
| 24 | | enNB | | Indicates the support of enhancements to the northbound interfaces. | |
| 25 | | EDGEAPP | | This feature controls the support of EDGE applications related functionalities (e.g. support the civic address as a possible location granularity).  The feature is not applicable to pre-5G (e.g. 4G). | |
| 26 | | UEId\_retrieval | | This feature supports AF specific UE ID retrieval which is not applicable to pre-5G (e.g. 4G). | |
| 27 | | UserConsentRevocation | | This feature indicates the support of user consent revocation management and enforcement (e.g. stop data processing) for EDGE applications. | |
| 28 | | Subscription\_Patch | | This feature indicates the support of the PATCH method for partial modification of an existing event monitoring subscription. | |
| 29 | | GMEC | | This feature indicates the support of Generic Group Management, Exposure and Communication Enhancements (e.g. Ggroup Member List Change event reporting).  This feature is not applicable to pre-5G (e.g. 4G). | |
| 30 | | Loss\_of\_connectivity\_notification\_5G | | The AF is notified when the 3GPP network detects that the UE is no longer reachable for signalling or user plane communication.  This feature is not applicable to pre-5G (e.g. 4G). | |
| 31 | | enNB1 | | Indicates the support of enhancements to this northbound API in Rel-18. | |
| 32 | | AppDetection\_5G | | This feature indicates the support of Application traffic detection (start and stop) monitoring event.  This feature is not applicable to pre-5G (e.g. 4G). | |
| 33 | | enNB1\_5G | | Indicates the support of enhancements to this northbound API for 5G in Rel-18.  This feature is not applicable to pre-5G (e.g. 4G). | |
| 34 | | eLCS\_en | | This feature indicates the support of the enhancements to the eLCS feature.  The following functionalities are supported:  - Support the error handling related to the area event reporting for the case where the requested location area is not allowed.  - Support location reporting over user plane between UE and AF.  This feature is not applicable to pre-5G (e.g. 4G). | |
| 35 | | eNSAC | | This feature indicates the support of the enhancements to the NSAC feature.  The following functionalities are supported:  - Support the status notification of the current number of UEs with at least one PDU session/PDN connection.This feature is not applicable to pre-5G (e.g. 4G). | |
| 36 | | Ranging\_SL | | This feature supports the enhanced location exposure service (e.g. location information for ranging and sidelink positioning), and requires the support of eLCS feature.  The feature is not applicable to pre-5G (e.g. 4G). | |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | | | | |

### 5.3.5 Error handling

#### 5.3.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.3.5.2 Protocol Errors

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

#### 5.3.5.3 Application Errors

The application errors defined for the MonitoringEvent API are listed in table 5.3.5.3-1.

Table 5.3.5.3-1: Application errors

|  |  |  |  |
| --- | --- | --- | --- |
| Application Error | HTTP status code | Description | Applicability |
| EVENT\_FEATURE\_MISMATCH | 400 Bad Request | Indicates the resource creation is not allowed since the supported feature corresponding to the monitoring event is not supported by the client. |  |
| DUPLICATE\_REQUEST | 400 Bad Request | Indicates that a duplicate subscription already exists for this client. | enNB |
| PARAMETER\_OUT\_OF\_RANGE | 403 Forbidden | Indicates that the resource is not allowed to be created since one or more of the received parameter are out of range defined by operator policies. |  |
| IDLE\_STATUS\_UNSUPPORTED | 403 Forbidden | Indicates that the resource is not allowed to be created since the Idle Status Indication is received in the request but not supported by the network. |  |
| OPERATION\_PROHIBITED | 403 Forbidden | Indicates the HTTP method is not supported. |  |
| CONSENT\_REVOCATION\_NOT\_SUPPORTED | 403 Forbidden | Indicates that the request is rejected because user consent management and enforcement is not supported by the client. | UserConsentRevocation |
| USER\_CONSENT\_NOT\_GRANTED | 403 Forbidden | Indicates that the request is rejected because user consent is not granted. | UserConsentRevocation |
| RESOURCES\_EXCEEDED | 403 Forbidden | Indicates that no more subscriptions are allowed for this client. | enNB |
| REQUEST\_NOT\_AUTHORIZED | 403 Forbidden | Indicates that the AF specific UE ID retrieval request is not authorized or the AF request to application detection is not authorized. | UEId\_retrieval, AppDetection\_5G |
| REQUESTED\_AREA\_NOT\_ALLOWED | 403 Forbidden | Indicates that the location request is rejected because the location area requested by the AF for an area event reporting is not allowed. | eLCS\_en |
| UE\_ID\_NOT\_AVAILABLE | 404 Not Found | Indicates that the AF specific UE ID is not available. | UEId\_retrieval |
| UE\_NOT\_FOUND | 404 Not Found | Indicates that the requested UE address is not found. | UEId\_retrieval |
| EVENT\_UNSUPPORTED | 500 Internal Server Error | Indicates the required monitoring event is not supported by the server. |  |

## 5.4 ResourceManagementOfBdt API

### 5.4.1 Overview

The ResourceManagementOfBdt API is a RESTful API that allows the SCS/AS to request background data transfer related conditions for a set of UEs. The ResourceManagementOfBdt API defines a set of data models, resources and the related procedures for the creation and management of the background data transfer request. The corresponding JSON schema for the representation of the resources and operations defined by the ResourceManagementOfBdt API is provided in its complete form in Annex A.4.

### 5.4.2 Data model

#### 5.4.2.1 Resource data types

##### 5.4.2.1.1 Introduction

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

Table 5.4.2.1.1-1 specifies data types re-used by the ResourceManagementOfBdt API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the ResourceManagementOfBdt API.

Table 5.4.2.1.1-1: ResourceManagementOfBdt API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| GeographicArea | 3GPP TS 29.572 [42] | Identifies the geographical information of the user(s). |
| CivicAddress | 3GPP TS 29.572 [42] | Identifies the civic address information of the user(s). |
| NetworkAreaInfo | 3GPP TS 29.554 [50] | Identifies a network area information. |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.4.4-1. |

Table 5.4.2.1.1-2 specifies the data types defined for the ResourceManagementOfBdt API.

Table 5.4.2.1.1-2: ResourceManagementOfBdt API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| Bdt | 5.4.2.1.2 | Represents a Background Data Transfer subscription. |  |
| BdtPatch | 5.4.2.1.3 | Represents a Background Data Transfer subscription modification request. |  |
| ExNotification | 5.4.2.1.4 | Represents a Background Data Transfer notification. |  |
| TrafficDescriptor | 5.4.2.3.2 | Identify a traffic descriptor as defined in Figure 5.2.2 of 3GPP TS 24.526 [64]. |  |
| TransferPolicy | 5.4.2.2.2 | Represents an offered transfer policy sent from the SCEF to the SCS/AS, or a selected transfer policy sent from the SCS/AS to the SCEF. |  |

##### 5.4.2.1.2 Type: Bdt

This type represents a BDT subscription. The same structure is used in the subscription request and subscription response.

Table 5.4.2.1.2-1: Definition of type Bdt

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| self | Link | 0..1 | Link to the resource "Individual BDT Subscription". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| aspId | string | 0..1 | Identifies an application service provider. | AspId\_5G |
| volumePerUE | UsageThreshold | 1 | Identifies the data volume expected to be transferred per UE. |  |
| numberOfUEs | integer | 1 | Identifies the number of UEs. |  |
| desiredTimeWindow | TimeWindow | 1 | Identifies the time interval. |  |
| locationArea | LocationArea | 0..1 | Identifies the area within which the SCS/AS requests the number of UE. | Bdt |
| locationArea5G | LocationArea5G | 0..1 | Identifies the area within which the AF requests the number of UE. | LocBdt\_5G |
| referenceId | BdtReferenceId | 0..1 | Identifies a selected policy of background data transfer. |  |
| transferPolicies | array(TransferPolicy) | 0..N | Identifies an offered transfer policy. |  |
| selectedPolicy | integer | 0..1 | Identity of the selected background data transfer policy. Shall not be present in initial message exchange, can be provided by NF service consumer in a subsequent message exchange. |  |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a group of users. (NOTE 2) | Group\_Id |
| notificationDestination | Link | 0..1 | Contains the URI to receive the BDT notification from the NEF. | BdtNotification\_5G |
| warnNotifEnabled | boolean | 0..1 | Indicates whether the BDT warning notification is enabled or not.  If it is set to true, the BDT warning notification is enabled; if it is set to false or absent, the BDT warning notification is disabled. | BdtNotification\_5G |
| trafficDes | TrafficDescriptor | 0..1 | Contains the traffic descriptor of the background data. (NOTE 2) |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.4.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 2: The attribute is only applicable to the NEF. | | | | |

##### 5.4.2.1.3 Type: BdtPatch

This type represents a BDT request for the service provided by the SCS/AS to the SCEF via T8 interface. The structure is used for PATCH request.

Table 5.4.2.1.3-1: Definition of type BdtPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| selectedPolicy | integer | 1 | Identity of the selected background data transfer policy. |  |
| warnNotifEnabled | boolean | 0..1 | Indicates whether the BDT warning notification is enabled.  - true: the BDT warning notification is enabled;  - false: the BDT warning notification is not enabled. | BdtNotification\_5G |
| notificationDestination | Link | 0..1 | Contains the URI to receive the BDT notification from the NEF. | enNB |
| NOTE: Properties marked with a feature as defined in clause 5.4.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

##### 5.4.2.1.4 Type: ExNotification

This type represents a BDT notification provided by the NEF to the AF. The structure is used for POST request.

Table 5.4.2.1.4-1: Definition of type ExNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| bdtRefId | BdtReferenceId | 1 | This IE indicates transfer policies of background data transfer which the notification corresponds to. |  |
| locationArea5G | LocationArea5G | 0..1 | This IE represents a network area where a network performance will go below the criteria set by the operator. |  |
| timeWindow | TimeWindow | 0..1 | This IE indicates a time window when a network performance will go below the criteria set by the operator. |  |
| candPolicies | array(TransferPolicy) | 0..N | This IE indicates a list of the candidate transfer policies from which the AF may select a new transfer policy due to network performance degradation. |  |
| NOTE: Properties marked with a feature as defined in clause 5.4.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

#### 5.4.2.2 Referenced structured data types

##### 5.4.2.2.1 Introduction

This clause defines structured data types that are referenced from data structures defined in the previous clauses.

##### 5.4.2.2.2 Type: TransferPolicy

This data type represents an offered transfer policy sent from the SCEF to the SCS/AS, or a selected transfer policy sent from the SCS/AS to the SCEF.

Table 5.4.2.2.2-1: Definition of type TransferPolicy

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| bdtPolicyId | integer | 1 | Identifier for the transfer policy |  |
| maxUplinkBandwidth | Bandwidth | 0..1 | Indicates the maximum aggregated bitrate in the uplink authorized by the PCRF. |  |
| maxDownlinkBandwidth | Bandwidth | 0..1 | Indicates the maximum aggregated bitrate in the downlink authorized by the PCRF. |  |
| ratingGroup | integer | 1 | Indicates the rating group during the time window. |  |
| timeWindow | TimeWindow | 1 | Indicates the recommended time window of the transfer policy |  |
| NOTE: Properties marked with a feature as defined in clause 5.4.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

#### 5.4.2.3 Referenced simple data types and enumerations

##### 5.4.2.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 5.2.1 can be referenced.

##### 5.4.2.3.2 Simple data types

The simple data types defined in table 5.4.2.3.2-1 shall be supported.

Table 5.4.2.3.2-1: Simple data types

|  |  |
| --- | --- |
| Type name | Description |
| TrafficDescriptor | String identifying a traffic descriptor as defined in table 5.2.1 of 3GPP TS 24.526 [64]. |

### 5.4.3 Resource structure

#### 5.4.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-bdt/v1**

"apiRoot" is set as described in clause 5.2.4. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.4.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| BDT Subscription | /{scsAsId}/subscriptions | GET | Read all active background data transfer subscription resources for a given SCS/AS |
| POST | Create a new background data transfer subscription resource |
| Individual BDT Subscription | /{scsAsId}/subscriptions/{subscriptionId} | PATCH | Modify a background data transfer subscription resource to select one of the transfer policies offered by the SCEF |
| PUT | Update a background data transfer subscription resource for negotiation of background data transfer policy |
| GET | Read a background data transfer subscription resource |
| DELETE | Delete a background data transfer resources |

#### 5.4.3.2 Resource: BDT Subscriptions

##### 5.4.3.2.1 Introduction

This resource allows the SCS/AS to read all active long-term transactions related to BDT resource management.

##### 5.4.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-bdt/v1/{scsAsId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.4.3.2.2-1.

Table 5.4.3.2.2-1: Resource URI variables for resource "BDT Subscriptions"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.4.3.2.3 Resource methods

###### 5.4.3.2.3.1 GET

The GET method allows to read all active resources for a given SCS/AS. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.4.3.2.3.1-1 and table 5.4.3.2.3.1-2.

Table 5.4.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.4.3.2.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(Bdt) | 0..N | 200 OK | The resource information for the SCS/AS in the request URI are returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.4.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.4.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.4.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.4.3.2.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.4.3.2.3.4 POST

The POST method creates a new background data transfer subscription resource for a given SCS/AS. The SCS/AS shall initiate the HTTP POST request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.4.3.2.3.4-1 and table 5.4.3.2.3.4-2.

Table 5.4.3.2.3.4-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.4.3.2.3.4-2: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| Bdt | 1 | Parameters to register a subscription to request background data transfer related information with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| Bdt | 1 | 201 Created | The resource was 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 also apply. | | | | |

Table 5.4.3.2.3.4-3: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-bdt/v1/{scsAsId}/subscriptions/{subscriptionId} |

###### 5.4.3.2.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.4.3.3 Resource: Individual BDT Subscription

##### 5.4.3.3.1 Introduction

This resource allows the SCS/AS to manage resources for BDT using a long-term transaction.

##### 5.4.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-bdt/v1/{scsAsId}/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 5.4.3.3.2-1.

Table 5.4.3.3.2-1: Resource URI variables for resource "Individual BDT Subscription"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| subscriptionId | string | Identifier of the subscription resource. The subscriptionId corresponds to the stage 2 TLTRI. |

##### 5.4.3.3.3 Resource methods

###### 5.4.3.3.3.1 GET

The GET method allows to read an individual BDT subscription resource to obtain details of an active resource BDT subscription. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.4.3.3.3.1-1 and table 5.4.3.3.3.1-2.

Table 5.4.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.4.3.3.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| Bdt | 1 | 200 OK | The resource information related to the request URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.4.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.4.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.4.3.3.3.2 PUT

The PUT method allows the SCS/AS to modify an existing subscription resource completely. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.4.3.3.3.2-1.

Table 5.4.3.3.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| Bdt | 1 | The SCS/AS requests to update the BDT policy subscription. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| Bdt | 1 | 200 OK | The subscription was modified successfully.  The SCEF shall return an updated subscription in the response content. |
| none |  | 204 No Content | The subscription was updated successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.4.3.3.3.2-2: 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 SCEF. |

Table 5.4.3.3.3.2-3: 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 SCEF. |

###### 5.4.3.3.3.3 PATCH

The PATCH method allows the SCS/AS to modify an existing subscription resource, in order to notify the SCEF about the selected transfer policy. The SCS/AS shall initiate the HTTP PATCH message and the SCEF shall respond to the message.

This method shall support request and response data structures, and response codes, as specified in the table 5.4.3.3.3.3-1.

Table 5.4.3.3.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| BdtPatch | 1 | Background data transfer policy selected by the SCS/AS. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| Bdt | 1 | 200 OK | The resource was modified successfully.  The SCEF shall return an updated subscription in the response content. |
| none |  | 204 No Content | The resource was modified successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.4.3.3.3.3-2: 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 SCEF. |

Table 5.4.3.3.3.3-3: 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 SCEF. |

###### 5.4.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.4.3.3.3.5 DELETE

The DELETE method deletes the resource and terminates the BDT subscription. The SCS/AS shall initiate the HTTP DELETE message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.4.3.3.3.5-1 and table 5.4.3.3.3.5-2.

Table 5.4.3.3.3.5-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.4.3.3.3.5-2: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The resource was terminated successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.4.3.3.3.5-3: Headers supported by the 307 Response Code on this resource

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

Table 5.4.3.3.3.5-4: Headers supported by the 308 Response Code on this resource

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

#### 5.4.3.4 Void

### 5.4.3A Notifications

#### 5.4.3A.1 General

The notifications provided by the ResourceManagementOfBdt API are specified in this clause.

Table 5.4.3A-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| BDT Warning Notification | {notificationDestination} | POST | Notify the BDT warning from the NEF to the AF identified by the notification destination URI (NOTE) |
| NOTE: This notification may only be supported in 5G. | | | |

#### 5.4.3A.2 BDT Warning Notification

##### 5.4.3A.2.1 Description

The BDT warning notification allows the NEF to notify the AF of the BDT warning notification. The notification may only be supported in 5G.

##### 5.4.3A.2.2 Target URI

The Callback URI **"{**notificationDestination**}"** shall be used with the callback URI variables defined in table 5.4.3A.2.2-1.

Table 5.4.3A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notificationDestination | Link | Reference provided by the AF when the AF requests to send a BDT warning notification when the network performance in the area of interest goes below the criteria set by the operator.  This URI shall be provided within the "notificationDestination" attribute in the Bdt data type. |

##### 5.4.3A.2.3 Standard Methods

###### 5.4.3A.2.3.1 Notification via POST

The POST method allows to notify AS identified by the notification destination URI of the BDT warning by the NEF and the AF shall respond to the message.

This method shall support the request data structures specified in table 5.4.3A.2.3.1-1 and the response data structures and response codes specified in table 5.4.3A.2.3.1-2.

Table 5.4.3A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| ExNotification | 1 | Representation of the BDT warning notification. |

Table 5.4.3A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| none |  | 204 No Content | This case represents a successful notification of BDT warning notification. |
| none |  | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.4.3A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.4.3A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.4.3A.2.3.2 Notification via Websocket

If supported by both AF and NEF and successfully negotiated, the ExNotification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

### 5.4.4 Used Features

The table below defines the features applicable to the ResourceManagementOfBdt API. Those features are negotiated as described in clause 5.2.7.

Table 5.4.4-1: Features used by ResourceManagementOfBdt API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | Bdt | The feature supports the pre-5G (e.g. 4G) requirement. |
| 2 | LocBdt\_5G | The feature supports the 5G requirement. This feature may only be supported in 5G. |
| 3 | Group\_Id | The feature supports forwarding an external group identifier of the user. This feature shall not be supported in pre-5G. |
| 4 | BdtNotification\_5G | The feature supports the sending of BDT notification. This feature includes sending of the BDT warning notification to the AF. This feature may only be supported in 5G. |
| 5 | enNB | The feature supports enhancement of northbound interfaces, e.g. enable the SCS/AS to update notification destination during modification procedure. |
| 6 | AspId\_5G | Indicates the support of application service provider.  This feature is not applicable to pre-5G (e.g. 4G). |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

### 5.4.5 Error handling

#### 5.4.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.4.5.2 Protocol Errors

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

#### 5.4.5.3 Application Errors

The application errors defined for ResourceManagementOfBdt API are listed in table 5.4.5.3-1.

Table 5.4.5.3-1: Application errors

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

## 5.5 ChargeableParty API

### 5.5.1 Overview

The ChargeableParty API is a RESTful API that allows the SCS/AS to either request to sponsor the traffic from the beginning or to request becoming the chargeable party at a later point in time via the T8 interface. The ChargeableParty API defines a set of data models, resources and the related procedures for the creation and management of the AS sessions with chargeable party change. The corresponding JSON schema for the representation of the resources and operations defined by the Chargeable API is provided in its complete form in Annex A.5.

### 5.5.2 Data model

#### 5.5.2.1 Resource data types

##### 5.5.2.1.1 Introduction

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

Table 5.5.2.1.1-1 specifies data types re-used by the ChargeableParty API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the ChargeableParty API.

Table 5.5.2.1.1-1: ChargeableParty API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| Dnn | 3GPP TS 29.571 [45] | Identifies a DNN. |
| EthFlowDescription | 3GPP TS 29.514 [52] | Defines a packet filter for an Ethernet flow.(NOTE) |
| IpAddr | 3GPP TS 29.571 [45] | UE IP Address. |
| MacAddr48 | 3GPP TS 29.571 [45] | MAC Address. |
| ServAuthInfo | 3GPP TS 29.514 [52] | The authorization result of a request bound to a transfer policy. |
| Snssai | 3GPP TS 29.571 [45] | Identifies the S-NSSAI. |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.5.4-1. |
| NOTE: In order to support a set of MAC addresses with a specific range in the traffic filter, feature MacAddressRange\_5G as specified in clause 5.5.4 shall be supported. | | |

Table 5.5.2.1.1-2 specifies the data types defined for the ChargeableParty API.

Table 5.5.2.1.1-2: ChargeableParty API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| ChargeableParty | 5.5.2.1.2 | Represents the configuration of a chargeable party. |  |
| ChargeablePartyPatch | 5.5.2.1.3 | Represents a modification request of a chargeable party resource. |  |

##### 5.5.2.1.2 Type: ChargeableParty

This type represents the configuration of a chargeable party. The same structure is used in the configuration request and configuration response.

Table 5.5.2.1.2-1: Definition of type ChargeableParty

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| self | Link | 0..1 | Link to the resource "Individual Chargeable Party Transaction". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| dnn | Dnn | 0..1 | Identifies a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. (NOTE 3) |  |
| snssai | Snssai | 0..1 | Identifies an S-NSSAI. (NOTE 3) |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| notificationDestination | Link | 1 | Contains the URI to receive the notification of bearer level event(s) from the SCEF. |  |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 5.2.5.4. | Notification\_websocket |
| exterAppId | string | 0..1 | Identifies the external Application Identifier. (NOTE 2) | AppId |
| ipv4Addr | Ipv4Addr | 0..1 | Identifies the Ipv4 address.  (NOTE 2) |  |
| ipDomain | string | 0..1 | The IPv4 address domain identifier.  The attribute may only be provided if the ipv4Addr attribute is present. |  |
| ipv6Addr | Ipv6Addr | 0..1 | Identifies the Ipv6 address.  (NOTE 2) |  |
| macAddr | MacAddr48 | 0..1 | Identifies the MAC address.  (NOTE 2) | EthChgParty\_5G |
| flowInfo | array(FlowInfo) | 0..N | Describes the IP flows.  (NOTE 2) (NOTE 4) |  |
| ethFlowInfo | array(EthFlowDescription) | 0..N | Identifies Ethernet packet flows.  (NOTE 2) | EthChgParty\_5G |
| sponsorInformation | SponsorInformation | 1 | Describes the sponsor information such as who is sponsoring the traffic. |  |
| sponsoringEnabled | boolean | 1 | Indicates whether the sponsoring data connectivity is enabled.  - true: the sponsoring data connectivity is enabled;  - false: the sponsoring data connectivity is not enabled. |  |
| referenceId | BdtReferenceId | 0..1 | The reference ID for a previously selected policy of background data transfer. |  |
| servAuthInfo | ServAuthInfo | 0..1 | Indicates the authorization result for the request bound to the transfer policy indicated by the "referenceId" attribute.  Supplied by the SCEF |  |
| usageThreshold | UsageThreshold | 0..1 | Time period and/or traffic volume. |  |
| events | array(Event) | 0..N | Corresponds to the event(s) to which the SCS/AS requests to subscribe. | enNB |
| NOTE 1: Properties marked with a feature as defined in clause 5.5.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 2: One of the "ipv4Addr", "ipv6Addr", or "macAddr" attribute shall be provided. If ipv4 or ipv6 address is provided, IP flow information shall be provided. If MAC address is provided and the AppId feature is not supported, Ethernet flow information shall be provided. If the AppId feature is supported, one of IP flow information, Ethernet flow information (if EthChgParty\_5G is supported) or External Application Identifier shall be provided.  NOTE 3: The property is only applicable for the NEF.  NOTE 4: The "tosTC" attribute of the "flowInfo" attribute may only be present if the "ToSTC\_5G" feature is supported. | | | | |

##### 5.5.2.1.3 Type: ChargeablePartyPatch

This type represents the configuration of a chargeable party. The structure is used for PATCH request.

Table 5.5.2.1.3-1: Definition of type ChargeablePartyPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| flowInfo | array(FlowInfo) | 0..N | Describes the IP flows. (NOTE 2)(NOTE 3) |  |
| exterAppId | string | 0..1 | Identifies the AF Application Identifier. (NOTE 2) | AppId |
| ethFlowInfo | array(EthFlowDescription) | 0..N | Describes Ethernet packet flows. (NOTE 2) | EthChgParty\_5G |
| sponsoringEnabled | boolean | 0..1 | Indicates whether the sponsoring data connectivity is enabled.  - true: the sponsoring data connectivity is enabled;  - false: the sponsoring data connectivity is not enabled. |  |
| referenceId | BdtReferenceId | 0..1 | The reference ID for a previously selected policy of background data transfer. |  |
| usageThreshold | UsageThresholdRm | 0..1 | Time period and/or traffic volume. |  |
| notificationDestination | Link | 0..1 | Contains the URL to receive the notification event(s) from the SCEF. |  |
| events | array(Event) | 0..N | Corresponds to the event(s) to which the SCS/AS requests to subscribe to. | enNB |
| NOTE 1: Properties marked with a feature as defined in clause 5.5.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: One of "flowInfo", "exterAppId" or "ethFlowInfo" may be provided.  NOTE 3: The "tosTC" attribute of the "flowInfo" attribute may only be present if the "ToSTC\_5G" feature is supported. | | | | |

### 5.5.3 Resource structure

#### 5.5.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-chargeable-party/v1**

"apiRoot" is set as described in clause 5.2.4. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.5.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| Chargeable Party Transactions | /{scsAsId}/transactions | GET | Read all or queried chargeable party transaction resources for a given SCS/AS |
| POST | Create a new chargeable party transaction resource |
| Individual Chargeable Party Transaction | /{scsAsId}/transactions/{transactionId} | GET | Read a chargeable party transaction resource |
| PATCH | Partial update a chargeable party transaction resource. |
| DELETE | Delete an existing chargeable party transaction resource |

#### 5.5.3.2 Resource: Chargeable Party Transactions

##### 5.5.3.2.1 Introduction

This resource allows the SCS/AS to read all active long-term transactions related to setting a chargeable party and create individual long-term transactions.

##### 5.5.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-chargeable-party/v1/{scsAsId}/transactions**

This resource shall support the resource URI variables defined in table 5.5.3.2.2-1.

Table 5.5.3.2.2-1: Resource URI variables for resource "Chargeable Party Transactions"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.5.3.2.3 Resource methods

###### 5.5.3.2.3.1 GET

The GET method allows to read all or queried active chargeable party transactions for a given SCS/AS. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.5.3.2.3.1-1 and table 5.5.3.2.3.1-2.

Table 5.5.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks | Applicability |
| ip-addrs | array(IpAddr) | 0..N | The IP address(es) of the requested UE(s). | enNB |
| ip-domain | string | 0..1 | The IPv4 address domain identifier.  The attribute may only be provided if IPv4 address is included in the ip-addrs query parameter. | enNB |
| mac-addrs | array(MacAddr48) | 0..N | The MAC address(es) of the requested UE(s). | enNB |
| NOTE: Either the "ip-addrs" parameter or the "mac-addrs" parameter may be provided at the same time. If multiple elements are provided in the array data structure, then each element shall be treated as a separate query parameter. | | | | |

Table 5.5.3.2.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(ChargeableParty) | 0..N | 200 OK | The chargeable party transactions information for the SCS/AS in the request URI are returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.5.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.5.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.5.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.5.3.2.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.5.3.2.3.4 POST

The POST method creates a new chargeable party transaction resource for a given SCS/AS. The SCS/AS shall initiate the HTTP POST request message and the SCEF shall respond to the message. The SCEF shall construct the URI of the created resource.

This method shall support request and response data structures, and response codes, as specified in the table 5.5.3.2.3.4-1.

Table 5.5.3.2.3.4-1: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| ChargeableParty | 1 | Parameters to create a chargeable party transaction with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| ChargeableParty | 1 | 201 Created | The transaction was 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 also apply. | | | | |

Table 5.5.3.2.3.4-2: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-chargeable-party/v1/{scsAsId}/transactions/{transactionId} |

###### 5.5.3.2.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.5.3.3 Resource: Individual Chargeable Party Transaction

##### 5.5.3.3.1 Introduction

This resource allows the SCS/AS to configure a chargeable party for some application flows using a long-term transaction.

##### 5.5.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-chargeable-party/v1/{scsAsId}/transactions/{transactionId}**

This resource shall support the resource URI variables defined in table 5.5.3.3.2-1.

Table 5.5.3.3.2-1: Resource URI variables for resource "Individual Chargeable Party Transaction"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| transactionId | string | Identifier of the transaction. The transactionId corresponds to the stage 2 TLTRI. |

##### 5.5.3.3.3 Resource methods

###### 5.5.3.3.3.1 GET

The GET method allows to read a transaction resource to obtain details of an active. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.5.3.3.3.1-1 and table 5.5.3.3.3.1-2.

Table 5.5.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.5.3.3.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| ChargeableParty | 1 | 200 OK | The chargeable party transactions information related to the request URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.5.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.5.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.5.3.3.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.5.3.3.3.3 PATCH

The PATCH method allows to change the sponsoring status of an active chargeable party transaction. It also allows to activate a background data tranfer policy. The SCS/AS shall initiate the HTTP PATCH request message and the SCEF shall respond to the message.This method shall support request and response data structures, and response codes, as specified in the table 5.5.3.3.3.3-1.

Table 5.5.3.3.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| ChargeablePartyPatch | 1 | Sponsor status change, usage threshold change and/or background data transfer policy activation. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| ChargeableParty | 1 | 200 OK | The chargeable party transaction resource was modified successfully.  The SCEF shall return a representation of the updated chargeable party transaction resource in the response content. |
| none |  | 204 No Content | The chargeable party transaction resource was modified successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.5.3.3.3.3-2: 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 SCEF. |

Table 5.5.3.3.3.3-3: 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 SCEF. |

###### 5.5.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.5.3.3.3.5 DELETE

The DELETE method allows to delete an active chargeable party transaction resource and to terminate the related chargeable party transaction. The SCS/AS shall initiate the HTTP DELETE request message and the SCEF shall respond to the message.

This method shall support request and response data structures, and response codes, as specified in the table 5.5.3.3.3.5-1.

Table 5.5.3.3.3.5-1.: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The subscription was deleted successfully. |
| NotificationData | 1 | 200 OK | The subscription was deleted successfully. The notification data shall be included in the response. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.5.3.3.3.5-2: 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 SCEF. |

Table 5.5.3.3.3.5-3: 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 SCEF. |

#### 5.5.3.4 Void

### 5.5.3A Notifications

#### 5.5.3A.1 General

The notifications provided by the ChargeableParty API are specified in this clause.

Table 5.5.3A-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| Event Notification | {notificationDestination} | POST | Notify the bearer level event(s) from the SCEF to the SCS/AS identified by the notification destination URI |

#### 5.5.3A.2 Event Notification

##### 5.5.3A.2.1 Description

The Event Notification allows the SCEF to notify the SCS/AS of the bearer level event(s).

##### 5.5.3A.2.2 Target URI

The Callback URI **"{**notificationDestination**}"** shall be used with the callback URI variables defined in table 5.5.3A.2.2-1.

Table 5.5.3A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notificationDestination | Link | Reference provided by the SCS/AS when the SCS/AS requests to sponsor the traffic from the beginning or to become the chargeable party at a later point.  This URI shall be provided within the "notificationDestination" attribute in the ChargeableParty type. |

##### 5.5.3A.2.3 Standard Methods

###### 5.5.3A.2.3.1 Notification via POST

The POST method allows to notify SCS/AS identified by the notification destination URI of the bearer level event(s) by the SCEF and the SCS/AS shall respond to the message.

This method shall support the request data structures specified in table 5.5.3A.2.3.1-1 and the response data structures and response codes specified in table 5.5.3A.2.3.1-2.

Table 5.5.3A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| NotificationData | 1 | Representation of the bearer level notification. |

Table 5.5.3A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| none |  | 204 No Content | This case represents a successful notification of bearer level event(s). |
| none |  | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.5.3A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.5.3A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.5.3A.2.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the NotificationData may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

### 5.5.4 Used Features

The table below defines the features applicable to the ChargeableParty API. Those features are negotiated as described in clause 5.2.7.

Table 5.5.4-1: Features used by ChargeableParty API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event feature is also supported. |
| 2 | Notification\_test\_event | The testing of notification connection is supported according to clause 5.2.5.3. |
| 3 | EthChgParty\_5G | Chargeable Party for Ethernet UE. This feature may only be supported in 5G. |
| 4 | MacAddressRange\_5G | Indicates the support of a set of MAC addresses with a specific range in the traffic filter. This feature may only be supported in 5G. |
| 5 | AppId | Indicates the support of dynamically providing the Application Identifier via the API. |
| 6 | enNB | Indicates the support of enhancements to the northbound interfaces, e.g. enable an SCS/AS to explicitly indicate the event(s) that it would like to subscribe to. |
| 7 | ToSTC\_5G | Indicates the support of Type of Service or Traffic Class. This feature may only be supported in 5G. |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

### 5.5.5 Error handling

#### 5.5.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.5.5.2 Protocol Errors

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

#### 5.5.5.3 Application Errors

The application errors defined for ChargeableParty API are listed in table 5.5.5.3-1.

Table 5.5.5.3-1: Application errors

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

## 5.6 NIDD API

### 5.6.1 Overview

The NIDD API is a RESTful API that allows the SCS/AS to send non-IP data to the UE or receive non-IP data from the UE. The NIDD API defines a set of data models, resources and the related procedures for the non-IP data transfer. The corresponding JSON schema for the representation of the resources and operations defined by the NIDD API is provided in its complete form in Annex A.6.

### 5.6.2 Data model

#### 5.6.2.1 Resource data types

##### 5.6.2.1.1 Introduction

This clause defines data structures to be used in resource representations, including subscription resources.

Table 5.6.2.1.1-1 specifies data types re-used by the NIDD API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the NIDD API.

Table 5.5.2.1.1-1: NIDD API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| NullValue | 3GPP TS 29.571 [45] | JSON's null value, used as an explicit value of an enumeration. |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.6.4-1. |

Table 5.6.2.1.1-2 specifies the data types defined for the NIDD API.

Table 5.6.2.1.1-2: NIDD API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| DeliveryStatus | 5.6.2.3.4 | Represents the status of a downlink NIDD data delivery. |  |
| GmdNiddDownlinkDataDeliveryNotification | 5.6.2.1.8 | Represents the delivery status of a specific group NIDD downlink data delivery. |  |
| GmdResult | 5.6.2.2.3 | Represents the group message delivery result. | GroupMessageDelivery |
| ManageEntity | 5.6.2.3.7 | Represents the origin that manages the RDS port. |  |
| ManagePort | 5.6.2.1.9 | Represents the configuration of a RDS dynamic port management. | Rds\_dynamic\_port |
| ManagePortNotification | 5.6.2.1.10 | Represents a ManagePort notification of port numbers that are reserved. |  |
| NiddConfiguration | 5.6.2.1.2 | Represents the configuration for NIDD. |  |
| NiddConfigurationPatch | 5.6.2.1.7 | Represents the parameters to update a NIDD configuration. |  |
| NiddConfigurationStatusNotification | 5.6.2.1.6 | Represents an NIDD configuration status notification. |  |
| NiddDownlinkDataDeliveryFailure | 5.6.2.2.4 | Represents information related to a failure delivery result. |  |
| NiddDownlinkDataDeliveryStatusNotification | 5.6.2.1.5 | Represents the delivery status of a specific NIDD downlink data delivery. |  |
| NiddDownlinkDataTransfer | 5.6.2.1.3 | Represents the received NIDD downlink data from the SCS/AS. |  |
| NiddDownlinkDataTransferPatch | 5.6.2.1.11 | Represents the parameters to request the modification of an Individual NIDD Downlink Data Delivery resource. | PatchUpdate |
| NiddStatus | 5.6.2.3.5 | Represents the status of a NIDD configuration. |  |
| NiddUplinkDataNotification | 5.6.2.1.4 | Represents NIDD uplink data to be notified to the SCS/AS. |  |
| PdnEstablishmentOptions | 5.6.2.3.3 | Represents PDN establishment options that describe the network behaviour when there is no PDN connection towards the addressed UE. |  |
| PdnEstablishmentOptionsRm | 5.6.2.3.6 | Represents the same information as the PdnEstablishmentOptions but with the "nullable: true" property. |  |
| RdsDownlinkDataDeliveryFailure | 5.6.2.2.5 | Represents the failure delivery result for RDS. |  |
| RdsPort | 5.6.2.2.2 | Represents the port configuration for Reliable Data Transfer. |  |
| SerializationFormat | 5.6.2.3.8 | Represents a serialization format associated with an RDS port. | Rds\_serialization\_format |

##### 5.6.2.1.2 Type: NiddConfiguration

This type represents the configuration for NIDD. The same structure is used in the configuration request and configuration response.

Table 5.6.2.1.2-1: Definition of type NiddConfiguration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| self | Link | 0..1 | Link to the resource "Individual NIDD configuration". This parameter shall be supplied by the SCEF in HTTP responses |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| mtcProviderId | string | 0..1 | Identifies the MTC Service Provider and/or MTC Application. (NOTE 3) |  |
| externalId | ExternalId | 0..1 | Each element uniquely identifies a user as defined in clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 2) |  |
| msisdn | Msisdn | 0..1 | Each element identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 2) |  |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in clause 4.6.3 of 3GPP TS 23.682 [2].  (NOTE 2) | GroupMessageDelivery |
| duration | DateTime | 0..1 | Identifies the absolute time at which the related NIDD Configuration request is considered to expire, as specified in clause 5.13.2 of 3GPP TS 23.682 [2]. When omitted in the request, it indicates the configuration is requested to be valid forever by the SCS/AS. When omitted in the response, it indicates the configuration is set to valid forever by the SCEF. |  |
| reliableDataService | boolean | 0..1 | Indicates whether the reliable data service (as defined in clause 4.5.14.3 of 3GPP TS 23.682 [2]) acknowledgement is requested.  - true: reliable data service acknowledgement is requested;  - false (default): reliable data service acknowledgement is not requested. |  |
| rdsPorts | array(RdsPort) | 0..N | Indicates the static port configuration that is used for reliable data transfer between specific applications using RDS (as defined in clause 5.2.4 and 5.2.5 of 3GPP TS 24.250 [31]). |  |
| pdnEstablishmentOption | PdnEstablishmentOptions | 0..1 | Indicate what the SCEF should do if the UE has not established the PDN connection and MT non-IP data needs to be sent. (wait for the UE to establish the PDN connection, respond with an error cause, or send a device trigger; see step 2 of the MT NIDD Procedure in clause 5.13.3 of 3GPP TS 23.682 [2])  The SCEF will use the value as the default preference from the SCS/AS when handling all MT non-IP packets associated with the NIDD connection. |  |
| notificationDestination | Link | 1 | An URI of a notification destination that T8 message shall be delivered to. |  |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 5.2.5.4. | Notification\_websocket |
| maximumPacketSize | integer | 0..1 | The Maximum Packet Size is the maximum NIDD packet size that was transferred to the UE by the SCEF in the PCO, see clause 4.5.14.1 of 3GPP TS 23.682 [2]. If no maximum packet size was provided to the UE by the SCEF, the SCEF sends a default configured max packet size to SCS/AS.  Unit: bit. |  |
| niddDownlinkDataTransfers | array(NiddDownlinkDataTransfer) | 0..N | The downlink data deliveries that needed to be executed by the SCEF. The cardinality of the property shall be 0..1 in the request and 0..N in the response (i.e. response may contain multiple buffered MT NIDD).  For GroupMessageDelivery feature, this property is only applicable for the configuration response to GET request. |  |
| status | NiddStatus | 0..1 | May be supplied by the SCEF |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features unless stated otherwise.  NOTE 2: One of the properties "externalId", "msisdn" or "externalGroupId" shall be included.  NOTE 3: The SCEF should check received MTC provider identifier and then the SCEF may:  - override it with local configured value and send it to HSS; - send it directly to the HSS; or - reject the NIDD configuration request. | | | | |

##### 5.6.2.1.3 Type: NiddDownlinkDataTransfer

This type represents received NIDD downlink data from the SCS/AS.

Table 5.6.2.1.3-1: Definition of type NiddDownlinkDataTransfer

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| externalId | ExternalId | 0..1 | Each element uniquely identifies a user as defined in clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 2) |  |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in clause 4.6.3 of 3GPP TS 23.682 [2].  (NOTE 2) | GroupMessageDelivery |
| msisdn | Msisdn | 0..1 | Each element identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 2) |  |
| self | Link | 0..1 | Link to the resource "Individual NIDD downlink data delivery". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| data | Bytes | 1 | The non-IP data that needed to be delivered to UE from the SCS/AS. |  |
| reliableDataService | boolean | 0..1 | Indicates whether the reliable data service (as defined in clause 4.5.14.3 of 3GPP TS 23.682 [2]) acknowledgement is requested.  - true: reliable data service acknowledgement is requested;  - false (default): reliable data service acknowledgement is not requested. |  |
| rdsPort | RdsPort | 0..1 | Indicates the port configuration that is used for reliable data transfer between specific applications using RDS (as defined in clause 5.2.4 and 5.2.5 of 3GPP TS 24.250 [31]). |  |
| maximumLatency | DurationSec | 0..1 | It is used to indicate maximum delay acceptable for downlink data and may be used to configure the buffer duration; a Maximum Latency of 0 indicates that buffering is not allowed. If not provided, the SCEF determines the acceptable delay based on local polices. |  |
| priority | integer | 0..1 | It is used to indicate the priority of the non-IP data packet relative to other non-IP data packets.  For GroupMessageDelivery feature, this property is not applicable. |  |
| pdnEstablishmentOption | PdnEstablishmentOptions | 0..1 | Indicate what the SCEF should do if the UE has not established the PDN connection and MT non-IP data needs to be sent (wait for the UE to establish the PDN connection, respond with an error cause, or send a device trigger; see step 2 of the MT NIDD Procedure in clause 5.13.3 of 3GPP TS 23.682 [2])  If PDN Connection Establishment Option is not provided with the non-IP packet, the SCEF uses the PDN Connection Establishment Option that was provided during NIDD Configuration to decide how to handle the absence of a PDN connection. |  |
| deliveryStatus | DeliveryStatus | 0..1 | Indicates the MT NIDD delivery status. |  |
| requestedRetransmissionTime | DateTime | 0..1 | Identifies the absolute time at which the SCEF is expected to retransmit the non-IP data when the deliveryStatus indicates that the non-IP data is buffered in the SCEF. This parameter may be supplied by the SCEF for delivery status "BUFFERING\_TEMPORARILY\_NOT\_REACHABLE" |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features unless stated otherwise.  NOTE 2: One of the properties "externalId", "msisdn" or "externalGroupId" shall be included. | | | | |

##### 5.6.2.1.4 Type: NiddUplinkDataNotification

This type represents NIDD uplink data to be notified to the SCS/AS.

Table 5.6.2.1.4-1: Definition of type NiddUplinkDataNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| niddConfiguration | Link | 1 | Link to the NIDD configuration resource to which this notification is related. |  |
| externalId | ExternalId | 0..1 | Each element uniquely identifies a user as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 2) |  |
| msisdn | Msisdn | 0..1 | Each element identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 2) |  |
| data | Bytes | 1 | The non IP data that needed to be delivered from the UE to the SCS/AS. |  |
| reliableDataService | boolean | 0..1 | Indicates whether the reliable data service acknowledgement is requested.  - true: reliable data service acknowledgement is requested;  - false: reliable data service acknowledgement is not requested. |  |
| rdsPort | RdsPort | 0..1 | Indicates the port configuration that is used for reliable data transfer between specific applications using RDS (as defined in clause 5.2.4 and 5.2.5 of 3GPP TS 24.250 [31]). |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: One of the properties "externalId" or "msisdn" shall be included. | | | | |

##### 5.6.2.1.5 Type: NiddDownlinkDataDeliveryStatusNotification

This type represents the delivery status for a specific NIDD downlink data delivery.

Table 5.6.2.1.5-1: Definition of type NiddDownlinkDataDeliveryStatusNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| niddDownlinkDataTransfer | Link | 1 | Link to the NIDD downlink data transfer resource to which this notification is related. |  |
| deliveryStatus | DeliveryStatus | 1 | Indicates the MT NIDD delivery status. |  |
| requestedRetransmissionTime | DateTime | 0..1 | Identifies the absolute time at which the UE will be reachable.  This parameter may be supplied by the SCEF for delivery status "FAILURE\_TEMPORARILY\_NOT\_REACHABLE" |  |
| NOTE: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

##### 5.6.2.1.6 Type: NiddConfigurationStatusNotifiation

This type represents an NIDD configuration status notification.

Table 5.6.2.1.6-1: Definition of type NiddConfigurationStatusNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| niddConfiguration | Link | 1 | Link to the NIDD configuration resource to which this notification is related. |  |
| externalId | ExternalId | 0..1 | Each element uniquely identifies a user as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 2) |  |
| msisdn | Msisdn | 0..1 | Each element identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 2) |  |
| status | NiddStatus | 1 | Indicates the NIDD configuration status. |  |
| rdsCapIndication | boolean | 0..1 | It indicates whether the network capability for the reliable data service is enabled or not. |  |
| rdsPort | RdsPort | 0..1 | Indicates the port configuration that is used for reliable data transfer between specific applications using RDS (as defined in clause 5.2.4 and 5.2.5 of 3GPP TS 24.250 [31]). | Rds\_port\_verification |
| NOTE 1: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 2: One of the properties "externalId" or "msisdn" shall be included. | | | | |

##### 5.6.2.1.7 Type: NiddConfigurationPatch

This type represents an NIDD configuration used in PATCH.

Table 5.6.2.1.7-1: Definition of type NiddConfigurationPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| duration | DateTimeRm | 0..1 | Identifies the absolute time at which the related NIDD Configuration request is considered to expire, as specified in clause 5.13.2 of 3GPP TS 23.682 [2]. When set to null in the PATCH request, it indicates the configuration is requested to be valid forever by the SCS/AS. When omitted in the response, it indicates the configuration is set to valid forever by the SCEF. |  |
| reliableDataService | boolean | 0..1 | Indicates whether the reliable data service (as defined in clause 4.5.14.3 of 3GPP TS 23.682 [2]) acknowledgement is requested.  - true: reliable data service acknowledgement is requested;  - false: reliable data service acknowledgement is not requested. |  |
| rdsPorts | array(RdsPort) | 0..N | Indicates the static port configuration that is used for reliable data transfer between specific applications using RDS (as defined in clause 5.2.4 and 5.2.5 of 3GPP TS 24.250 [31]). |  |
| pdnEstablishmentOption | PdnEstablishmentOptionsRm | 0..1 | Indicate what the SCEF should do if the UE has not established the PDN connection and MT non-IP data needs to be sent. (wait for the UE to establish the PDN connection, respond with an error cause, or send a device trigger; see step 2 of the MT NIDD Procedure in clause 5.13.3 of 3GPP TS 23.682 [2])  The SCEF will use the value as the default preference from the SCS/AS when handling all MT non-IP packets associated with the NIDD connection. |  |
| notificationDestination | Link | 0..1 | An URI of a notification destination that the message shall be delivered to. |  |
| NOTE: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

##### 5.6.2.1.8 Type: GmdNiddDownlinkDataDeliveryNotification

This type represents the delivery status for a specific group NIDD downlink data delivery.

Table 5.6.2.1.8-1: Definition of type GmdNiddDownlinkDataDeliveryNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| niddDownlinkDataTransfer | Link | 1 | Link to the NIDD downlink data transfer resource to which this notification is related. |  |
| gmdResults | array(GmdResult) | 1..N | Indicates the group message delivery result. | GroupMessageDelivery |
| NOTE: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

##### 5.6.2.1.9 Type: ManagePort

This type represents the configuration for RDS dynamic port management which is applicable for Rds\_dynamic\_port feature.

Table 5.6.2.1.9-1: Definition of type ManagePort

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| self | Link | 0..1 | Link to the resource "Individual ManagePort Configuration". This parameter shall be supplied by the SCEF in HTTP PUT/GET responses and in the notification POST request. |  |
| applicationId | string | 1 | Indicates the application that is associated with port configuration specified above (as defined in clause 5.4.2.6 of 3GPP TS 24.250 [31]). |  |
| manageEntity | ManageEntity | 0..1 | Indicates the "Individual ManagePort Configuration" resource is created by which function entity (UE or the AS). This attribute is supplied by the SCEF. |  |
| skipUeInquiry | boolean | 0..1 | Indicate whether to skip UE inquiry. Set to "true" if the SCS/AS decides to reserve port on the SCEF without confirming with the UE; otherwise set to "false". Default value is "false" if omitted. |  |
| supportedFormats | array(SerializationFormat) | 0..N | Indicates the serialization format(s) that are supported by the SCS/AS on the associated RDS port.  This attribute is supplied by the SCS/AS. | Rds\_serialization\_format |
| configuredFormat | SerializationFormat | 0..1 | Indicates the serialization format that has been configured/negotiated for the RDS port.  This attribute is supplied by the SCEF.  (NOTE) | Rds\_serialization\_format |
| NOTE: The same serialization format is used in the MO and MT directions. | | | | |

##### 5.6.2.1.10 Type: ManagePortNotification

This type represents a ManagePort notification of port numbers that are reserved.

Table 5.6.2.1.10-1: Definition of type ManagePortNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| niddConfiguration | Link | 1 | Link to the NIDD configuration resource to which this notification is related. |  |
| externalId | ExternalId | 0..1 | Each element uniquely identifies a user as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE) |  |
| msisdn | Msisdn | 0..1 | Each element identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE) |  |
| managedPorts | array(ManagePort) | 0..N | Indicates the reserved RDS port configuration information. |  |
| NOTE: One of the properties "externalId" or "msisdn" shall be included. | | | | |

##### 5.6.2.1.11 Type: NiddDownlinkDataTransferPatch

This data type represents the parameters to request the modification of an Individual NIDD Downlink Data Delivery resource.

Table 5.6.2.1.11-1: Definition of type NiddDownlinkDataTransferPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| data | Bytes | 1 | The updated non-IP data that needs to be delivered to the UE from the SCS/AS. |  |
| reliableDataService | boolean | 0..1 | Indicates whether the reliable data service (as defined in clause 4.5.14.3 of 3GPP TS 23.682 [2]) acknowledgement is requested.  - true: reliable data service acknowledgement is requested;  - false: reliable data service acknowledgement is not requested. |  |
| rdsPort | RdsPort | 0..1 | Indicates the port configuration that is used for reliable data transfer between specific applications using RDS (as defined in clause 5.2.4 and 5.2.5 of 3GPP TS 24.250 [31]). |  |
| maximumLatency | DurationSec | 0..1 | It is used to indicate the maximum delay acceptable for downlink data delivery. It may be used to configure the buffer duration. A Maximum Latency of 0 indicates that buffering is not allowed.  If not provided, the SCEF determines the acceptable delay based on local polices. |  |
| priority | integer | 0..1 | It is used to indicate the priority of these non-IP data packets relative to other non-IP data packets. |  |
| pdnEstablishmentOption | PdnEstablishmentOptions | 0..1 | Indicates what the SCEF should do if the UE has not established the PDN connection and MT non-IP data needs to be sent (wait for the UE to establish the PDN connection, respond with an error cause, or send a device trigger; see step 2 of the MT NIDD Procedure in clause 5.13.3 of 3GPP TS 23.682 [2])  If PDN Connection Establishment Option is not provided with the non-IP packets, the SCEF uses the PDN Connection Establishment Option that was provided during NIDD Configuration to decide how to handle the absence of a PDN connection. |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features unless stated otherwise. | | | | |

#### 5.6.2.2 Referenced structured data types

##### 5.6.2.2.1 Introduction

This clause defines structured data types that are referenced from data structures defined in the previous clauses.

##### 5.6.2.2.2 Type: RdsPort

This type represents the port configuration for Reliable Data Transfer. It shall comply with the provisions defined in table 5.6.2.2.2-1.

Table 5.6.2.2.2-1: Definition of RdsPort data Type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| portUE | Port | 1 | Indicates the port number on UE that is used for reliable data transfer with a specific application on UE using RDS (as defined in clause 5.2.4 and 5.2.5 of 3GPP TS 24.250 [31]). |
| portSCEF | Port | 1 | Indicates the port number on SCEF that is used for reliable data transfer with a specific application on SCEF using RDS (as defined in clause 5.2.4 and 5.2.5 of 3GPP TS 24.250 [31]). |

##### 5.6.2.2.3 Type: GmdResult

This type represents the group message delivery result. It shall comply with the provisions defined in table 5.6.2.2.3-1.

Table 5.6.2.2.3-1: Definition of GmdResult data Type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| externalId | ExternalId | 0..1 | Each element uniquely identifies a user as defined in sublause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE) |
| msisdn | Msisdn | 0..1 | Each element identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE) |
| deliveryStatus | DeliveryStatus | 1 | Indicates the MT NIDD delivery status. |
| requestedRetransmissionTime | DateTime | 0..1 | Identifies the absolute time at which the UE will be reachable.  This parameter may be supplied by the SCEF for delivery status "FAILURE\_TEMPORARILY\_NOT\_REACHABLE" |
| NOTE: One of the properties "externalId" or "msisdn" shall be included. | | | |

##### 5.6.2.2.4 Type: NiddDownlinkDataDeliveryFailure

This type represents the failure delivery result. It shall comply with the provisions defined in table 5.6.2.2.4-1.

Table 5.6.2.2.4-1: Definition of NiddDownlinkDataDeliveryFailure data Type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| problemDetail | ProblemDetails | 1 | Detailed problem as defined in clause 5.2.1.2.12. |
| requestedRetransmissionTime | DateTime | 0..1 | Identifies the absolute time at which the UE will be reachable.  This parameter may be supplied by the SCEF for error indicating "TEMPORARILY\_NOT\_REACHABLE" |

##### 5.6.2.2.5 Type: RdsDownlinkDataDeliveryFailure

This type represents the failure delivery result for RDS. It shall comply with the provisions defined in table 5.6.2.2.5-1.

Table 5.6.2.2.5-1: Definition of RdsDownlinkDataDeliveryFailure data Type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| requestedRetransmissionTime | DateTime | 0..1 | Identifies the absolute time at which the UE will be reachable.  This parameter may be supplied by the SCEF for error indicating "TEMPORARILY\_NOT\_REACHABLE" |
| supportedUeFormats | array(SerializationFormat) | 0..N | Indicates the serialization format(s) that are supported by the UE on the associated RDS port.  This parameter may be supplied by the SCEF for error indicating " SERIALIZATION\_FORMAT\_NOT\_SUPPORTED" |
| NOTE: This data type also contains all the properties defined for ProblemDetails data type in clause 5.2.1.2.12. | | | |

#### 5.6.2.3 Referenced simple data types and enumerations

##### 5.6.2.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 5.2.1 can be referenced.

##### 5.6.2.3.2 Simple data types

The simple data types defined in table 5.6.2.3.2-1 shall be supported.

Table 5.6.2.3.2-1: Simple data types

|  |  |
| --- | --- |
| Type name | Description |
|  |  |

##### 5.6.2.3.3 Enumeration: PdnEstablishmentOptions

The enumeration PdnEstablishmentOptions represents PDN establishment options that describe the network behaviour when there is no PDN connection towards the addressed UE.

Table 5.6.2.3.3-1: Enumeration PdnEstablishmentOptions

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| WAIT\_FOR\_UE | wait for the UE to establish the PDN connection |  |
| INDICATE\_ERROR | respond with an error cause |  |
| SEND\_TRIGGER | send a device trigger |  |
| NOTE: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | |

##### 5.6.2.3.4 Enumeration: DeliveryStatus

The enumeration DeliveryStatus represents the status of a downlink NIDD data delivery resource.

Table 5.6.2.3.4-1: Enumeration DeliveryStatus

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| SUCCESS | Success but details not provided |  |
| SUCCESS\_NEXT\_HOP\_ACKNOWLEDGED | Successful delivery to the next hop with acknowledgment. |  |
| SUCCESS\_NEXT\_HOP\_UNACKNOWLEDGED | Successful delivery to the next hop without acknowledgment |  |
| SUCCESS\_ACKNOWLEDGED | Reliable delivery was acknowledged by the UE |  |
| SUCCESS\_UNACKNOWLEDGED | Reliable delivery was not acknowledged by the UE |  |
| TRIGGERED | The SCEF triggered the device and is buffering the data. |  |
| BUFFERING | The SCEF is buffering the data due to no PDN connection established. |  |
| BUFFERING\_TEMPORARILY\_NOT\_REACHABLE | The SCEF has been informed that the UE is temporarily not reachable but is buffering the data |  |
| SENDING | The SCEF has forwarded the data, but they may be stored elsewhere. |  |
| FAILURE | Delivery failure but details not provided |  |
| FAILURE\_RDS\_DISABLED | RDS was disabled. |  |
| FAILURE\_NEXT\_HOP | Unsuccessful delivery to the next hop. |  |
| FAILURE\_TIMEOUT | Unsuccessful delivery due to timeout. |  |
| FAILURE\_TEMPORARILY\_NOT\_REACHABLE | The SCEF has been informed that the UE is temporarily not reachable without buffering the data. |  |
| NOTE: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.6.2.3.5 Enumeration: NiddStatus

The enumeration NiddStatus represents the status of a NIDD configuration.

Table 5.6.2.3.5-1: Enumeration NiddStatus

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| ACTIVE | The NIDD configuration is active. |  |
| TERMINATED\_UE\_NOT\_AUTHORIZED | The NIDD configuration was terminated because the UE´s authorisation was revoked. |  |
| TERMINATED | The NIDD configuration was terminated. |  |
| RDS\_PORT\_UNKNOWN | The RDS port is unknown. | Rds\_port\_verification |
| NOTE: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | |

##### 5.6.2.3.6 Enumeration: PdnEstablishmentOptionsRm

The enumeration PdnEstablishmentOptionsRm represents PDN establishment options that describe the network behaviour when there is no PDN connection towards the addressed UE. It is defined in clause 5.6.2.3.3 but also allows null value (specified as "NullValue" data type) so it can be removed in "JSON Merge Patch", as defined in IETF RFC 7396 [39].

Table 5.6.2.3.6-1: Enumeration PdnEstablishmentOptionsRm

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| WAIT\_FOR\_UE | wait for the UE to establish the PDN connection |  |
| INDICATE\_ERROR | respond with an error cause |  |
| SEND\_TRIGGER | send a device trigger |  |
| NOTE: Properties marked with a feature as defined in clause 5.6.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.6.2.3.7 Enumeration: ManageEntity

The enumeration ManageEntity represents the origin that manages the RDS port.

Table 5.6.2.3.7-1: Enumeration ManageEntity

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| UE | Representing the UE. |  |
| AS | Representing the Application Server |  |

##### 5.6.2.3.8 Enumeration: SerializationFormat

The enumeration SerializationFormat represents a serialization format associated with an RDS port which is applicable for the Rds\_serialization\_format feature.

Table 5.6.2.3.8-1: Enumeration SerializationFormat

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| CBOR | The CBOR Serialzition format |  |
| JSON | The JSON Serialzition format |  |
| XML | The XML Serialzition format |  |

### 5.6.3 Resource structure

#### 5.6.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-nidd/v1**

"apiRoot" is set as described in clause 5.2.4. "apiName" shall be set to "3gpp-nidd" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.6.3.1-1: Resources and methods overview

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | HTTP initiator | Meaning |
| NIDD configurations | /{scsAsId}/configurations | GET | SCS/AS | Read all NIDD configuration resources for a given SCS/AS. |
| POST | SCS/AS | Create a new NIDD configuration resource. |
| Individual NIDD configuration | /{scsAsId}/configurations/{configurationId} | PATCH | SCS/AS | Modify an existing NIDD configuration resource. |
| GET | SCS/AS | Read an NIDD configuration resource. |
| DELETE | SCS/AS | Delete an existing NIDD configuration resource. |
| NIDD downlink data deliveries | /{scsAsId}/configurations/{configurationId}/downlink-data-deliveries | GET | SCS/AS | Read all pending NIDD downlink data delivery resources related to a particular NIDD configuration resource. |
| POST | SCS/AS | Create an NIDD downlink data delivery resource related to a particular NIDD configuration resource. |
| Individual NIDD downlink data delivery | /{scsAsId}/configurations/{configurationId}/downlink-data-deliveries/{downlinkDataDeliveryId} | PUT | SCS/AS | Replace an Individual NIDD downlink data delivery resource. |
| PATCH | SCS/AS | Modify an Individual NIDD downlink data delivery resource. |
| DELETE | SCS/AS | Delete an NIDD downlink data delivery resource. |
| GET | SCS/AS | Read pending NIDD downlink data delivery resource. |
| ManagePort Configurations | /{scsAsId}/configurations/{configurationId}/rds-ports | GET | SCS/AS | Read all RDS ManagePort Configurations. |
| Individual ManagePort Configuration | /{scsAsId}/configurations/{configurationId}/rds-ports/{portId} | PUT | SCS/AS | Create a new Individual ManagePort Configuration resource to reserve port numbers. |
| DELETE | SCS/AS | Delete an Individual ManagePort Configuration resource to release port numbers. |
| GET | SCS/AS | Read an Individual ManagePort Configuration resource to query port numbers. |

#### 5.6.3.2 Resource: NIDD Configurations

##### 5.6.3.2.1 Introduction

This resource allows the SCS/AS to create an NIDD configuration at the SCEF, and read all NIDD configurations in the SCEF.

##### 5.6.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-nidd/v1/{scsAsId}/configurations**

This resource shall support the resource URI variables defined in table 5.6.3.2.2-1.

Table 5.6.3.2.2-1: Resource URI variables for resource "NIDD Configurations"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.6.3.2.3 Resource methods

###### 5.6.3.2.3.1 GET

The GET method allows to read all active NIDD configurations for a given SCS/AS. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.6.3.2.3.1-1 and table 5.6.3.2.3.1-2.

Table 5.6.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.6.3.2.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(NiddConfiguration) | 0..N | 200 OK | The configuration information for the SCS/AS in the request URI are returned. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.6.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.6.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.6.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.6.3.2.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.6.3.2.3.4 POST

To create a NIDD configuration, the SCS/AS shall use the HTTP POST method on the "configurations" collection resource as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.6.2.1.2-1.

The possible response messages from the SCEF, depending on whether the POST request is successful or unsuccessful, are shown in table 5.6.3.2.3.4-1.

Table 5.6.3.2.3.4-1: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NiddConfiguration | 1 | Parameters to create and authorize a NIDD configuration with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NiddConfiguration | 1 | 201 Created | The NIDD configuration was created successfully.  The SCEF shall return a data structure of type "NiddConfiguration" in the response content.  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 also apply. | | | | |

Table 5.6.3.2.3.4-2: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-nidd/v1/{scsAsId}/configurations/{configurationId} |

###### 5.6.3.2.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.6.3.3 Resource: Individual NIDD Configuration

##### 5.6.3.3.1 Introduction

This resource allows the SCS/AS to query/update/cancel the specific NIDD configuration at the SCEF.

##### 5.6.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-nidd/v1/{scsAsId}/configurations/{configurationId}**

This resource shall support the resource URI variables defined in table 5.6.3.3.2-1.

Table 5.6.3.3.2-1: Resource URI variables for resource "Individual NIDD Configuration"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| configurationId | string | Identifier of the configuration. The configurationId corresponds to the stage 2 TLTRI. |

##### 5.6.3.3.3 Resource methods

###### 5.6.3.3.3.1 GET

The GET method allows to read a NIDD configuration resource to obtain details of an active configuration. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.6.3.3.3.1-1 and table 5.6.3.3.3.1-2.

Table 5.6.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.6.3.3.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| None |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NiddConfiguration | 1 | 200 OK | The configuration information related to the request URI is returned. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.6.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.6.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.6.3.3.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.6.3.3.3.3 PATCH

Assuming that a NIDD configuration has been created using the HTTP POST method described in clause 5.6.3.2.3.4, partial updating of its properties can be performed by the SCS/AS by using the HTTP PATCH method on the "configuration" instance resource as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.6.2.1.2-1

The possible response messages from the SCEF, depending on whether the PATCH request is successful or unsuccessful, are shown in table 5.6.3.3.3.3-1.

Table 5.6.3.3.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NiddConfigurationPatch | 1 | Parameters to update a NIDD configuration with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NiddConfiguration | 1 | 200 OK | The NIDD configuration was modified successfully.  The SCEF shall return an updated data structure of type "NiddConfiguration" in the response content. |
| None |  | 204 No Content | The NIDD configuration has been modified successfully and no content is to be sent in the response message body. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.6.3.3.3.3-2: 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 SCEF. |

Table 5.6.3.3.3.3-3: 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 SCEF. |

###### 5.6.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.6.3.3.3.5 DELETE

To cancel a NIDD configuration, the SCS/AS shall use the HTTP DELETE method on the individual "NIDD configuration" resource which is indicated by the URI in the Location header of the HTTP POST response:

The possible response messages from the SCEF, depending on whether the DELETE request is successful or unsuccessful, are shown in Table 5.6.3.3.3.5-1.

Table 5.6.3.3.3.5-1.: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  | . | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NiddConfiguration | 1 | 200 OK | The NIDD configuration was cancelled successfully.  The SCEF shall return a full representation of the deleted resource including a data structure of type "NiddConfiguration" with a "TERMINATE" status in the response body. |
| None |  | 204 No Content | The NIDD configuration was cancelled successfully.  The response body shall be empty. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.6.3.3.3.5-2: 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 SCEF. |

Table 5.6.3.3.3.5-3: 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 SCEF. |

#### 5.6.3.4 Resource: NIDD downlink data deliveries

##### 5.6.3.4.1 Introduction

This resource allows the SCS/AS to read all pending NIDD downlink data delivery resources for a particular NIDD configuration resource.

This resource also allows the SCS/AS to create an NIDD downlink data delivery.

This resource is applicable for a single UE and a group of UEs NIDD MT delivery.

##### 5.6.3.4.2 Resource definition

Resource URI: **{apiRoot}/3gpp-nidd/v1/{scsAsId}/configurations/{configurationId}/downlink-data-deliveries**

This resource shall support the resource URI variables defined in table 5.6.3.4.2-1.

Table 5.6.3.4.2-1: Resource URI variables for resource "NIDD Downlink Data Deliveries"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| configurationId | string | Identifier of the configuration. |

##### 5.6.3.4.3 Resource methods

###### 5.6.3.4.3.1 GET

The GET method allows to read all pending NIDD downlink data deliveries for a given SCS/AS and NIDD configuration. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.6.3.4.3.1-1 and table 5.6.3.4.3.1-2.

Table 5.6.3.4.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.6.3.4.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| None |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(NiddDownlinkDataTransfer) | 0..N | 200 OK | All pending NIDD downlink data deliveries for the SCS/AS and NIDD configuration in the request URI are returned. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.6.3.4.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.6.3.4.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.6.3.4.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.6.3.4.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.6.3.4.3.4 POST

To deliver the downlink non-IP data, the SCS/AS shall use the HTTP POST method on the "NIDD downlink data deliveries" resource with the body of the message is encoded in JSON format with the data structure defined in table 5.6.2.1.3-1.

The possible response messages from the SCEF, depending on whether the POST request is successful or unsuccessful, are shown in Table 5.6.3.4.3.4-1.

Table 5.6.3.4.3.4-1: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NiddDownlinkDataTransfer | 1 | The parameters and non-IP data for the MT delivery. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NiddDownlinkDataTransfer | 1 | 200 OK | The NIDD downlink data delivery was successful.  The SCEF shall return a data structure of type "NiddDownlinkDataTransfer" in the response content. |
| NiddDownlinkDataTransfer | 1 | 201 Created | The NIDD downlink data delivery request was accepted by the SCEF, the NIDD will be performed later.  The SCEF shall return a data structure of type "NiddDownlinkDataTransfer" in the response content, and shall return the URI of the resource representing the downlink data transfer in the "Location" header. |
| None |  | 307 Temporary Redirect | Temporary redirection, during NIDD downlink data delivery. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during NIDD downlink data delivery. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NiddDownlinkDataDeliveryFailure | 0..1 | 500 Internal Server Error | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.6.5.3. | | | | |

Table 5.6.3.4.3.4-2: 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 SCEF. |

Table 5.6.3.4.3.4-3: 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 SCEF. |

Table 5.6.3.4.3.4-2: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-nidd/v1/{scsAsId}/configurations/{configurationId}/downlink-data-deliveries/{downlinkDataDeliveryId} |

###### 5.6.3.4.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.6.3.5 Resource: Individual NIDD downlink data delivery

##### 5.6.3.5.1 Introduction

For NIDD MT delivery for a single UE, this resource allows the SCS/AS to read a pending NIDD downlink delivery resource, or to replace or cancel an NIDD downlink data delivery resource related to an NIDD configuration resource.

For NIDD MT delivery for a group of UEs, this resource allows the SCS/AS to read a pending NIDD downlink delivery resource related to a NIDD configuration resource.

##### 5.6.3.5.2 Resource definition

Resource URI: **{apiRoot}/3gpp-nidd/v1/{scsAsId}/configurations/{configurationId}/downlink-data-deliveries/{downlinkDataDeliveryId}**

This resource shall support the resource URI variables defined in table 5.6.3.5.2-1.

Table 5.6.3.4.2-1: Resource URI variables for resource "Individual NIDD Downlink Data Delivery"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| configurationId | string | Identifier of the configuration. |
| downlinkDataDeliveryId | string | Identifier of the downlink data delivery. |

##### 5.6.3.5.3 Resource methods

###### 5.6.3.5.3.1 GET

The GET method allows to read a NIDD downlink data delivery resource to obtain details. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.6.3.5.3.1-1 and table 5.6.3.5.3.1-2.

Table 5.6.3.5.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.6.3.5.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NiddDownlinkDataTransfer | 1 | 200 OK | Individual NIDD downlink data delivery resource is returned. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.6.3.5.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.6.3.5.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.6.3.5.3.2 PUT

To replace the buffered downlink non-IP data, the SCS/AS shall use the HTTP PUT method on the "Individual NIDD downlink data delivery" resource with the body of the message encoded in JSON format with the data structure defined in table 5.6.2.1.3-1.

The possible response messages from the SCEF, depending on whether the PUT request is successful or unsuccessful, are shown in Table 5.6.3.5.3.2-1.

Table 5.6.3.5.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NiddDownlinkDataTransfer | 1 | The parameters and non-IP data for the MT delivery. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NiddDownlinkDataTransfer | 1 | 200 OK | The update of the Individual NIDD downlink data delivery resource was successful.  The SCEF shall return an updated representation of the resource within the NiddDownlinkDataTransfer data structure in the response message body. |
| None |  | 204 No Content | The update of the Individual NIDD downlink data delivery was successful and no content is to be sent in the response message body. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| ProblemDetails | 0..1 | 404 Not Found | (NOTE 2) |
| ProblemDetails | 0..1 | 409 Conflict | (NOTE 2) |
| NiddDownlinkDataDeliveryFailure | 0..1 | 500 Internal Server Error | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.6.5.3. | | | | |

Table 5.6.3.5.3.2-2: 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 SCEF. |

Table 5.6.3.5.3.2-3: 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 SCEF. |

###### 5.6.3.5.3.3 PATCH

If the "PatchUpdate" feature defined in clause 5.7.4 is supported, to partially modify the buffered downlink non-IP data, the SCS/AS shall use the HTTP PATCH method on the "Individual NIDD downlink data delivery" resource with the body of the message encoded in JSON format with the data structure defined in table 5.6.2.1.11-1.

The possible response messages from the SCEF, depending on whether the HTTP PATCH request is successful or unsuccessful, are shown in Table 5.6.3.5.3.3-1.

Table 5.6.3.5.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NiddDownlinkDataTransferPatch | 1 | The parameters to modify an existing Individual NIDD downlink data delivery resource. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NiddDownlinkDataTransfer | 1 | 200 OK | The modification of the Individual NIDD downlink data delivery resource was successful.  The SCEF shall return an updated representation of the resource within the NiddDownlinkDataTransfer data structure in the response message body. |
| n/a |  | 204 No Content | The modification of the Individual NIDD downlink data delivery resource was successful and no content is to be sent in the response message 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| ProblemDetails | 0..1 | 404 Not Found | (NOTE 2) |
| ProblemDetails | 0..1 | 409 Conflict | (NOTE 2) |
| NiddDownlinkDataDeliveryFailure | 0..1 | 500 Internal Server Error | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.6.5.3. | | | | |

Table 5.6.3.5.3.3-2: 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 SCEF. |

Table 5.6.3.5.3.3-3: 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 SCEF. |

###### 5.6.3.5.3.4 POST

This HTTP method is not supported for the resource.

###### 5.6.3.5.3.5 DELETE

To cancel a NIDD downlink data delivery, the SCS/AS shall use the HTTP DELETE method on the "Individual NIDD downlink data delivery" resource which is indicated by the URI in the Location header of the HTTP POST response:

The possible response messages from the SCEF, depending on whether the DELETE request is successful or unsuccessful, are shown in table 5.6.3.3.3.5-1.

Table 5.6.3.5.3.5-1.: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  | . | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The NIDD downlink data delivery was cancelled successfully.  The response body shall be empty. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| ProblemDetails | 0..1 | 404 Not Found | (NOTE 2) |
| ProblemDetails | 0..1 | 409 Conflict | (NOTE 2) |
| NiddDownlinkDataDeliveryFailure | 0..1 | 500 Internal Server Error | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.6.5.3. | | | | |

Table 5.6.3.5.3.5-2: 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 SCEF. |

Table 5.6.3.5.3.5-3: 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 SCEF. |

#### 5.6.3.6 Void

#### 5.6.3.7 Void

#### 5.6.3.8 Void

#### 5.6.3.9 Resource: Individual ManagePort Configuration

##### 5.6.3.9.1 Introduction

This resource allows the SCS/AS to create, delete or read the specific ManagePort configuration at the SCEF.

##### 5.6.3.9.2 Resource definition

Resource URI: **{apiRoot}/3gpp-nidd/v1/{scsAsId}/configurations/{configurationId}/rds-ports/{portId}**

This resource shall support the resource URI variables defined in table 5.6.3.9.2-1.

Table 5.6.3.9.2-1: Resource URI variables for resource "Individual ManagePort Configuration"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| configurationId | string | Identifier of the configuration. The configurationId corresponds to the stage 2 TLTRI. |
| portId | string | UE port identifier including both UE port number and exposure function port number.  Pattern: "^(ue([0-9]|(1[0-5]))-ef([0-9]|(1[0-5])))$". |

##### 5.6.3.9.3 Resource methods

###### 5.6.3.9.3.1 GET

The GET method allows to read a ManagePort configuration resource to query the ports reserved. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.6.3.9.3.1-1 and table 5.6.3.9.3.1-2.

Table 5.6.3.9.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.6.3.9.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| None |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| ManagePort | 1 | 200 OK | The configuration information related to the request URI is returned. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.6.3.9.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.6.3.9.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.6.3.9.3.2 PUT

To create a ManagePort configuration and reserve a port number, the SCS/AS shall use the HTTP PUT method on the "ManagePort" resource with the body of the message is encoded in JSON format with the data structure defined in table 5.6.3.9.3.2-1.

The possible response messages from the SCEF, depending on whether the PUT request is successful or unsuccessful, are shown in Table 5.6.3.9.3.2-1.

Table 5.6.3.9.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| ManagePort | 1 | The ManagePort configuration to be created which represents the information used for reserving the port configuration for an application. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| ManagePort | 1 | 201 Created | This indicates the reservation of port configuration for specified application is successful. |
| None |  | 202 Accepted | This indicates the request for reservation of port configuration for specified application is accepted and under processing. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| RdsDownlinkDataDeliveryFailure | 0..1 | 500 Internal Server Error | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.6.5.3. | | | | |

###### 5.6.3.9.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.6.3.9.3.4 POST

This HTTP method is not supported for the resource.

###### 5.6.3.9.3.5 DELETE

To cancel a ManagePort configuration and release port numbers, the SCS/AS shall use the HTTP DELETE method on the ManagePort resource which is indicated by the URI in the Location header of the HTTP POST response:

The possible response messages from the SCEF, depending on whether the DELETE request is successful or unsuccessful, are shown in Table 5.6.3.9.3.5-1.

Table 5.6.3.9.3.5-1.: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| ManagePort | 1 | The ManagePort configuration to be cancelled which represents the information used for releasing the port configuration for an application | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| None |  | 204 No Content | The ManagePort configuration was cancelled successfully and the port configuration was released. |
| None |  | 202 Accepted | This indicates the request for cancellation of port configuration for specified application is accepted and under processing. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetails | 0..1 | 404 Not Found | (NOTE 2) |
| RdsDownlinkDataDeliveryFailure | 0..1 | 500 Internal Server Error | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.6.5.3. | | | | |

Table 5.6.3.9.3.5-2: 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 SCEF. |

Table 5.6.3.9.3.5-3: 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 SCEF. |

#### 5.6.3.10 Void

#### 5.6.3.11 Resource: ManagePort Configurations

##### 5.6.3.11.1 Introduction

This resource allows the SCS/AS to read all ManagePort configurations for a given NIDD configuration at the SCEF.

##### 5.6.3.11.2 Resource definition

Resource URI: **{apiRoot}/3gpp-nidd/v1/{scsAsId}/configurations/{configurationId}/rds-ports**

This resource shall support the resource URI variables defined in table 5.6.3.11.2-1.

Table 5.6.3.11.2-1: Resource URI variables for resource "ManagePort Configurations"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| configurationId | string | Identifier of the configuration of type string. The configurationId corresponds to the stage 2 TLTRI. |

##### 5.6.3.11.3 Resource methods

###### 5.6.3.11.3.1 GET

The GET method allows to read all ManagePort configurations on the SCEF. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.6.3.11.3.1-1 and table 5.6.3.11.3.1-2.

Table 5.6.3.11.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.6.3.11.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| None |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(ManagePort) | 0..N | 200 OK | All RDS dynamic port configuration information related to the request URI are returned. |
| None |  | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.6.3.11.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.6.3.11.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.6.3.11.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.6.3.11.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.6.3.11.3.4 POST

This HTTP method is not supported for the resource.

###### 5.6.3.11.3.5 DELETE

This HTTP method is not supported for the resource.

### 5.6.3A Notifications

#### 5.6.3A.1 General

The notifications provided by the NIDD API are specified in this clause.

Table 5.6.3A-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| NIDD Configuration Update Notification | {notification\_uri} | POST | Send notifications about the status of an NIDD configuration to the SCS/AS. |
| NIDD Downlink Data Delivery Status Notification | {notification\_uri} | POST | Report a specific NIDD downlink data delivery result to the SCS/AS. |
| NIDD Uplink Data Notification | {notification\_uri} | POST | Send an uplink non-IP data notification from the SCEF to the SCS/AS. |
| ManagePort Notification | {notification\_uri} | POST | Send notifications about the port numbers that are reserved. |

#### 5.6.3A.2 NIDD Configuration Update Notification

##### 5.6.3A.2.1 Description

The NIDD Configuration Update Notification allows the SCEF to send notifications about the status of an NIDD configuration to the SCS/AS.

##### 5.6.3A.2.2 Target URI

The Callback URI **"{**notification\_uri**}"** shall be used with the callback URI variables defined in table 5.6.3A.2.2-1.

Table 5.6.3A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notification\_uri | Link | A URI indicating the notification destination where T8 notification requests shall be delivered.  This URI shall be provided within the "notificationDestination" attribute in the NiddConfiguration type. |

##### 5.6.3A.2.3 Standard Methods

###### 5.6.3A.2.3.1 Notification via POST

To report the status of the NIDD configuration to the SCS/AS, the SCEF shall use the HTTP POST method on the notification point as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.6.2.1.6-1.

This method shall support the request data structures specified in table 5.6.3A.2.3.1-1 and the response data structures and response codes specified in table 5.6.3A.2.3.1-2.

Table 5.6.3A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| NiddConfigurationStatusNotification | 1 | The NIDD configuration status notification. |

Table 5.6.3A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| Acknowledgement | 1 | 200 OK | The successful acknowledgement of the notification with a body. |
| (None) |  | 204 No Content | The successful acknowledgement of the notification without a body. |
| None |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| None |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.6.3A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.6.3A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.6.3A.2.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the NiddConfigurationStatusNotification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

#### 5.6.3A.3 NIDD Downlink Data Delivery Status Notification

##### 5.6.3A.3.1 Description

The NIDD Downlink Data Delivery Status Notification allows the SCEF to send notifications about the status of downlink NIDD data delivery to the SCS/AS. This resource is applicable for a single UE and a group of UEs NIDD MT delivery.

##### 5.6.3A.3.2 Target URI

The Callback URI **"{**notification\_uri**}"** shall be used with the callback URI variables defined in table 5.6.3A.3.2-1.

Table 5.6.3A.3.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notification\_uri | Link | A URI indicating the notification destination URI where T8 notification requests shall be delivered.  This URI shall be provided within the "notificationDestination" attribute in the NiddConfiguration type. |

##### 5.6.3A.3.3 Standard Methods

###### 5.6.3A.3.3.1 Notification via POST

To report the delivery status of the downlink non-IP data delivery, the SCEF shall use the HTTP POST method on the notification endpoint with the body of the message encoded in JSON format with the data structure defined in table 5.6.2.1.5-1 for a single UE or table 5.6.2.1.8-1 for a group of UEs.

This method shall support the request and response data structures specified in table 5.6.3A.3.3.1-1 and table 5.6.3A.3.3.1-2 for a single UE, and support the request and response data structures specified in table 5.6.3A.3.3.1-3 and table 5.6.3A.3.3.1-4 for a group of UEs.

Table 5.6.3A.3.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| NiddDownlinkDataDeliveryStatusNotification | 1 | The Down link data delivery status notification for a single UE. |

Table 5.6.3A.3.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| Acknowledgement | 1 | 200 OK | The successful acknowledgement of the notification. |
| (None) |  | 204 No Content | The successful acknowledgement of the notification without a body. |
| None |  | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.6.3A.3.3.1-3: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| GmdNiddDownlinkDataDeliveryStatusNotification | 1 | The Down link data delivery status notification for a group of UEs. |

Table 5.6.3A.3.3.1-4: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| Acknowledgement | 1 | 200 OK | The successful acknowledgement of the notification. |
| (None) |  | 204 No Content | The successful acknowledgement of the notification without a body. |
| None |  | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.6.3A.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 representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.6.3A.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 representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.6.3A.3.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the NiddDownlinkDataDeliveryStatusNotification or GmdNiddDownlinkDataDeliveryStatusNotification may alternatively be delivered for a single UE or a group of UEs through the Websocket mechanism as defined in clause 5.2.5.4.

#### 5.6.3A.4 NIDD Uplink Data Notification

##### 5.6.3A.4.1 Description

The NIDD Uplink Data Notification allows the SCEF to send notifications about received NIDD uplink data..

##### 5.6.3A.4.2 Target URI

The Callback URI **"{**notification\_uri**}"** shall be used with the callback URI variables defined in table 5.6.3A.4.2-1.

Table 5.6.3A.4.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notification\_uri | Link | A URI indicating the notification destination URI where T8 notification requests shall be delivered.  This URI shall be provided within the "notificationDestination" attribute in the NiddConfiguration type. |

##### 5.6.3A.4.3 Standard Methods

###### 5.6.3A.4.3.1 Notification via POST

To send the uplink non-IP data to the SCS/AS, the SCEF shall use the HTTP POST method on the notification endpoint in SCS/AS as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.6.2.1.4-1.

This method shall support the request data structures specified in table 5.6.3A.4.3.1-1 and the response data structures and response codes specified in table 5.6.3A.4.3.1-2.

Table 5.6.3A.4.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| NiddUplinkDataNotification | 1 | The parameters and non-IP data for the NIDD uplink non-IP data notification. |

Table 5.6.3A.4.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| Acknowledgement | 1 | 200 OK | The successful acknowledgement of the uplink data notification |
| (None) |  | 204 No Content | The successful acknowledgement of the notification without a body. |
| None |  | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.6.3A.4.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.6.3A.4.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.6.3A.4.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the NiddUplinkDataNotification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

#### 5.6.3A.5 ManagePort Notification

##### 5.6.3A.5.1 Description

The ManagePort Notification allows the SCEF to send notifications about the port numbers that are reserved.

##### 5.6.3A.5.2 Target URI

The Callback URI **"{**notification\_uri**}"** shall be used with the callback URI variables defined in table 5.6.3A.5.2-1.

Table 5.6.3A.5.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notification\_uri | Link | A URI indicating the notification destination URI where T8 notification requests shall be delivered.  This URI shall be provided within the "notificationDestination" attribute in the NiddConfiguration type. |

##### 5.6.3A.5.3 Standard Methods

###### 5.6.3A.5.3.1 Notification via POST

To send the information about reserved ports and their configuration to the SCS/AS, the SCEF shall use the HTTP POST method on the notification endpoint in SCS/AS as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.6.2.1.10-1.

This method shall support the request data structures specified in table 5.6.3A.5.3.1-1 and the response data structures and response codes specified in table 5.6.3A.5.3.1-2.

Table 5.6.3A.5.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| ManagePortNotification | 1 | The parameters that represents the information about port numbers that are reserved for use with an application. |

Table 5.6.3A.5.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| Acknowledgement | 1 | 200 OK | The successful notification of reserved port configuration. |
| (None) |  | 204 No Content | The successful acknowledgement of the reserved port configuration without a body. |
| None |  | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| None |  | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.6.3A.5.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.6.3A.5.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.6.3A.5.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the ManagePortNotification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

### 5.6.4 Used Features

The table below defines the features applicable to the NIDD API. Those features are negotiated as described in clause 5.2.7.

Table 5.6.4-1: Features used by NIDD API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | GroupMessageDelivery | This feature indicates the support of group message delivery via MT NIDD as defined in clause 5.5.3 of 3GPP TS 23.682 [2]. |
| 2 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 3 | Notification\_test\_event | The testing of notification connection is supported according to clause 5.2.5.3. |
| 4 | MT\_NIDD\_modification\_cancellation | Modification and cancellation of an individual MT NIDD resource. |
| 5 | Rds\_port\_verification | This feature indicates the support of RDS port verification in the MO/MT NIDD delivery. |
| 6 | Rds\_dynamic\_port | This feature indicates the support of RDS dynamic port management. |
| 7 | Rds\_serialization\_format | This feature indicates the support of RDS Serialization Format reservation, notification, and query. This feature requires that the Rds\_dynamic\_port is also supported. |
| 8 | PatchUpdate | Indicates the support of enhancements to the northbound interfaces (e.g. support the partial modification of an existing subscription resource). |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

### 5.6.5 Error handling

#### 5.6.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.6.5.2 Protocol Errors

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

#### 5.6.5.3 Application Errors

The application errors defined for the NIDD API are listed in table 5.6.5.3-1.

Table 5.6.5.3-1: Application errors

|  |  |  |  |
| --- | --- | --- | --- |
| Application Error | HTTP status code | Description | Applicability |
| QUOTA\_EXCEEDED | 403 Forbidden | Not enough quota for the MT NIDD |  |
| DATA\_TOO\_LARGE | 403 Forbidden | The non-IP data size is larger than "maximumPacketSize" of the NIDD configuration. |  |
| RDS\_PORT\_UNKNOWN | 403 Forbidden | The SCEF does not know the RDS port numbers in the MT NIDD, such port numbers does not match with the configured port numbers. | Rds\_port\_verification |
| OPERATION\_PROHIBITED | 403 Forbidden | Indicates the operation is prohibited. |  |
| PORT\_NOT\_FREE | 403 Forbidden | Port is not free as it is already associated with an application | Rds\_dynamic\_port |
| ALREADY\_DELIVERED | 404 Not Found | The SCEF has already delivered the buffered data. |  |
| PORT\_NOT\_ASSOC\_WITH\_APP | 404 Not Found | Port is free and is not associated with any application. | Rds\_dynamic\_port |
| SENDING | 409 Conflict | The SCEF is already in sending the buffered non-IP data. |  |
| TRIGGERED | 500 Internal Server Error | The SCEF triggered the device but did not buffer the data. The SCS AS may resubmit the data |  |
| TEMPORARILY\_NOT\_REACHABLE | 500 Internal Server Error | The SCEF has aborted the delivery because the UE is temporarily not reachable. The SCEF may in addition indicate a requested re-submission time for the data. |  |
| NEXT\_HOP | 500 Internal Server Error | Unsuccessful delivery to the next hop. |  |
| TIMEOUT | 500 Internal Server Error | Unsuccessful delivery due to timeout. |  |
| NO\_PDN\_CONNECTION | 500 Internal Server Error | The SCEF cannot proceed since there is no PDN connection. |  |
| SERIALIZATION\_FORMAT\_NOT\_SUPPORTED | 500 Internal Server Error | The SCEF was not able to configure a Serialization Format for the port | Rds\_serialization\_format |

## 5.7 DeviceTriggering API

### 5.7.1 Overview

The DeviceTriggering API is a RESTful API that allows the SCS/AS to deliver specific device trigger to the SCEF; it allows the SCS/AS to replace or recall the pending device trigger via the SCEF. If the corresponding device trigger delivery report is received by the SCEF, it also allows the SCEF to indicate the trigger delivery result to the SCS/AS.

The DeviceTriggering API defines a set of data models, resources and the related procedure for the creation and management of the device triggering. The corresponding JSON schema for the representation of the resources and operations defined by the DeviceTriggering API is provided in its complete form in Annex A.7.

### 5.7.2 Data model

#### 5.7.2.1 Resource data types

##### 5.7.2.1.1 Introduction

This clause defines data structures to be used in resource representations, including subscription resources.

Table 5.7.2.1.1-1 specifies data types re-used by the DeviceTriggering API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the DeviceTriggering API.

Table 5.7.2.1.1-1: DeviceTriggering API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.7.4-1. |

Table 5.7.2.1.1-2 specifies the data types defined for the DeviceTriggering API.

Table 5.7.2.1.1-2: DeviceTriggering API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| DeliveryResult | 5.7.2.2.3 | Represents the result of the delivery of a device triggering request. |  |
| DeviceTriggering | 5.7.2.1.2 | Represents device triggering related information. |  |
| DeviceTriggeringDeliveryReportNotification | 5.7.2.1.3 | Represents a device triggering delivery report notification. |  |
| DeviceTriggeringPatch | 5.7.2.1.4 | Represents the parameters to request the modification of an Individual Device Triggering Transaction resource. | PatchUpdate |
| Priority | 5.7.2.2.4 | Represents the priority indication for a trigger payload. |  |

##### 5.7.2.1.2 Type: DeviceTriggering

This type represents device triggering request. The same structure is used in the request and response.

Table 5.7.2.1.2-1: Definition of type DeviceTriggering

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| self | Link | 0..1 | Link to the resource "Individual Device Triggering Transaction". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| externalId | ExternalId | 0..1 | Uniquely identifies a user as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 2) |  |
| msisdn | Msisdn | 0..1 | Identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 2) |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| validityPeriod | DurationSec | 1 | The validity time in seconds for the specific action requested. |  |
| priority | Priority | 1 | Identifies the priority of the device trigger. |  |
| applicationPortId | Port | 1 | This is used to uniquely identify the triggering application addressed in the device for destination port. See clause 9.2.3.24.4 in 3GPP TS 23.040 [43] for further details. |  |
| appSrcPortId | Port | 0..1 | This is used to uniquely identify the triggering application addressed in the device for originator port. See clause 9.2.3.24.4 in 3GPP TS 23.040 [43] for further details. |  |
| triggerPayload | Bytes | 1 | The device triggering payload. |  |
| notificationDestination | Link | 1 | A URI indicating the notification destination for T8 notifications. |  |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 5.2.5.4. | Notification\_websocket |
| deliveryResult | DeliveryResult | 0..1 | The delivery result shall be included in the HTTP responses that indicate the delivery status of the device triggering. |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.7.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 2: One of the properties "externalId" or "msisdn" shall be included. | | | | |

##### 5.7.2.1.3 Type: DeviceTriggeringDeliveryReportNotification

This type represents device triggering delivery report notification.

Table 5.7.2.1.4-1: Definition of type DeviceTriggeringDeliveryReportNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| transaction | Link | 1 | Link to the related device triggering transaction resource to which this notification is related. |  |
| Result | DeliveryResult | 1 | OK, unknown or diverse failures |  |
| NOTE: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

##### 5.7.2.1.4 Type: DeviceTriggeringPatch

This type represents the parameters to request the modification of an Individual Device Triggering Transaction resource.

Table 5.7.2.1.4-1: Definition of type DeviceTriggeringPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| validityPeriod | DurationSec | 1 | The validity time in seconds for the specific action requested. |  |
| priority | Priority | 1 | Identifies the priority of the device triggering request. |  |
| applicationPortId | Port | 1 | This is used to uniquely identify the triggering application addressed in the device for the destination port. See clause 9.2.3.24.4 in 3GPP TS 23.040 [43] for further details. |  |
| appSrcPortId | Port | 0..1 | This is used to uniquely identify the triggering application addressed in the device for the originator port. See clause 9.2.3.24.4 in 3GPP TS 23.040 [43] for further details. |  |
| triggerPayload | Bytes | 1 | The modified device triggering payload. |  |
| notificationDestination | Link | 1 | A URI indicating the notification destination for T8 notifications. |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.7.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

#### 5.7.2.2 Referenced simple data types and enumerations

##### 5.7.2.2.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 5.2.1 can be referenced.

##### 5.7.2.2.2 Simple data types

The simple data types defined in table 5.7.2.2.2-1 shall be supported.

Table 5.7.2.2.2-1: Simple data types

|  |  |
| --- | --- |
| Type name | Description |
|  |  |
|  |  |

##### 5.7.2.2.3 Enumeration: DeliveryResult

The enumeration DeliveryResult represents the result of the delivery of a device triggering request

Table 5.7.2.2.3-1: Enumeration DeliveryResult

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| SUCCESS | The SCEF includes this value in a device triggering notification.  The value indicates that the device action request was successfully completed. |  |
| UNKNOWN | The SCEF includes this value in a device triggering notification.  The value indicates any unspecified errors. |  |
| FAILURE | The SCEF includes this value in a device triggering notification.  The value indicates that this trigger encountered a delivery error and is deemed permanently undeliverable. |  |
| TRIGGERED | The SCEF includes this value in the response for a successful device triggering request.  The value indicates that device triggering request is accepted by the SCEF. |  |
| EXPIRED | The SCEF includes this value in a device triggering notification.  The value indicates that the validity period expired before the trigger could be delivered. |  |
| UNCONFIRMED | The SCEF includes this value in a device triggering notification.  The value indicates that the delivery of the device action request is not confirmed. |  |
| REPLACED | The SCEF includes this value in the response for a successful device triggering replacement request.  The value indicates that the device triggering replacement request is accepted by the SCEF. |  |
| TERMINATE | The SCEF includes this value in the response for a successful device triggering cancellation request.  The value indicates that the delivery of the device action request is terminated by the SCS/AS. |  |
| NOTE: Properties marked with a feature as defined in clause 5.7.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.7.2.2.4 Enumeration: Priority

The enumeration Priority represents the priority indication for a trigger payload.

Table 5.7.2.2.4-1: Enumeration Priority

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| NO\_PRIORITY | This value indicates that the device trigger has no priority. |  |
| PRIORITY | This value indicates that the device trigger has priority. |  |
| NOTE: Properties marked with a feature as defined in clause 5.7.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

### 5.7.3 Resource structure

#### 5.7.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-device-triggering/v1**

"apiRoot" is set as described in clause 5.2.4. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.7.3.1-1: Resources and methods overview

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | HTTP initiator | Meaning |
| Device Triggering Transactions | /{scsAsId}/transactions | GET | SCS/AS | Read all active device triggering transaction resources for a given SCS/AS |
| POST | SCS/AS | Create a new device triggering transaction resource |
| Individual Device Triggering Transaction | /{scsAsId}/transactions/{transactionId} | PUT | SCS/AS | Replace an existing Individual Device Triggering Transaction resource and the corresponding device triggering request |
| PATCH | SCS/AS | Modify an existing Individual Device Triggering Transaction resource and the corresponding device triggering request. |
| GET | SCS/AS | Read a device triggering transaction resource |
| DELETE | SCS/AS | Delete an existing device triggering transaction resource and cancel the device triggering |

#### 5.7.3.2 Resource: Device Triggering Transactions

##### 5.7.3.2.1 Introduction

This resource allows the SCS/AS to read all active resources related to device triggering, and create a resource for a device triggering transaction with the SCEF.

##### 5.7.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-device-triggering/v1/{scsAsId}/transactions**

This resource shall support the resource URI variables defined in table 5.7.3.2.2-1.

Table 5.7.3.2.2-1: Resource URI variables for resource "Device Triggering Transactions"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.7.3.2.3 Resource methods

###### 5.7.3.2.3.1 GET

The GET method allows to read all active device triggering transactions for a given SCS/AS. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in table 5.7.3.2.3.1-1 and table 5.7.3.2.3.1-2.

Table 5.7.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.7.3.2.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(DeviceTriggering) | 0..N | 200 OK | The device triggering transactions information for the SCS/AS in the request URI are returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.7.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.7.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.7.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.7.3.2.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.7.3.2.3.4 POST

To create a long-term transaction for a device triggering, the SCS/AS shall use the HTTP POST method on the "transactions" collection resource as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.7.2.1.2-1.

The possible response messages from the SCEF, depending on whether the POST request is successful or unsuccessful, are shown in Table 5.7.3.2.3.4-1.

Table 5.7.3.2.3.4-1: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| DeviceTriggering | 1 | Parameters to request a device triggering delivery. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| DeviceTriggering | 1 | 201 Created | The long term transaction for the device triggering was created successfully.  The SCEF shall return a data structure of type "DeviceTriggering" in the response content.  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 also apply. | | | | |

Table 5.7.3.2.3.4-2: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-device-triggering/v1/{scsAsId}/transactions/{transactionId} |

###### 5.7.3.2.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.7.3.3 Resource: Individual Device Triggering Transaction

##### 5.7.3.3.1 Introduction

This resource allows the SCS/AS to operate a specific pending device triggering by using a long-term transaction.

##### 5.7.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-device-triggering/v1/{scsAsId}/transactions/{transactionId}**

This resource shall support the resource URI variables defined in table 5.7.3.3.2-1.

Table 5.7.3.3.2-1: Resource URI variables for resource "Individual Device Triggering Transaction"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| transactionId | string | Identifier of the transaction resource. The transactionId corresponds to the stage 2 TLTRI. |

##### 5.7.3.3.3 Resource methods

###### 5.7.3.3.3.1 GET

The GET method allows to read an individual device triggering transaction resource to obtain details of an active transaction. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.7.3.3.3.1-1 and table 5.7.3.3.3.1-2.

Table 5.7.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.7.3.3.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| DeviceTriggering | 1 | 200 OK | The device triggering transaction information related to the request URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.7.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.7.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.7.3.3.3.2 PUT

A pending device triggering delivery can be replaced by the SCS/AS. To replace the pending device triggering, the SCS/AS shall use the HTTP PUT method on the "transaction" instance resource as follows with the body of the message encoded in JSON format including the data structure defined in table 5.7.2.1.2-1

The properties "msisdn" or "externalId" shall remain unchanged from previously provided value.

The possible response messages from the SCEF, depending on whether the PUT request is successful or unsuccessful, are shown in Table 5.7.3.3.3.2-1.

Table 5.7.3.3.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| DeviceTriggering | 1 | Parameters to replace a device triggering with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| DeviceTriggering | 1 | 200 OK | The device triggering was replaced successfully.  The SCEF shall return an updated representation of the resource within the DeviceTriggering data structure includingthe "deliveryResult" attribute in the response message body. |
| none |  | 204 No Content | The device triggering was updated successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply. | | | | |

Table 5.7.3.3.3.2-2: 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 SCEF. |

Table 5.7.3.3.3.2-3: 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 SCEF. |

###### 5.7.3.3.3.3 PATCH

A pending device triggering delivery can be modified by the SCS/AS. If the "PatchUpdate" feature defined in clause 5.7.4 is supported, to partially modify a pending device triggering, delivery, the SCS/AS shall use the HTTP PATCH method on the concerned Individual Device Triggering Transaction resource as follows with the body of the message is encoded in JSON format including the data structure defined in table 5.7.2.1.4-1

The possible response messages from the SCEF, depending on whether the PATCH request is successful or unsuccessful, are shown in Table 5.7.3.3.3.3-1.

Table 5.7.3.3.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| DeviceTriggeringPatch | 1 | Parameters to request the modification of a pending device triggering delivery. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| DeviceTriggering | 1 | 200 OK | The Individual Device Triggering Transaction resource was successfully modified and a representation of the modified Individual Device Triggering Transaction resource within the DeviceTriggering data structure including the "deliveryResult" attribute is returned by the SCEF in the response message body. |
| n/a |  | 204 No Content | The Individual Device Triggering Transaction resource was successfully modified no content is to be sent in the response message 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.7.3.3.3.3-2: 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 SCEF. |

Table 5.7.3.3.3.3-3: 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 SCEF. |

###### 5.7.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.7.3.3.3.5 DELETE

To cancel an ongoing device triggering delivery, the SCS/AS shall use the HTTP DELETE method on the individual "transaction" resource which is indicated by the URI in the Location header of the HTTP POST response:

The possible response messages from the SCEF, depending on whether the DELETE request is successful or unsuccessful, are shown in Table 5.7.3.3.3.5-1.

Table 5.7.3.3.3.5-1: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  | . | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| DeviceTriggering | 1 | 200 OK | The Device Triggering delivery was cancelled successfully.  The SCEF shall return a data structure of type "DeviceTriggering" with a "TERMINATE" status in the response body. |
| None |  | 204 No Content | The Device Triggering was cancelled successfully. The SCEF shall not return a response content. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.7.3.3.3.5-2: 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 SCEF. |

Table 5.7.3.3.3.5-3: 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 SCEF. |

#### 5.7.3.4 Void

### 5.7.3A Notifications

#### 5.7.3A.1 General

The notifications provided by the DeviceTriggering API are specified in this clause.

Table 5.7.3A-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| Device Triggering Delivery Report Notification | {notification\_uri} | POST | Report a device triggering delivery report to SCS/AS. |

#### 5.7.3A.2 Device Triggering Delivery Report Notification

##### 5.7.3A.2.1 Description

The Device Triggering Delivery Report Notification allows the SCEF to send notifications about device triggering delivery report events to the SCS/AS.

##### 5.7.3A.2.2 Target URI

The Callback URI **"{**notification\_uri**}"** shall be used with the callback URI variables defined in table 5.7.3A.2.2-1.

Table 5.7.3A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notification\_uri | Link | A URI indicating the notification destination URI where T8 notification requests shall be delivered.  This URI shall be provided within the "notificationDestination" attribute in the DeviceTriggering type. |

##### 5.7.3A.2.3 Standard Methods

###### 5.7.3A.2.3.1 Notification via POST

To report the delivery status of the device trigging delivery, the SCEF shall use the HTTP POST method on the notification endpoint as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.7.2.1.4-1.

This method shall support the request data structures specified in table 5.7.3A.2.3.1-1 and the response data structures and response codes specified in table 5.7.3A.2.3.1-2.

Table 5.7.3A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| DeviceTriggeringDeliveryReportNotification | 1 | The Device Triggering delivery report. |

Table 5.7.3A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| Acknowledgement | 1 | 200 OK | The successful acknowledgement of the notification. |
| (None) |  | 204 No Content | The successful acknowledgement of the notification without a body. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.7.3A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.7.3A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.7.3a.2.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the DeviceTriggeringDeliveryReportNotification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

### 5.7.4 Used Features

The table below defines the features applicable to the DeviceTriggering API. Those features are negotiated as described in clause 5.2.7.

Table 5.7.4-1: Features used by DeviceTriggering API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 2 | Notification\_test\_event | The testing of notification connection is supported according to clause 5.2.5.3. |
| 3 | PatchUpdate | Indicates the support of enhancements to the northbound interfaces (e.g. support the partial modification of an existing subscription resource). |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

### 5.7.5 Error handling

#### 5.7.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.7.5.2 Protocol Errors

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

#### 5.7.5.3 Application Errors

The application errors defined for DeviceTriggering API are listed in table 5.7.5.3-1.

Table 5.7.5.3-1: Application errors

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

## 5.8 GMD via MBMS related APIs

### 5.8.1 Overview

There are two Group Message Delivery via MBMS related APIs defined:

- GMDviaMBMSbyMB2 API;

- GMDviaMBMSbyxMB API.

Both APIs are RESTful APIs that allow the SCS/AS to deliver the group message to the SCEF. They define a set of data models, resources and the related procedures for the creation and management of the group message delivery. The corresponding JSON schema for the representation of the resources and operations defined by the GMDviaMBMSbyMB2 API and GMDviaMBMSbyxMB API are provided in its complete form in Annex A.8.1 and Annex A.8.2, respectively.

### 5.8.2 GMDviaMBMSbyMB2 API

#### 5.8.2.1 Data model

##### 5.8.2.1.1 Resource data types

###### 5.8.2.1.1.1 Introduction

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

Table 5.8.2.1.1.1-1 specifies data types re-used by the GMDviaMBMSbyMB2 API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the GMDviaMBMSbyMB2 API.

Table 5.8.2.1.1.1-1: GMDviaMBMSbyMB2 API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| GeographicArea | 3GPP TS 29.572 [42] | Identifies the geographical information of the user(s). |
| CivicAddress | 3GPP TS 29.572 [42] | Identifies the civic address information of the user(s). |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.8.2.3-1. |

Table 5.8.2.1.1.1-2 specifies the data types defined for the GMDviaMBMSbyMB2 API.

Table 5.8.2.1.1.1-2: GMDviaMBMSbyMB2 API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| GMDByMb2Notification | 5.8.2.1.1.4 | Represents a group message delivery notification. |  |
| GMDViaMBMSByMb2 | 5.8.2.1.1.3 | Represents a group message delivery via MBMS by MB2. |  |
| GMDViaMBMSByMb2Patch | 5.8.2.1.1.6 | Represents a modification request of a group message delivery via MBMS by MB2. |  |
| MbmsLocArea | 5.8.2.1.1.7 | Represents a user location area whithin which is sent a group message delivery via MBMS request. |  |
| TMGIAllocation | 5.8.2.1.1.2 | Represents an individual TMGI Allocation resource. |  |
| TMGIAllocationPatch | 5.8.2.1.1.5 | Represents the parameters to request the modification of a TMGI Allocation resource. |  |

###### 5.8.2.1.1.2 Type: TMGIAllocation

This type represents TMGI Allocation request. The same structure is used in the request and response.

Table 5.8.2.1.1.2-1: Definition of type TMGIAllocation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| self | Link | 0..1 | Link to the resource "Individual TMGI Allocation". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in clause 4.6.2 of 3GPP TS 23.682 [2]. |  |
| mbmsLocArea | MbmsLocArea | 0..1 | Represents the location area within which the group message delivery via MBMS is allowed. |  |
| tmgiExpiration | DateTimeRo | 0..1 | Identifies the absolute time at which the TMGI is considered to expire. |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

###### 5.8.2.1.1.3 Type: GMDViaMBMSByMb2

This type represents the group message delivery via MBMS by MB2.

Table 5.8.2.1.1.3-1: Definition of type GMDViaMBMSByMb2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| self | Link | 0..1 | Link to the resource "Individual GMD via MBMS by MB". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| notificationDestination | Link | 1 | A URI indicating the notification destination where T8 notification requests shall be delivered |  |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 5.2.5.4. | Notification\_websocket |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in clause 4.6.2 of 3GPP TS 23.682 [2]. |  |
| mbmsLocArea | MbmsLocArea | 0..1 | Represents the location area within which the group message delivery via MBMS is allowed. |  |
| messageDeliveryStartTime | DateTime | 0..1 | Identifies the absolute time at which the SCS/As starts to distribute the data. If absent, it indicates the message shall be sent immediately. |  |
| groupMessagePayload | Bytes | 0..1 | Indicates the payload the SCS/AS intends to deliver to the UEs. |  |
| scefMessageDeliveryIPv4 | Ipv4AddrRo | 0..1 | Indicates the Ipv4 address where the SCEF wants to receive the data. |  |
| scefMessageDeliveryIPv6 | Ipv6AddrRo | 0..1 | Indicates the Ipv6 address where the SCEF wants to receive the data. |  |
| scefMessageDeliveryPort | PortRo | 0..1 | Indicates the port number where the SCEF wants to receive the data. |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

###### 5.8.2.1.1.4 Type: GMDByMb2Notification

This type represents the group message delivery notification.

Table 5.8.2.1.1.4-1: Definition of type GMDByMb2Notification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| transaction | Link | 1 | Link to the transaction resource to which this notification is related. |  |
| deliveryTriggerStatus | boolean | 1 | Indicates whether delivery of group message payload corresponding to the TMGI was successful (TRUE) or not (FALSE). |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

###### 5.8.2.1.1.5 Type: TMGIAllocationPatch

This type represents TMGI Allocation request. The structure is used for PATCH request.

Table 5.8.2.1.1.5-1: Definition of type TMGIAllocationPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in clause 4.6.2 of 3GPP TS 23.682 [2]. |  |
| mbmsLocArea | MbmsLocArea | 0..1 | Represents the location area within which the group message delivery via MBMS is allowed. |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

###### 5.8.2.1.1.6 Type: GMDViaMBMSByMb2Patch

This type represents group message delivery via MBMS request by MB2. The structure is used for PATCH request.

Table 5.8.2.1.1.6-1: Definition of the GMDViaMBMSByMb2Patch data type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in clause 4.6.2 of 3GPP TS 23.682 [2]. |  |
| mbmsLocArea | MbmsLocArea | 0..1 | Represents the location area within which the group message delivery via MBMS is allowed. |  |
| messageDeliveryStartTime | DateTime | 0..1 | Identifies the absolute time at which the SCS/As starts to distribute the data. If absent, it indicates the message shall be sent immediately. |  |
| groupMessagePayload | Bytes | 0..1 | Indicates the payload the SCS/AS intends to deliver to the UEs. |  |
| notificationDestination | Link | 0..1 | A URI indicating the notification destination where the notification requests shall be delivered. |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

###### 5.8.2.1.1.7 Type: MbmsLocArea

This data type represents the user location area which is sent from the SCS/AS to the SCEF by group message delivery via MBMS request.

Table 5.8.2.1.1.7-1: Definition of the MbmsLocArea data type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| cellId | array(string) | 0..N | Indicates a Cell Global Identification of the user which identifies the cell the UE is registered. |  |
| enodeBId | array(string) | 0..N | Indicates an eNodeB in which the UE is currently located. |  |
| geographicArea | array(GeographicArea) | 0..N | Identifies a geographic area of the user where the UE is located. |  |
| mbmsServiceAreaId | array(string) | 0..N | Identifies an MBMS Service Area Identity of the user where the UE is located. |  |
| civicAddress | array(CivicAddress) | 0..N | Identifies a civic address of the user where the UE is located. |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.2.3 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

#### 5.8.2.2 Resource structure

##### 5.8.2.2.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-group-message-delivery-mb2/v1**

"apiRoot" is set as described in clause 5.2.4. "apiName" shall be set to "3gpp**-**group**-**message**-**delivery**-**mb2" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.8.2.2.1-1: Resources and methods overview

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | HTTP initiator | Meaning |
| TMGI Allocation | /{scsAsId}  /tmgi-allocation | GET | SCS/AS | Read all active TMGI resources for a given SCS/AS |
| POST | SCS/AS | Create a new TMGI resource for a given SCS/AS |
| Individual TMGI Allocation | /{scsAsId}  /tmgi-allocation/{tmgi} | PUT | SCS/AS | Replace an existing TMGI resource for a given SCS/AS and TMGI |
| PATCH | SCS/AS | Modify an existing TMGI resource for a given SCS/AS and TMGI |
| GET | SCS/AS | Read a TMGI allocation resource for a given SCS/AS and a TMGI |
| DELETE | SCS/AS | Deallocate an existing TMGI resource for agiven SCS/AS and TMGI |
| GMD via MBMS by MB2 | /{scsAsId}  /tmgi-allocation/{tmgi}/delivery-via-mbms | GET | SCS/AS | Read all group message delivery resources for a given SCS/AS and TMGI. |
| POST | SCS/AS | Create a group message delivery resource for given SCS/AS and TMGI selected by the SCS/AS when MB2 is used as a southbound interface. |
| Individual GMD via MBMS by MB2 | /{scsAsId}  /tmgi-allocation/{tmgi}/delivery-via-mbms/  {transactionId} | PUT | SCS/AS | Replace a group message delivery resource |
| PATCH | SCS/AS | Modify a group message delivery resource. |
| GET | SCS/AS | Read a group message delivery resource. |
| DELETE | SCS/AS | Delete a group message delivery resource. |

##### 5.8.2.2.2 Resource: TMGI Allocation

###### 5.8.2.2.2.1 Introduction

This resource allows the SCS/AS to read all active TMGI or request a TMGI allocation.

###### 5.8.2.2.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-group-message-delivery-mb2/v1/{scsAsId}/tmgi-allocation**

This resource shall support the resource URI variables defined in table 5.8.2.2.2.2-1.

Table 5.8.2.2.2.2-1: Resource URI variables for resource "TMGI Allocation"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

###### 5.8.2.2.2.3 Resource methods

5.8.2.2.2.3.1 GET

The GET method read all TMGI Allocation resource for a given SCS/AS. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.2.2.2.3.1-1.

Table 5.8.2.2.2.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(TMGIAllocation) | 0..N | 200 OK | The TMGI allocation for the SCS/AS in the request URI are returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.2.3.1-2: 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 SCEF. |

Table 5.8.2.2.2.3.1-3: 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 SCEF. |

5.8.2.2.2.3.2 PUT

This HTTP method is not supported for the resource.

5.8.2.2.2.3.3 PATCH

This HTTP method is not supported for the resource.

5.8.2.2.2.3.4 POST

The POST method creates a new TMGI Allocation resource for a given SCS/AS. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.2.2.2.3.4-1.

Table 5.8.2.2.2.3.4-1: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| TMGIAllocation | 1 | Parameters to create a TMGI allocation resource | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| TMGIAllocation | 1 | 201 Created | The creation of a TMGI allocation was created successfully.  The SCEF shall return a data structure of type "TMGI Allocation" in the response content.  On success, the HTTP response shall include a "Location" HTTP header that points to the created resource URI identified by the ScsAsId and the TMGI |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.2.3.4-2: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-group-message-delivery-mb2/v1/{scsAsId}/tmgi-allocation/{tmgi} |

5.8.2.2.2.3.5 DELETE

This HTTP method is not supported for the resource.

##### 5.8.2.2.3 Resource: Individual TMGI Allocation

###### 5.8.2.2.3.1 Introduction

This resource allows the SCS/AS to read an active TMGI or renew an TMGI.

###### 5.8.2.2.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-group-message-delivery-mb2/v1/{scsAsId}/tmgi-allocation/{tmgi}**

This resource shall support the resource URI variables defined in table 5.8.2.2.3.2-1.

Table 5.8.2.2.3.2-1: Resource URI variables for resource "Individual TMGI Allocation"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| Tmgi | string | TMGI. |

###### 5.8.2.2.3.3 Resource methods

5.8.2.2.3.3.1 GET

The GET method reads a TMGI Allocation resource for a given SCS/AS. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.2.2.3.3.1-1.

Table 5.8.2.2.3.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| TMGIAllocation | 1 | 200 OK | A TMGI allocation for the SCS/AS in the request URI is returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.3.3.1-2: 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 SCEF. |

Table 5.8.2.2.3.3.1-3: 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 SCEF. |

5.8.2.2.3.3.2 PUT

The PUT method replaces a TMGI Allocation resource for a given SCS/AS to renew a TMGI expiration time. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.2.2.3.3.2-1.

Table 5.8.2.2.3.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| TMGIAllocation | 1 | Parameters to replace a TMGI resource | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| TMGIAllocation | 1 | 200 OK | The replace of a TMGI allocation was created successfully. |
| none |  | 204 No Content | The TMGI expiration time renewal is successful, and no content is to be sent in the response message body. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.3.3.2-2: 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 SCEF. |

Table 5.8.2.2.3.3.2-3: 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 SCEF. |

5.8.2.2.3.3.3 PATCH

The PATCH method modifies a TMGI Allocation resource for a given SCS/AS to renew a TMGI expiration time. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.2.2.3.3.3-1.

Table 5.8.2.2.3.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| TMGIAllocationPatch | 1 | Parameters to modify a TMGI resource | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| TMGIAllocation | 1 | 200 OK | The modification of a TMGI allocation was created successfully. |
| none |  | 204 No Content | The TMGI expiration time renewal is successful, and no content is to be sent in the response message body. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.3.3.3-2: 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 SCEF. |

Table 5.8.2.2.3.3.3-3: 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 SCEF. |

5.8.2.2.3.3.4 POST

This HTTP method is not supported for the resource.

5.8.2.2.3.3.5 DELETE

The DELETE method deletes a TMGI Allocation resource for a given SCS/AS to deallocate a TMGI. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.2.2.3.3.5-1.

Table 5.8.2.2.3.3.5-1: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The TMGI allocation resource was removed successfully. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.3.3.5-2: 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 SCEF. |

Table 5.8.2.2.3.3.5-3: 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 SCEF. |

##### 5.8.2.2.4 Resource: GMD via MBMS by MB2

###### 5.8.2.2.4.1 Introduction

This resource allows the SCS/AS to read all active group message delivery resources or create a group message delivery when the MB2 is used as a southbound interface.

###### 5.8.2.2.4.2 Resource definition

Resource URI: **{apiRoot}/3gpp-group-message-delivery-mb2/v1/{scsAsId}/tmgi-allocation/{tmgi}/delivery-via-mbms**

This resource shall support the resource URI variables defined in table 5.8.2.2.4.2-1.

Table 5.8.2.2.4.2-1: Resource URI variables for resource "GMD via MBMS by MB2"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| Tmgi | string | TMGI |

###### 5.8.2.2.4.3 Resource methods

5.8.2.2.4.3.1 GET

The GET method reads all group message delivery via MBMS resources for a given SCS/AS and a TMGI. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.2.2.4.3.1-1.

Table 5.8.2.2.4.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(GMDViaMBMSByMb2) | 0..N | 200 OK | The TMGI allocation for the SCS/AS in the request URI are returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.4.3.1-2: 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 SCEF. |

Table 5.8.2.2.4.3.1-3: 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 SCEF. |

5.8.2.2.4.3.2 PUT

This HTTP method is not supported for the resource.

5.8.2.2.4.3.3 PATCH

This HTTP method is not supported for the resource.

5.8.2.2.4.3.4 POST

The POST method creates a new group message delivery via MBMS resource for a given SCS/AS and TMGI selected by the SCS/AS. It is initiated by the SCS/AS and answered by the SCEF. The SCEF shall construct the URI of the created resource using that URI.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.2.2.4.3.4-1.

Table 5.8.2.2.4.3.4-1: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| GMDViaMBMSByMb2 | 1 | Parameters to create and authorize a group message delivery via MBMS with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| GMDViaMBMSByMb2 | 1 | 201 Created | The creation of a group message delivery was created successfully.  The SCEF shall return a data structure of type "GMDViaMBMSByMb2" in the response content.  On success, the HTTP response shall include a "Location" HTTP header that points to the created resource URI identified by the ScsAsId and the Transaction Id. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.4.3.4-2: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-group-message-delivery-mb2/v1/{scsAsId}/tmgi-allocation/{tmgi}/delivery-via-mbms/{transactionId} |

5.8.2.2.4.3.5 DELETE

This HTTP method is not supported for the resource.

##### 5.8.2.2.5 Resource: Individual GMD via MBMS by MB2

###### 5.8.2.2.5.1 Introduction

This resource allows the SCS/AS to modify or delete a group message delivery via MBMS by MB2 resource.

###### 5.8.2.2.5.2 Resource definition

Resource URI: **{apiRoot}/3gpp-group-message-delivery-mb2/v1/{scsAsId}/tmgi-allocation/{tmgi}/delivery-via-mbms/{transactionId}**

This resource shall support the resource URI variables defined in table 5.8.2.2.5.2-1.

Table 5.8.2.2.5.2-1: Resource URI variables for resource "Individual GMD via MBMS by MB2"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| transactionId | string | TransactionId selected by the SCEF. The transactionId corresponds to the stage 2 TLTRI. |

###### 5.8.2.2.5.3 Resource methods

5.8.2.2.5.3.1 GET

The GET method reads a group message delivery via MBMS by MB2 resource for a given SCS/AS, a TMGI and a transactionId. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.2.2.5.3.1-1.

Table 5.8.2.2.5.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| GMDViaMBMSbyMb2 | 0..1 | 200 OK | The group message delivery resource for the SCS/AS in the request URI is returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.5.3.1-2: 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 SCEF. |

Table 5.8.2.2.5.3.1-3: 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 SCEF. |

5.8.2.2.5.3.2 PUT

Assuming that a group message delivery has been created using the HTTP POST method described in clause 5.8.2.2.4.3.4, replace of its properties can be performed by the SCS/AS by using the HTTP PUT method on the "delivery\_via\_mbms" instance resource as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.8.2.2.5.3.2-1.

The content body of the group message delivery via MBMS update request shall contain updated full representation of the group message delivery resource. Only the properties "locationinfo", "accuracy", "messageDeliverystarttime" and "groupMessagepayload" can be modified.

The possible response messages from the SCEF, depending on whether the PUT request is successful or unsuccessful, are shown in table 5.8.2.2.5.3.2-1.

Table 5.8.2.2.5.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| GMDViaMBMSByMb2 | 1 | Parameters to replace group message delivery resource with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| GMDViaMBMSByMb2 | 1 | 200 OK | The group message delivery was modified successfully.  The SCEF shall return an updated data structure of type "GMDViaMBMSByMb2" in the response content. |
| none |  | 204 No Content | The group message delivery is replaced successfully, and no content is to be sent in the response message body. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.5.3.2-2: 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 SCEF. |

Table 5.8.2.2.5.3.2-3: 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 SCEF. |

5.8.2.2.5.3.3 PATCH

Assuming that a group message delivery has been created using the HTTP POST method described in clause 5.8.2.2.4.3.4, partial updating of its properties can be performed by the SCS/AS by using the HTTP PATCH method on the "delivery-via-mbms" instance resource.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.2.2.5.3.3-1.

Table 5.8.2.2.5.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| GMDViaMBMSByMb2Patch | 1 | Parameters to partially update a group message delivery with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| GMDViaMBMSByMb2 | 1 | 200 OK | The group message delivery was modified successfully.  The SCEF shall return an updated data structure of type "GMDViaMBMSByMb2" in the response content. |
| none |  | 204 No Content | The group message delivery is modified successfully, and no content is to be sent in the response message body. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.5.3.3-2: 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 SCEF. |

Table 5.8.2.2.5.3.3-3: 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 SCEF. |

5.8.2.2.5.3.4 POST

This HTTP method is not supported for the resource.

5.8.2.2.5.3.5 DELETE

To cancel a group message delivery, the SCS/AS shall use the HTTP DELETE method on the individual "delivery\_via\_mbms" resource which is indicated by the URI in the Location header of the HTTP POST response:

The possible response messages from the SCEF, depending on whether the DELETE request is successful or unsuccessful, are shown in table 5.8.2.2.5.3.5-1.

Table 5.8.2.2.5.3.5-1.: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The group message delivery subscription was cancelled successfully. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.2.2.5.3.5-2: 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 SCEF. |

Table 5.8.2.2.5.3.5-3: 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 SCEF. |

##### 5.8.2.2.6 Void

#### 5.8.2.2A Notifications

##### 5.8.2.2A.1 General

The notifications provided by the GMDviaMBMSbyMB2 API are specified in this clause.

Table 5.8.2.2A.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| GMD via MBMS by MB2 Notification | {notificationDestination} | POST | Report a specific group message delivery result to the SCS/AS for a given transaction Id selected by the SCEF. |

##### 5.8.2.2A.2 GMD via MBMS by MB2 Notification

###### 5.8.2.2A.2.1 Description

The GMD via MBMS by MB2 Notification allows the SCEF report the delivery trigger status to the SCS/AS to indicate whether group message delivery was triggered successful.

###### 5.8.2.2A.2.2 Target URI

The Callback URI **"{**notificationDestination**}"** shall be used with the callback URI variables defined in table 5.8.2.2A.2.2-1.

Table 5.8.2.2A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notificationDestination | Link | A URI indicating the notification destination where T8 notification requests shall be delivered.  This URI shall be provided within the field "notificationDestination" in the GMDViaMBMSByMb2 type. |

###### 5.8.2.2A.2.3 Standard Methods

5.8.2.2A.2.3.1 Notification via POST

To report the status of the delivery trigger status to the SCS/AS, the SCEF shall use the HTTP POST method on the notification point as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.8.2.1.1.4-1.

This method shall support the request data structures specified in table 5.8.2.2A.2.3.1-1 and the response data structures and response codes specified in table 5.8.2.2A.2.3.1-2.

Table 5.8.2.2A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| GMDByMb2Notification | 1 | The delivery status notification. |

Table 5.8.2.2A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| Acknowledgement | 1 | 200 OK | The successful acknowledgement of the notification with a body. |
| (None) |  | 204 No Content | The successful acknowledgement of the notification without a body. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.8.2.2A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.8.2.2A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

5.8.2.2A.2.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the GMDByMb2Notification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

#### 5.8.2.3 Used Features

The table below defines the features applicable to the GMDviaMBMSbyMB2 API. Those features are negotiated as described in clause 5.2.7.

Table 5.8.2.3-1: Features used by GMDviaMBMSbyMB2 API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 2 | Notification\_test\_event | The testing of notification connection is supported according to clause 5.2.5.3. |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

#### 5.8.2.4 Error handling

##### 5.8.2.4.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

##### 5.8.2.4.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the GMDviaMBMSbyMB2 API.

##### 5.8.2.4.3 Application Errors

The application errors defined for GMDviaMBMSbyMB2 API are listed in table 5.8.2.4.3-1.

Table 5.8.2.4.3-1: Application errors

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

### 5.8.3 GMDviaMBMSbyxMB API

#### 5.8.3.1 Data model

##### 5.8.3.1.1 Resource data types

###### 5.8.3.1.1.1 Introduction

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

Table 5.8.3.1.1.1-1 specifies data types re-used by the GMDviaMBMSbyxMB API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the GMDviaMBMSbyxMB API.

Table 5.8.3.1.1.1-1: GMDviaMBMSbyxMB API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| GeographicArea | 3GPP TS 29.572 [42] | Identifies the geographical information of the user(s). |
| CivicAddress | 3GPP TS 29.572 [42] | Identifies the civic address information of the user(s). |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.8.3.3-1. |

Table 5.8.3.1.1.1-2 specifies the data types defined for the GMDviaMBMSbyxMB API.

Table 5.8.3.1.1.1-2: GMDviaMBMSbyxMB API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| GMDByxMBNotification | 5.8.3.1.1.4 | Represents a group message delivery notification. |  |
| GMDViaMBMSByxMB | 5.8.3.1.1.3 | Represents a group message delivery via MBMS by xMB. |  |
| GMDViaMBMSByxMBPatch | 5.8.3.1.1.5 | Represents a modification request of a group message delivery via MBMS by xMB. |  |
| MbmsLocArea | 5.8.3.1.1.6 | Represents a user location area whithin which is sent a group message delivery via MBMS request. |  |
| ServiceAnnouncementMode | 5.8.3.1.2.3 | Represents the service annoucement mode. |  |
| ServiceCreation | 5.8.3.1.1.2 | Represents an individual xMB Service resource. |  |

###### 5.8.3.1.1.2 Type: ServiceCreation

This type represents the service resource.

Table 5.8.3.1.1.2-1: Definition of the ServiceCreation data type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| self | Link | 0..1 | Link to the resource "Individual xMB Service". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in clause 4.6.2 of 3GPP TS 23.682 [2] supplied by the SCS/AS. |  |
| userServiceId | string | 0..1 | Identifies the MBMS User Service supplied by the SCEF. |  |
| serviceClass | string | 0..1 | The service class that service belongs to supplied by the SCEF. |  |
| serviceLanguages | array(string) | 0..N | List of language of the service content supplied by the SCEF. |  |
| serviceNames | array(string) | 0..N | List of Service Names supplied by the SCEF |  |
| receiveOnlyMode | boolean | 0..1 | When set to 'true', the Content Provider indicates that the service is a Receive Only Mode service. This parameter is supplied by the SCEF |  |
| serviceAnnouncementMode | ServiceAnnouncementMode | 0..1 | Enumeration of Service Announcement Mode supplied by the SCEF. |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

###### 5.8.3.1.1.3 Type: GMDViaMBMSByxMB

This type represents the group message delivery via MBMS by xMB.

Table 5.8.3.1.1.3-1: Definition of type GMDViaMBMSByxMB

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| self | Link | 0..1 | Link to the resource "Individual GMD via MBMS by xMB". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| notificationDestination | Link | 1 | A URI indicating the notification destination where T8 notification requests shall be delivered |  |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 5.2.5.4. | Notification\_websocket |
| mbmsLocArea | MbmsLocArea | 0..1 | Represents the location area within which the group message delivery via MBMS is allowed. |  |
| messageDeliveryStartTime | DateTime | 0..1 | Identifies the absolute time at which the SCS/As starts to distribute the data. If absent, it indicates the message shall be sent immediately. |  |
| messageDeliveryStopTime | DateTime | 0..1 | Identifies the absolute time at which the SCS/As is expected to stop distributing the data. If absent, configuration time will be used. |  |
| groupMessagePayload | Bytes | 0..1 | Indicates the payload the SCS/AS intends to deliver to the UEs. |  |
| scefMessageDeliveryIPv4 | Ipv4AddrRo | 0..1 | Indicates the Ipv4 address where the SCEF wants to receive the data. |  |
| scefMessageDeliveryIPv6 | Ipv6AddrRo | 0..1 | Indicates the Ipv6 address where the SCEF wants to receive the data. |  |
| scefMessageDeliveryPort | PortRo | 0..1 | Indicates the port number where the SCEF wants to receive the data. |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

###### 5.8.3.1.1.4 Type: GMDByxMBNotification

This type represents the group message delivery notification.

Table 5.8.3.1.1.4-1: Definition of type GMDByxMbNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| transaction | Link | 1 | Link to the transaction resource to which this notification is related. |  |
| deliveryTriggerStatus | boolean | 1 | Indicates whether delivery of group message payload was successful (TRUE) or not (FALSE) |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

###### 5.8.3.1.1.5 Type: GMDViaMBMSByxMBPatch

This type represents group message delivery via MBMS request. The structure is used for PATCH request.

Table 5.8.3.1.1.5-1: Definition of the GMDViaMBMSByxMBPatch data type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| mbmsLocArea | MbmsLocArea | 0..1 | Represents the location area within which the group message delivery via MBMS is allowed. |  |
| messageDeliveryStartTime | DateTime | 0..1 | Identifies the absolute time at which the SCS/As starts to distribute the data. If absent, it indicates the message shall be sent immediately. |  |
| messageDeliveryStopTime | DateTime | 0..1 | Identifies the absolute time at which the SCS/As is expected to stop distributing the data. If absent, the configuration value will be used. |  |
| groupMessagePayload | Bytes | 0..1 | Indicates the payload the SCS/AS intends to deliver to the UEs. |  |
| notificationDestination | Link | 0..1 | A URI indicating the notification destination where the notification requests shall be delivered |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

###### 5.8.3.1.1.6 Type: MbmsLocArea

This data type represents the user location area which is sent from the SCS/AS to the SCEF by group message delivery via MBMS request.

Table 5.8.3.1.1.6-1: Definition of the MbmsLocArea data type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| cellId | array(string) | 0..N | Indicates a Cell Global Identification of the user which identifies the cell the UE is registered. |  |
| enodeBId | array(string) | 0..N | Indicates an eNodeB in which the UE is currently located. |  |
| geographicArea | array(GeographicArea) | 0..N | Identifies a geographic area of the user where the UE is located. |  |
| mbmsServiceAreaId | array(string) | 0..N | Identifies an MBMS Service Area Identity of the user where the UE is located. |  |
| civicAddress | array(CivicAddress) | 0..N | Identifies a civic address of the user where the UE is located. |  |
| NOTE: Properties marked with a feature as defined in clause 5.8.2.3 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

##### 5.8.3.1.2 Referenced simple data types and enumerations

###### 5.8.3.1.2.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 5.2.1 can be referenced.

###### 5.8.3.1.2.2 Simple data types

The simple data types defined in table 5.8.3.1.2.2-1 shall be supported.

Table 5.8.3.1.2.2-1: Simple data types

|  |  |
| --- | --- |
| Type name | Description |
|  |  |
|  |  |

###### 5.8.3.1.2.3 Enumeration: ServiceAnnouncementMode

The enumeration ServiceAnnouncementMode represents the service annoucement mode

Table 5.8.3.1.2.3-1: Enumeration ServiceAnnouncementMode

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| SACH | BM-SC performs the service announcement for the current service using the SACH channel. |  |
| CONTENT\_PROVIDER | BM-SC provides the necessary service access information used by the Content Provider to create the service announcement information. |  |
| NOTE: Properties marked with a feature as defined in clause 5.7.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

#### 5.8.3.2 Resource structure

##### 5.8.3.2.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-group-message-delivery-xmb/v1**

"apiRoot" is set as described in clause 5.2.4. "apiName" shall be set to "3gpp-group-message-delivery-xmb" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.8.3.2.1-1: Resources and methods overview

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | HTTP initiator | Meaning |
| xMB Services | /{scsAsId}  /services | POST | SCS/AS | Create a service when xMB is used as a southbound interface. |
| GET | SCS/AS | Read all active service resources for a given SCS/AS. |
| Individual xMB Service | /{scsAsId}  /services/{serviceId} | GET | SCS/AS | Read an active service resource for a given SCS/AS and Service Id. |
| DELETE | SCS/AS | Delete an existing service resource for agiven SCS/AS and Service Id. |
| GMD via MBMS by xMB | /{scsAsId}  /services/{serviceId}/delivery-via-mbms | GET | SCS/AS | Read all group message delivery resources for a given SCS/AS and Service Id. |
| POST | SCS/AS | Create a group message delivery resource for given SCS/AS and Service Id when xMB is used as a southbound interface. |
| Individual GMD via MBMS by xMB | /{scsAsId}  /services/{serviceId}/delivery-via-mbms/{transactionId} | PUT | SCS/AS | Replace a group message delivery resource |
| PATCH | SCS/AS | Modify a group message delivery resource. |
| GET | SCS/AS | Read a group message delivery resource. |
| DELETE | SCS/AS | Delete a group message delivery resource. |

##### 5.8.3.2.2 Resource: xMB Services

###### 5.8.3.2.2.1 Introduction

This resource allows the SCS/AS to create service resource when the xMB is used as a southbound interface.

###### 5.8.3.2.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-group-message-delivery-xmb/v1/{scsAsId}/services**

This resource shall support the resource URI variables defined in table 5.8.3.2.2.2-1.

Table 5.8.3.2.2.2-1: Resource URI variables for resource "GMD via MBMS by xMB"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

###### 5.8.3.2.2.3 Resource methods

5.8.3.2.2.3.1 GET

The GET method allows the SCS/AS read all active service resources for a given SCS/AS. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.3.2.2.3.1-1.

Table 5.8.3.2.2.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none. |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(ServiceCreation) | 0..N | 200 OK | The service resource for the SCS/AS in the request URI is returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.3.2.2.3.1-2: 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 SCEF. |

Table 5.8.3.2.2.3.1-3: 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 SCEF. |

5.8.3.2.2.3.2 PUT

This HTTP method is not supported for the resource.

5.8.3.2.2.3.3 PATCH

This HTTP method is not supported for the resource.

5.8.3.2.2.3.4 POST

The POST method creates a new service resource for a given SCS/AS. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.3.2.2.3.4-1.

Table 5.8.3.2.2.3.4-1: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| ServiceCreation | 1 | Parameters to create and authorize a service with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| ServiceCreation | 1 | 201 Created | The resource of a service was created successfully.  The SCEF shall return a data structure of type "ServiceCreation" in the response content.  On success, the HTTP response shall include a "Location" HTTP header that points to the created resource URI identified by the ScsAsId and the ServiceId. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.3.2.2.3.4-2: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-group-message-delivery-xmb/v1/{scsAsId}/services/{serviceId} |

5.8.3.2.2.3.5 DELETE

This HTTP method is not supported for the resource.

##### 5.8.3.2.3 Resource: Individual xMB Service

###### 5.8.3.2.3.1 Introduction

This resource allows the SCS/AS to delete a service resource.

###### 5.8.3.2.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-group-message-delivery-xmb/v1/{scsAsId}/services/{serviceId}**

This resource shall support the resource URI variables defined in table 5.8.3.2.3.2-1.

Table 5.8.3.2.3.2-1: Resource URI variables for resource "Individual Service Creation"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| serviceId | string | Identifier of the service. |

###### 5.8.3.2.3.3 Resource methods

5.8.3.2.3.3.1 GET

The GET method reads a active service resource for a given SCS/AS and a service Id. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.3.2.3.3.1-1.

Table 5.8.3.2.3.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| ServiceCreation | 0..1 | 200 OK | The service resource for the SCS/AS and Service Id in the request URI is returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.3.2.3.3.1-2: 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 SCEF. |

Table 5.8.3.2.3.3.1-3: 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 SCEF. |

5.8.3.2.3.3.2 PUT

This HTTP method is not supported for the resource.

5.8.3.2.3.3.3 PATCH

This HTTP method is not supported for the resource.

5.8.3.2.3.3.4 POST

This HTTP method is not supported for the resource.

5.8.3.2.3.3.5 DELETE

To delete a service resource, the SCS/AS shall use the HTTP DELETE method on the "ServiceCreation" resource which is indicated by the URI in the Location header of the HTTP POST response:

The possible response messages from the SCEF, depending on whether the DELETE request is successful or unsuccessful, are shown in table 5.8.3.2.3.3.5-1.

Table 5.8.3.2.3.3.5-1.: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The group message delivery subscription was cancelled successfully. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply | | | | |

Table 5.8.3.2.3.3.5-2: 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 SCEF. |

Table 5.8.3.2.3.3.5-3: 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 SCEF. |

##### 5.8.3.2.4 Resource: GMD via MBMS by xMB

###### 5.8.3.2.4.1 Introduction

This resource allows the SCS/AS to:

- read all of the group message delivery via MBMS by xMB resources for a given SCS/AS and a service identifier; or

- create a group message delivery when the xMB is used as a southbound interface.

###### 5.8.3.2.4.2 Resource definition

Resource URI: **{apiRoot}/3gpp-group-message-delivery-xmb/v1/{scsAsId}/services/{serviceId}/delivery-via-mbms**

This resource shall support the resource URI variables defined in table 5.8.3.2.4.2-1.

Table 5.8.3.2.4.2-1: Resource URI variables for resource "GMD via MBMS by xMB"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| ServiceId | string | Identifier of the service |

###### 5.8.3.2.4.3 Resource methods

5.8.3.2.4.3.1 GET

The GET method reads all of the group message delivery via MBMS by xMB resources for a given SCS/AS and a service identifier. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.3.2.4.3.1-1.

Table 5.8.3.2.4.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| None |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(GMDViaMBMSByxMB) | 0..N | 200 OK | The list of "GMDViaMBMSByxMB" data for the SCS/AS and the service identifier are returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.3.2.4.3.1-2: 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 SCEF. |

Table 5.8.3.2.4.3.1-3: 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 SCEF. |

5.8.3.2.4.3.2 PUT

This HTTP method is not supported for the resource.

5.8.3.2.4.3.3 PATCH

This HTTP method is not supported for the resource.

5.8.3.2.4.3.4 POST

The POST method creates a new group message delivery via MBMS resource for a given SCS/AS and service Id selected by the SCS/AS. It is initiated by the SCS/AS and answered by the SCEF. This method shall support request and response data structures, and response codes, as specified in the table 5.8.3.2.4.3.4-1.

Table 5.8.3.2.4.3.4-1: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| GMDViaMBMSByxMB | 1 | Parameters to create and authorize a group message delivery via MBMS with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| GMDViaMBMSByxMB | 1 | 201 Created | The creation of a group message delivery was created successfully.  The SCEF shall return a data structure of type "GMDViaMBMSByxMB" in the response content.  On success, the HTTP response shall include a "Location" HTTP header that points to the created resource URI identified by the ScsAsId and the Transaction Id |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.3.2.4.3.4-2: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-group-message-delivery-xmb/v1/{scsAsId}/services/{serviceId}/delivery-via-mbms/{transactionId} |

5.8.3.2.4.3.5 DELETE

This HTTP method is not supported for the resource.

##### 5.8.3.2.5 Resource: Individual GMD via MBMS by xMB

###### 5.8.3.2.5.1 Introduction

This resource allows the SCS/AS to modify or delete a group message delivery via MBMS resource.

###### 5.8.3.2.5.2 Resource definition

Resource URI: **{apiRoot}/3gpp-group-message-delivery-xmb/v1/{scsAsId}/services/{serviceId}/delivery-via-mbms/{transactionId}**

This resource shall support the resource URI variables defined in table 5.8.3.2.5.2-1.

Table 5.8.3.2.5.2-1: Resource URI variables for resource "Individual GMD via MBMS by xMB"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| serviceIdId | string | Identifier of the service selected by the SCEF. The transactionId corresponds to the stage 2 TLTRI. |

###### 5.8.3.2.5.3 Resource methods

5.8.3.2.5.3.1 GET

The GET method reads a group message delivery via MBMS resource for a given SCS/AS, a service Id and a transactionId. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.3.2.3.3.1-1.

Table 5.8.3.2.5.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| GMDViaMBMSByxMB | 0..1 | 200 OK | The group message delivery resource for the SCS/AS in the request URI is returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.3.2.5.3.1-2: 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 SCEF. |

Table 5.8.3.2.5.3.1-3: 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 SCEF. |

5.8.3.2.5.3.2 PUT

Assuming that a group message delivery has been created using the HTTP POST method described in clause 5.8.3.2.4.3.4, replace of its properties can be performed by the SCS/AS by using the HTTP PUT method on the "delivery-via-mbms" instance resource as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.8.3.1.1.3-1.

The content body of the group message delivery via MBMS update request shall contain updated full representation of the group message delivery resource. Only the properties "locationinfo", "accuracy", "messageDeliverystarttime", "messageDeliverystoptime" and "groupMessagepayload" can be modified.

The possible response messages from the SCEF, depending on whether the PUT request is successful or unsuccessful, are shown in table 5.8.3.2.5.3.2-1.

Table 5.8.3.2.5.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| GMDViaMBMSByxMB | 1 | Parameters to replace group message delivery resource with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| GMDViaMBMSByxMB | 1 | 200 OK | The group message delivery was modified successfully.  The SCEF shall return an updated data structure of type "GMDViaMBMSByxMB" in the response content. |
| none |  | 204 No Content | The group message delivery was modified successfully, and no content is to be sent in the response message body. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.3.2.5.3.2-2: 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 SCEF. |

Table 5.8.3.2.5.3.2-3: 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 SCEF. |

5.8.3.2.5.3.3 PATCH

Assuming that a group message delivery has been created using the HTTP POST method described in clause 5.8.3.2.4.3.4, partial updating of its properties can be performed by the SCS/AS by using the HTTP PATCH method on the "delivery-via-mbms" instance resource.

This method shall support request and response data structures, and response codes, as specified in the table 5.8.3.2.5.3.3-1.

Table 5.8.3.2.5.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| GMDViaMBMSByxMB Patch | 1 | Parameters to partially update a group message delivery with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| GMDViaMBMSByxMB | 1 | 200 OK | The group message delivery was modified successfully.  The SCEF shall return an updated data structure of type "GMDViaMBMSByxMB" in the response content. |
| none |  | 204 No Content | The group message delivery was modified successfully, and no content is to be sent in the response message body. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.3.2.5.3.3-2: 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 SCEF. |

Table 5.8.3.2.5.3.3-3: 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 SCEF. |

5.8.3.2.5.3.4 POST

This HTTP method is not supported for the resource.

5.8.3.2.5.3.5 DELETE

To cancel a group message delivery, the SCS/AS shall use the HTTP DELETE method on the individual "delivery\_via\_mbms" resource which is indicated by the URI in the Location header of the HTTP POST response:

The possible response messages from the SCEF, depending on whether the DELETE request is successful or unsuccessful, are shown in table 5.8.3.2.5.3.5-1.

Table 5.8.3.2.5.3.5-1: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The group message delivery subscription was cancelled successfully. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.8.3.2.5.3.5-2: 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 SCEF. |

Table 5.8.3.2.5.3.5-3: 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 SCEF. |

##### 5.8.3.2.6 Void

#### 5.8.3.2A Notifications

##### 5.8.3.2A.1 General

The notifications provided by the GMDviaMBMSbyxMB API are specified in this clause.

Table 5.8.3.2A.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| GMD via MBMS by xMB Notification | {notificationDestination} | POST | Report a specific group message delivery result to the SCS/AS for a given Transaction Id selected by the SCEF. |

##### 5.8.3.2A.2 GMD via MBMS by xMB Notification

###### 5.8.3.2A.2.1 Description

The GMD via MBMS by xMB Notification allows the SCEF report the delivery trigger status to the SCS/AS to indicate whether group message delivery was triggered successful.

###### 5.8.3.2A.2.2 Target URI

The Callback URI **"{**notificationDestination**}"** shall be used with the callback URI variables defined in table 5.8.3.2A.2.2-1.

Table 5.8.3.2A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notificationDestination | Link | A URI indicating the notification destination where T8 notification requests shall be delivered.  This URI shall be provided within the field "notificationDestination" in the GMDViaMBMSByxMB type. |

###### 5.8.3.2A.2.3 Standard Methods

5.8.3.2A.2.3.1 Notification via POST

To report the status of the delivery trigger status to the SCS/AS, the SCEF shall use the HTTP POST method on the notification point as follows:

- the body of the message is encoded in JSON format with the data structure defined in table 5.8.3.1.1.4-1.

This method shall support the request data structures specified in table 5.8.3.2A.2.3.1-1 and the response data structures and response codes specified in table 5.8.3.2A.2.3.1-2.

Table 5.8.3.2A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| GMDByxMBNotification | 1 | The delivery status notification. |

Table 5.8.3.2A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| Acknowledgement | 1 | 200 OK | The successful acknowledgement of the notification with a body. |
| (None) |  | 204 No Content | The successful acknowledgement of the notification without a body. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.8.3.2A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.8.3.2A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

5.8.3.2a.2.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the GMDByxMBNotification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

#### 5.8.3.3 Used Features

The table below defines the features applicable to the GMDviaMBMSbyxMB API. Those features are negotiated as described in clause 5.2.7.

Table 5.8.3.3-1: Features used by GMDviaMBMSbyxMB API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 2 | Notification\_test\_event | The testing of notification connection is supported according to clause 5.2.5.3. |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

#### 5.8.3.4 Error handling

##### 5.8.3.4.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

##### 5.8.3.4.2 Protocol Errors

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

##### 5.8.3.4.3 Application Errors

The application errors defined for GMDviaMBMSbyxMB API are listed in table 5.8.3.4.3-1.

Table 5.8.3.4.3-1: Application errors

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

## 5.9 ReportingNetworkStatus API

### 5.9.1 Overview

The ReportingNetworkStatus API is a RESTful API that allows the SCS/AS to be one-time or continuous notified of the network status in a geographic area. The ReportingNetworkStatus API defines a set of data models, resources and the related procedures for the creation and management of the network status reporting request. The corresponding JSON schema for the representation of the resources and operations defined by the ReportingNetworkStatus API is provided in its complete form in Annex A.9.

### 5.9.2 Data model

#### 5.9.2.1 Resource data types

##### 5.9.2.1.1 Introduction

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

Table 5.9.2.1.1-1 specifies data types re-used by the ReportingNetworkStatus API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the ReportingNetworkStatus API.

Table 5.9.2.1.1-1: ReportingNetworkStatus API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| GeographicArea | 3GPP TS 29.572 [42] | Identifies the geographical information of the user(s). |
| CivicAddress | 3GPP TS 29.572 [42] | Identifies the civic address information of the user(s). |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.9.4-1. |

Table 5.9.2.1.1-2 specifies the data types defined for the ReportingNetworkStatus API.

Table 5.9.2.1.1-2: ReportingNetworkStatus API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| CongestionType | 5.9.2.3.3 | Represents abstracted values for congestion status. |  |
| CongestionValue | 5.9.2.3.2 | Represents the congestion level value |  |
| NetStatusRepSubsPatch | 5.9.2.1.3 | Represents the parameters to request the modification of network status reporting subscription. | PatchUpdate |
| NetworkStatusReportingNotification | 5.9.2.2.2 | Represents a network status reporting notification. |  |
| NetworkStatusReportingSubscription | 5.9.2.1.2 | Represents a subscription to network status information reporting. |  |

##### 5.9.2.1.2 Type: NetworkStatusReportingSubscription

This type represents the subscription of reporting the network status. The same structure is used in the subscription request and subscription response.

Table 5.9.2.1.2-1: Definition of type NetworkStatusReportingSubscription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| self | Link | 0..1 | Link to the resource "Individual Network Status  Reporting subscription". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| notificationDestination | Link | 1 | A URI indicating the notification destination where T8 notification requests shall be delivered |  |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 5.2.5.4. | Notification\_websocket |
| locationArea | LocationArea | 1 | Identifies a location area. It can be either a list of cell IDs, or a list of Tracking Areas, or civic addresses, or a geographic area, or a combination of any of the above. |  |
| timeDuration | DateTime | 0..1 | Identifies the time for which a continuous reporting is requested. Shall not be provided for one time reporting case. |  |
| thresholdValues | array(CongestionValue) | 0..N | Identifies a list of congestion level(s) with exact value that the SCS/AS requests to be informed of when reached.  (NOTE 2) |  |
| thresholdTypes | array(CongestionType) | 0..N | Identifies a list of congestion level(s) with abstracted value that the SCS/AS requests to be informed of when reached.  (NOTE 2) |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.9.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 2: thresholdValues and thresholdTypes shall be mutually exclusive. | | | | |

##### 5.9.2.1.3 Type: NetStatusRepSubsPatch

This data type represents the parameters to request the modification of network status reporting subscription.

Table 5.9.2.1.3-1: Definition of type NetStatusRepSubsPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| notificationDestination | Link | 0..1 | A URI indicating the notification destination where T8 notification requests shall be delivered. |  |
| locationArea | LocationArea | 0..1 | Identifies a location area. It can be either a list of cell IDs, or a list of Tracking Areas, or civic addresses, or a geographic area, or a combination of any of the above. |  |
| timeDuration | DateTimeRm | 0..1 | Identifies the time for which a continuous reporting is requested. Shall not be provided for one time reporting case. |  |
| thresholdValues | array(CongestionValue) | 0..N | Identifies a list of congestion level(s) with exact value that the SCS/AS requests to be informed of when reached.  (NOTE 2) |  |
| thresholdTypes | array(CongestionType) | 0..N | Identifies a list of congestion level(s) with abstracted value that the SCS/AS requests to be informed of when reached.  (NOTE 2) |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.9.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 2: The "thresholdValue" attribute and the "thresholdType" attribute shall be mutually exclusive. | | | | |

#### 5.9.2.2 Notification data types

##### 5.9.2.2.1 Introduction

This clause defines data structures to be used in notifications.

##### 5.9.2.2.2 Type: NetworkStatusReportingNotification

This data type represents a network status reporting notification which is sent from the SCEF to the SCS/AS.

Table 5.9.2.2.2-1: Definition of type NetworkStatusReportingNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| subscription | Link | 1 | Link to the subscription resource to which this notification is related. |  |
| nsiValue | CongestionValue | 0..1 | Network Status Indicator based on exact value for congestion status received from RCAF(s).  (NOTE 2) |  |
| nsiType | CongestionType | 0..1 | Network Status Indicator based on abstracted value for congestion status.  (NOTE 2) |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.9.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: nsiValue and nsiType shall be mutually exclusive. | | | | |

#### 5.9.2.3 Referenced simple data types and enumerations

##### 5.9.2.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 5.2.1 can be referenced.

##### 5.9.2.3.2 Simple data types

The simple data types defined in table 5.9.2.3.2-1 shall be supported.

Table 5.9.2.3.2-1: Simple data types

|  |  |
| --- | --- |
| Type name | Description |
| CongestionValue | Unsigned integer with valid values between 0 and 31. The value 0 indicates that there is no congestion. The value 1 is the lowest congestion level and value 31 is the highest congestion level. |

##### 5.9.2.3.3 Enumeration: CongestionType

The enumeration CongestionType represents abstracted values for congestion status.

Table 5.9.2.3.3-1: Enumeration CongestionType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| HIGH | The congestion status is high. |  |
| MEDIUM | The congestion status is medium. |  |
| LOW | The congestion status is low. |  |
| NOTE: Properties marked with a feature as defined in clause 5.9.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

### 5.9.3 Resource structure

#### 5.9.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-net-stat-report/v1**

"apiRoot" is set as described in clause 5.2.4. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.9.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| Network Status  Reporting Subscriptions | /{scsAsId}/subscriptions | GET | Read all network status reporting subscription resources for a given SCS/AS. |
| POST | Create a new network status reporting subscription resource. |
| Individual Network Status  Reporting subscription | /{scsAsId}/subscriptions/{subscriptionId} | GET | Read a network status reporting subscription resource. |
| PUT | Update an existing Individual Network Status Reporting Subscription resource. |
| PATCH | Modify an existing Individual Network Status Reporting Subscription resource. |
| DELETE | Delete an existing continuous network status reporting subscription resource. |

#### 5.9.3.2 Resource: Network Status Reporting Subscriptions

##### 5.9.3.2.1 Introduction

This resource allows the SCS/AS to read all active long-term subscriptions related to a network status reporting.

##### 5.9.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-net-stat-report/v1/{scsAsId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.9.3.2.2-1.

Table 5.9.3.2.2-1: Resource URI variables for resource "Network Status Reporting Subscriptions"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.9.3.2.3 Resource methods

###### 5.9.3.2.3.1 GET

The GET method allows to read all active network status reporting subscriptions for a given SCS/AS. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.9.3.2.3.1-1 and table 5.9.3.2.3.1-2.

Table 5.9.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.9.3.2.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(NetworkStatusReportingSubscription) | 0..N | 200 OK | The information about the network status reporting subscriptions related to the request URI is returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.9.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.9.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.9.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.9.3.2.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.9.3.2.3.4 POST

The POST method creates a new network status reporting subscription resource for a given SCS/AS. The SCS/AS shall initiate the HTTP POST request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.9.3.2.3.4-1 and table 5.9.3.2.3.4-2.

Table 5.9.3.2.3.4-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.9.3.2.3.4-2: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NetworkStatusReportingSubscription | 1 | Parameters to register a subscription to request notifications about network status information report with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NetworkStatusReportingSubscription | 1 | 201 Created | The subscription was created successfully.  The URI of the created resource shall be returned in the "Location" HTTP header. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.9.5.3. | | | | |

Table 5.9.3.2.3.4-3: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-net-stat-report/v1/{scsAsId}/subscriptions/{subscriptionId} |

###### 5.9.3.2.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.9.3.3 Resource: Individual Network Status Reporting Subscription

##### 5.9.3.3.1 Introduction

This resource allows the SCS/AS to request for being notified about the network status using a long-term subscription.

##### 5.9.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-net-stat-report/v1/{scsAsId}/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 5.9.3.3.2-1.

Table 5.9.3.3.2-1: Resource URI variables for resource "Individual Network Status Reporting Subscription"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| subscriptionId | string | Identifier of the subscription resource. The subscriptionId corresponds to the stage 2 TLTRI. |

##### 5.9.3.3.3 Resource methods

###### 5.9.3.3.3.1 GET

The GET method allows to read an active network status reporting subscription resource. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.9.3.3.3.1-1 and table 5.9.3.3.3.1-2.

Table 5.9.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.9.3.3.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NetworkStatusReportingSubscription | 1 | 200 OK | The subscription information related to the request URI is returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.9.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.9.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.9.3.3.3.2 PUT

The PUT method updates an existing subscription resource to update a subscription. The SCS/AS shall initiate the HTTP PUT request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.9.3.3.3.2-1 and table 5.9.3.3.3.2-2.

Table 5.9.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.9.3.3.3.2-2: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NetworkStatusReportingSubscription | 1 | Parameters to update a subscription to request notifications about network status information report with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NetworkStatusReportingSubscription | 1 | 200 OK | The subscription was updated successfully. |
| none |  | 204 No Content | The subscription was updated successfully. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply. | | | | |

Table 5.9.3.3.3.2-3: Headers supported by the 307 Response Code on this resource

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

Table 5.9.3.3.3.2-4: Headers supported by the 308 Response Code on this resource

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

###### 5.9.3.3.3.3 PATCH

The PATCH method modifies an existing subscription resource to modify a subscription. The SCS/AS shall initiate the HTTP PATCH request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures and response codes specified in the table 5.9.3.3.3.3-1 and table 5.9.3.3.3.3-2.

Table 5.9.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| n/a |  |  |  |

Table 5.9.3.3.3.3-2: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NetStatusRepSubsPatch | 1 | Contains the parameters to modify an existing Individual Network Status Reporting Subscription resource. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NetworkStatusReportingSubscription | 1 | 200 OK | The modification of the Individual Network Status Reporting Subscription resource was successfull.  The SCEF shall return an updated representation of the resource within the NetworkStatusReportingSubscription data structure in the response message body. |
| n/a |  | 204 No Content | The modification of the Individual Network Status Reporting Subscription resource was successfull and no content is to be sent in the response message 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE 1: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.9.3.3.3.3-3: Headers supported by the 307 Response Code on this resource

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

Table 5.9.3.3.3.3-4: Headers supported by the 308 Response Code on this resource

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

###### 5.9.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.9.3.3.3.5 DELETE

The DELETE method deletes the resource and terminates the related network status reporting subscription. The SCS/AS shall initiate the HTTP DELETE request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.9.3.3.3.5-1 and table 5.9.3.3.3.5-2.

Table 5.9.3.3.3.5-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.9.3.3.3.5-2: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The subscription was terminated successfully. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.9.3.3.3.5-3: Headers supported by the 307 Response Code on this resource

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

Table 5.9.3.3.3.5-4: Headers supported by the 308 Response Code on this resource

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

#### 5.9.3.4 Void

### 5.9.3A Notifications

#### 5.9.3A.1 General

The notifications provided by the ReportingNetworkStatus API are specified in this clause.

Table 5.9.3A-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| Network Status Reporting Notification | {notificationDestination} | POST | Report a detected network status for a subscription from the SCEF to the SCS/AS |

#### 5.9.3A.2 Network Status Reporting Notification

##### 5.9.3A.2.1 Description

The Network Status Reporting Notification allows the SCEF to send notifications about the detected network status to the SCS/AS.

##### 5.9.3A.2.2 Target URI

The Callback URI **"{**notification\_uri**}"** shall be used with the callback URI variables defined in table 5.9.3A.2.2-1.

Table 5.9.3A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notificationDestination | Link | Callback reference provided by the SCS/AS during creation or modification of the network status reporting subscription. |

##### 5.9.3A.2.3 Standard Methods

###### 5.9.3A.2.3.1 Notification via POST

The HTTP POST method reports the detected network status for a network status subscription. The SCEF shall initiate the HTTP POST request message and the SCS/AS shall respond to the message.

This method shall support the request data structures specified in table 5.9.3A.2.3.1-1 and the response data structures and response codes specified in table 5.9.3A.2.3.1-2.

Table 5.9.3A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| NetworkStatusReportingNotification | 1 | The network status reporting notification provided by the SCEF. |

Table 5.9.3A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| none |  | 204 No Content | The network status reporting notification is received successfully. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.9.3A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.9.3A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.9.3A.2.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the NetworkStatusReportingNotification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

### 5.9.4 Used Features

The table below defines the features applicable to the ReportingNetworkStatus API. Those features are negotiated as described in clause 5.2.7.

Table 5.9.4-1: Features used by ReportingNetworkStatus API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 2 | Notification\_test\_event | The testing of notifications connections is supported according to clause 5.2.5.3. |
| 3 | PatchUpdate | Indicates the support of enhancements to the northbound interfaces (e.g. support the partial modification of an existing subscription resource). |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

### 5.9.5 Error handling

#### 5.9.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.9.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the ReportingNetworkStatus API.

#### 5.9.5.3 Application Errors

The application errors defined for the ReportingNetworkStatus API are listed in table 5.9.5.3-1.

Table 5.9.5.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| QUOTA\_EXCEEDED | 403 Forbidden | Not enough quota for SCS/AS. |

## 5.10 CpProvisioning API

### 5.10.1 Overview

The CpProvisioning API is a RESTful API that allows the SCS/AS to add, change or delete the communication pattern parameter sets of the UE. The CpProvisioning API defines a set of data models, resources and the related procedures for the creation and management of the resources for communication pattern parameter provisioning. The corresponding JSON schema for the representation of the resources and operations defined by the CpProvisioning API is provided in its complete form in Annex A.10.

### 5.10.2 Data model

#### 5.10.2.1 Resource data types

##### 5.10.2.1.1 Introduction

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

Table 5.10.2.1.1-1 specifies data types re-used by the CpProvisioning API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the CpProvisioning API.

Table 5.10.2.1.1-1: CpProvisioning API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| Dnn | 3GPP TS 29.571 [45] | Identifies a DNN. |
| IpAddr | 3GPP TS 29.571 [45] | UE IP Address. |
| MacAddr48 | 3GPP TS 29.571 [45] | MAC Address. |
| NetworkAreaInfo | 3GPP TS 29.554 [50] | Identifies a network area information. |
| Snssai | 3GPP TS 29.571 [45] | Identifies the S-NSSAI. |
| TimeWindow | 5.2.1.2.3 | Identifies the time window from the start time to the end time. |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.10.4-1. |

Table 5.10.2.1.1-2 specifies the data types defined for the CpProvisioning API.

Table 5.10.2.1.1-2: CpProvisioning API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| AppExpUeBehaviour | 5.10.2.2.6 | Contains the Application Specific Expected UE Behaviour parameters. | AppExpUeBehaviour |
| BatteryIndication | 5.10.2.3.6 | Represents the type of power consumption. |  |
| CommunicationIndicator | 5.10.2.3.3 | Represents the communication type used by the UE. |  |
| CpFailureCode | 5.10.2.3.5 | Represents the failure reason of the CP parameter provisioning. |  |
| CpInfo | 5.10.2.1.2 | Represents the resources for communication pattern parameter provisioning. |  |
| CpParameterSet | 5.10.2.2.2 | Represents an offered communication pattern parameter set. |  |
| CpReport | 5.10.2.2.4 | Represents a CP report indicating the CP set identifier(s) which CP parameter(s) are not added or modified successfully and the corresponding failure cause(s). |  |
| ScheduledCommunicationTime | 5.10.2.2.3 | Represents an offered scheduled communication time. |  |
| ScheduledCommunicationType | 5.10.2.3.8a | Represents the type of scheduled communication. | ScheduledCommType\_5G |
| StationaryIndication | 5.10.2.3.4 | Indicates whether the UE is stationary or mobile. |  |
| TrafficProfile | 5.10.2.3.7 | Represents the type of data transmission. |  |
| UmtLocationArea5G | 5.10.2.2.5 | Represents the user location area describing the UE moving trajectory. | ExpectedUMT\_5G, ExpectedUmtTime\_5G |

##### 5.10.2.1.2 Type: CpInfo

This type represents the resources for communication pattern parameter provisioning. The same structure is used in the subscription request and subscription response.

Table 5.10.2.1.2-1: Definition of type CpInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 2) |
| self | Link | 0..1 | Link to the resource "Individual CP Provisioning Subscription".  This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| mtcProviderId | string | 0..1 | Identifies the MTC Service Provider and/or MTC Application. (NOTE 3) |  |
| dnn | Dnn | 0..1 | Identifies a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. | UEId\_retrieval |
| externalId | ExternalId | 0..1 | Each element uniquely identifies a user as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  The attribute may also be present in the CP provisioning subscription response message, if the "UEId\_retrieval" feature is supported and the corresponding request message includes the "ueIpAddr" attribute or the "ueMacAddr" attribute.  (NOTE 1) |  |
| msisdn | Msisdn | 0..1 | Each element identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 1) |  |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 1) |  |
| cpParameterSets | map(CpParameterSet) | 1..N | Identifies a set of CP parameter information that may be part of this CpInfo structure.  Any string value can be used as a key of the map. |  |
| cpReports | map(CpReport) | 0..N | Supplied by the SCEF and contains the CP set identifiers for which CP parameter(s) are not added or modified successfully. The failure reason is also included.  Each element provides the related information for one or more CP set identifier(s) and is identified in the map via the failure identifier as key. (NOTE 4). |  |
| snssai | Snssai | 0..1 | Indicate the S-NSSAI. | UEId\_retrieval |
| ueIpAddr | IpAddr | 0..1 | UE IP address. | UEId\_retrieval |
| ueMacAddr | MacAddr48 | 0..1 | UE MAC address. | UEId\_retrieval |
| NOTE 1: One of the properties "externalId", "msisdn" or "externalGroupId" shall be included.  NOTE 2: Properties marked with a feature as defined in clause 5.10.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 3: The SCEF should check received MTC provider identifier and then the SCEF may:  - override it with local configured value and send it to HSS; - send it directly to the HSS; or - reject the communication pattern parameter provisioning request.  NOTE 4: The failure identifier is a string encoded map key. | | | | |

#### 5.10.2.2 Referenced structured data types

##### 5.10.2.2.1 Introduction

This clause defines structured data types that are referenced from data structures defined in the previous clauses.

##### 5.10.2.2.2 Type: CpParameterSet

This data type represents an offered communication pattern parameter set sent from the SCC/AS to the SCEF.

Table 5.10.2.2.2-1: Definition of type CpParameterSet

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| setId | string | 1 | SCS/AS-chosen correlator provided by the SCS/AS in the request to create a resource fo CP parameter set(s).  (NOTE 4) |  |
| self | Link | 0..1 | Link to the resource "Individual CP set Provisioning". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| validityTime | DateTime | 0..1 | Identifies when the CP parameter set expires and shall be deleted. If absent, it indicates that there is no expiration time for this CP parameter set. |  |
| periodicCommunicationIndicator | CommunicationIndicator | 0..1 | Identifies whether UE communicates periodically or on demand. |  |
| communicationDurationTime | DurationSec | 0..1 | Identifies duration time of periodic communication. |  |
| periodicTime | DurationSec | 0..1 | Identifies interval time of periodic communication. |  |
| scheduledCommunicationTime | ScheduledCommunicationTime | 0..1 | Identifies time zone and day of the week when the UE is available for communication. |  |
| scheduledCommunicationType | ScheduledCommunicationType | 0..1 | Indicates the Scheduled Communication Type.  May only be present if the "scheduledCommunicationTime" attribute is provided. | ScheduledCommType\_5G |
| stationaryIndication | StationaryIndication | 0..1 | Identifies whether the UE is stationary or mobile. |  |
| batteryInds | array(BatteryIndication) | 0..N | Indicates the power consumption type(s) of the UE.  (NOTE 3) |  |
| trafficProfile | TrafficProfile | 0..1 | Identifies the type of data transmission. |  |
| expectedUmts | array(UmtLocationArea5G) | 0..N | Identifies the UE's expected geographical movement. The attribute is only applicable in 5G.  (NOTE 2) | ExpectedUMT\_5G  ExpectedUmtTime\_5G |
| expectedUmtDays | DayOfWeek | 0..6 | Identifies the day of the week. If absent, it indicates every day of the week. | ExpectedUmtTime\_5G |
| expectedUmtDaysAdd | array(DayOfWeek) | 0..5 | Identifies the additional day(s) of the week.  (NOTE 5) | ExpectedUmtTime\_Add |
| appExpUeBehvs | array(AppExpUeBehaviour) | 0..N | Contains the Application Specific Expected UE Behaviour parameters. | AppExpUeBehaviour |
| confidenceLevel | string | 0..1 | When present, this IE indicates the Confidence level for the associated Expected UE Behaviour parameter.  The value shall be between 0.01 and 1.00 with a step size of 0.01, represented as string.  If not present, confidence level 1.00 applies.  Pattern: '^[0]\.[0-9]{2}|[1.00]$' | ConfAccuLevels |
| accuracyLevel | string | 0..1 | When present, this IE indicates the accuracy level for the associated Expected UE Behaviour parameter.  The value shall be between 0.01 and 1.00 with a step size of 0.01, represented as string.  If not present, accuracy level 1.00 applies.  Pattern: '^[0]\.[0-9]{2}|[1.00]$' | ConfAccuLevels |
| NOTE 1: Properties marked with a feature as defined in clause 5.10.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: The first instance of the attribute represents the start of the location, and the last one represents the stop of the location.  NOTE 3: If "BATTERY\_RECHARGE" is provided, "BATTERY\_NO\_RECHARGE" shall not be provided simultaneously, vice versa; If "BATTERY\_REPLACE" is provided, "BATTERY\_NO\_REPLACE" shall not be provided simultaneously, vice versa; If "NO\_BATTERY" is provided, any value indicating UE powered with battery shall not be provided simultaneously, vice versa.  NOTE 4: A setId can only belong to one "Individual CP Provisioning Subscription" resource.  NOTE 5: The "expectedUmtDaysAdd" attribute may only be provided to indicate the additional day(s) if the "expectedUmtDays" attribute is also provided. | | | | |

##### 5.10.2.2.3 Type: ScheduledCommunicationTime

This data type represents an offered scheduled communication time.

Table 5.10.2.2.3-1: Definition of type ScheduledCommunicationTime

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| daysOfWeek | array(DayOfWeek) | 0..6 | Identifies the day(s) of the week. If absent, it indicates every day of the week. |  |
| timeOfDayStart | TimeOfDay | 0..1 | Identifies the start time of the day. |  |
| timeOfDayEnd | TimeOfDay | 0..1 | Identifies the end time of the day. |  |
| NOTE: Properties marked with a feature as defined in subclause 5.10.4 are applicable as described in subclause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

##### 5.10.2.2.4 Type: CpReport

This type represents a CP report to indicate the CP set identifier(s) which CP parameter(s) are not added or modified successfully and corresponding failure reason.

Table 5.10.2.2.4-1: Definition of type CpReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| setIds | array(string) | 0..N | Identifies the CP set identifier(s) which CP parameter(s) are not added or modified successfully |  |
| failureCode | CpFailureCode | 1 | Identifies the failure reason |  |
| NOTE: Properties marked with a feature as defined in subclause 5.10.4 are applicable as described in subclause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

##### 5.10.2.2.5 Type: UmtLocationArea5G

This data type represents the user location area describing the UE moving trajectory which is sent from the AF.

Table 5.10.2.2.5-1: Definition of the UmtLocationArea5G data Type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| umtTime | TimeOfDay | 0..1 | This IE identifies the time of the day when the UE arrives the location. | ExpectedUmtTime\_5G |
| umtDuration | DurationSec | 0..1 | This IE identifies the time duration the UE stays in the location. | ExpectedUmtTime\_5G |
| NOTE 1: Properties marked with a feature as defined in clause 5.10.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: This data type also contains all the properties defined for LocationArea5G data type, these properties are applicable for ExpectedUMT\_5G. | | | | |

##### 5.10.2.2.6 Type: AppExpUeBehaviour

Table 5.10.2.2.6-1: Definition of type AppExpUeBehaviour

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| appId | string | C | 0..1 | Indicates the Application Identifier.  (NOTE 1) |  |
| expPduSesInacTm | TimeWindow | O | 0..1 | Identifies the expected PDU Session Inactivity time during which the UE will not have traffic related to the application. |  |
| flowDescriptions | array(string) | C | 0..N | Represents a 3-tuple with protocol, server ip and server port for UL/DL application traffic. The content of the string has the same encoding as the IPFilterRule AVP value as defined in IETF RFC 6733 [46].  (NOTE 1) |  |
| confidenceLevel | string | O | 0..1 | When present, this IE indicates the Confidence level for the associated Application-Specific Expected UE Behaviour parameter.  The value shall be between 0.01 and 1.00 with a step size of 0.01, represented as string.  If not present, confidence level 1.00 applies.  Pattern: '^[0]\.[0-9]{2}|[1.00]$' |  |
| accuracyLevel | string | O | 0..1 | When present, this IE indicates the accuracy level for the associated Application-Specific Expected UE Behaviour parameter.  The value shall be between 0.01 and 1.00 with a step size of 0.01, represented as string.  If not present, accuracy level 1.00 applies.  Pattern: '^[0]\.[0-9]{2}|[1.00]$' |  |
| failureCode | CpFailureCode | O | 0..1 | Identifies the failure reason for the Application-Specific Expected UE Behaviour parameter is not added or modified successfully.  If absent, the value of the "failureCode" attribute in the higher-level "CpInfo" data type shall be used.  (NOTE 3) |  |
| validityTime | DateTime | O | 0..1 | Identifies when the Application-Specific Expected UE Behaviour parameter expires.  If absent, the value of the "validityTime" attribute in the higher-level "CpParameterSet" data type shall be used.  (NOTE 2) |  |
| NOTE 1: One of the "appId" attribute or "flowDescriptions" attribute shall be included.  NOTE 2: The attribute if provided, take precedence over the "validityTime" attribute in the higher-level "CpParameterSet" data type.  NOTE 3: The attribute if provided, take precedence over the "failureCode" attribute in the higher-level "CpInfo" data type. | | | | | |

#### 5.10.2.3 Referenced simple data types and enumerations

##### 5.10.2.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 5.2.1 can be referenced.

##### 5.10.2.3.2 Simple data types

The simple data types defined in table 5.10.2.3.2-1 shall be supported.

Table 5.10.2.3.2-1: Simple data types

|  |  |
| --- | --- |
| Type name | Description |
|  |  |
|  |  |

##### 5.10.2.3.3 Enumeration: CommunicationIndicator

Table 5.10.2.3.3-1: Enumeration CommunicationIndicator

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| PERIODICALLY | Identifies the UE communicates periodically |  |
| ON\_DEMAND | Identifies the UE communicates on demand |  |
| NOTE: Properties marked with a feature as defined in clause 5.10.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.10.2.3.4 Enumeration: StationaryIndication

Table 5.10.2.3.4-1: Enumeration StationaryIndication

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| STATIONARY | Identifies the UE is stationary |  |
| MOBILE | Identifies the UE is mobile |  |
| NOTE: Properties marked with a feature as defined in clause 5.10.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.10.2.3.5 Enumeration: CpFailureCode

The enumeration FailureCode represents the failure reason of the CP parameter provisioning.

Table 5.10.2.3.5-1: Enumeration CpFailureCode

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| MALFUNCTION | This value indicates that something functions wrongly in CP parameter provisioning or the CP parameter provisioning does not function at all. |  |
| SET\_ID\_DUPLICATED | The received CP set identifier(s) are already provisioned. |  |
| OTHER\_REASON | Other reason unspecified. |  |
| CONFIDENCE\_LEVEL\_NOT\_SUFFICIENT | This value indicate that the confidence level provided is not sufficient | ConfAccuLevels |
| ACCURACY\_LEVEL\_NOT\_SUFFICIENT | This value indicate that the accuracy level provided is not sufficient | ConfAccuLevels |
| NOTE: Properties marked with a feature as defined in clause 5.10.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.10.2.3.6 Enumeration: BatteryIndication

The enumeration BatteryIndication represents the type of power consumption.

Table 5.10.2.3.6-1: Enumeration BatteryIndication

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| BATTERY\_RECHARGE | UE powered with rechargeable battery. |  |
| BATTERY\_REPLACE | UE powered with replaceable battery. |  |
| BATTERY\_NO\_RECHARGE | UE powered with no rechargeable battery. |  |
| BATTERY\_NO\_REPLACE | UE powered with no replaceable battery. |  |
| NO\_BATTERY | UE not battery powered. |  |
| NOTE: Properties marked with a feature as defined in clause 5.10.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.10.2.3.7 Enumeration: TrafficProfile

The enumeration TrafficProfile represents the type of data transmission.

Table 5.10.2.3.7-1: Enumeration TrafficProfile

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| SINGLE\_TRANS\_UL | Uplink single packet transmission. |  |
| SINGLE\_TRANS\_DL | Downlink single packet transmission. |  |
| DUAL\_TRANS\_UL\_FIRST | Dual packet transmission, firstly uplink packet transmission with subsequent downlink packet transmission. |  |
| DUAL\_TRANS\_DL\_FIRST | Dual packet transmission, firstly downlink packet transmission with subsequent uplink packet transmission. |  |
| MULTI\_TRANS | Multiple packet transmission. |  |
| NOTE: Properties marked with a feature as defined in clause 5.10.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | |

##### 5.10.2.3.8A Enumeration: ScheduledCommunicationType

The enumeration ScheduledCommunicationType represents the type of scheduled communication.

Table 5.10.2.3.8A-1: Enumeration ScheduledCommunicationType

|  |  |
| --- | --- |
| Enumeration value | Description |
| DOWNLINK | Downlink only |
| UPLINK | Uplink only |
| BIDIRECTIONAL | Bi-directional |

### 5.10.3 Resource structure

#### 5.10.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-cp-parameter-provisioning/v1**

"apiRoot" is set as described in clause 5.2.4. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.10.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| CP provisioning Subscriptions | /{scsAsId}/subscriptions | GET | Read all active CP parameter provisioning subscription resources for a given SCS/AS. |
| POST | Create a new subscription resource of provisioning CP parameter set(s). |
| Individual CP Provisioning Subscription | /{scsAsId}/subscriptions/{subscriptionId} | GET | Read a CP parameter provisioning subscription resource. |
| PUT | Modify a CP parameter provisioning subscription resource. |
| DELETE | Delete a CP parameter provisioning subscription resource. |
| Individual CP set Provisioning | /{scsAsId}/subscriptions/{subscriptionId}/cpSets/{setId}  (NOTE 1, NOTE 2) | PUT | Update CP at individual CP set(s) level associated with a CP parameter set Id. |
| GET | Read CP at individual CP set(s) level associated with a CP parameter set Id. |
| DELETE | Delete CP at individual CP set(s) level associated with a CP parameter set Id. |
| NOTE 1: This setId as a resource identifier is not necessarily identical as the CP parameter set Id received from the SCS/AS.  NOTE 2: The path segment "cpSets" does not follow the related naming convention defined in clause 5.2.4. The path segment is however kept as currently defined in this specification for backward compatibility considerations. | | | |

#### 5.10.3.2 Resource: CP Provisioning Subscriptions

##### 5.10.3.2.1 Introduction

This resource allows the SCS/AS to read all active long-term transactions related to CP parameter provisioning resource management.

##### 5.10.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-cp-parameter-provisioning/v1/{scsAsId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.10.3.2.2-1.

Table 5.10.3.2.2-1: Resource URI variables for resource "CP Provisioning Subscriptions"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.10.3.2.3 Resource methods

###### 5.10.3.2.3.1 GET

The GET method allows to read all active subscriptions for a given SCS/AS. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.10.3.2.3.1-1 and table 5.10.3.2.3.1-2.

Table 5.10.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.10.3.2.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(CpInfo) | 0..N | 200 OK | The subscription information related to the request URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.10.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.10.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.10.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.10.3.2.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.10.3.2.3.4 POST

The POST method allows to create subscription for a given SCS/AS. The SCS/AS shall initiate the HTTP POST request message and the SCEF shall respond to the message.

This method shall support request and response data structures, and response codes, as specified in the table 5.10.3.2.3.4-1.

Table 5.10.3.2.3.4-1: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| CpInfo | 1 | Change information in CP parameter set. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| CpInfo | 1 | 201 Created | The subscription was created successfully.  The SCEF shall return the created subscription in the response content. CpReport may be included to provide detailed failure information for some CP sets. |
| array(CpReport) | 1..N | 500 Internal Server Error | The CP parameters for all CP sets were not created successfully. CpReport is included with detailed information. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| ProblemDetails | 0..1 | 404 Not Found | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply.  NOTE 2: Failure causes are described in clause 5.10.5. | | | | |

Table 5.10.3.2.3.4-2: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-cp-parameter-provisioning/v1/{scsAsId}/subscriptions/{subscriptionId} |

###### 5.10.3.2.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.10.3.3 Resource: Individual CP Provisioning Subscription

##### 5.10.3.3.1 Introduction

This resource allows the SCS/AS to manage resources for CP parameter provisioning using a subscription Id.

##### 5.10.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-cp-parameter-provisioning/v1/{scsAsId}/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 5.10.3.3.2-1.

Table 5.10.3.3.2-1: Resource URI variables for resource "Individual CP Provisioning Subscription"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| subscriptionId | string | Identifier of the subscription resource. The subscriptionId corresponds to the stage 2 TLTRI. |

##### 5.10.3.3.3 Resource methods

###### 5.10.3.3.3.1 GET

The GET method allows to read the subscription for a given SCS/AS and subscription Id. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.10.3.3.3.1-1 and table 5.10.3.3.3.1-2.

Table 5.10.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.10.3.3.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| CpInfo | 1 | 200 OK | The subscription information related to the request URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.10.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.10.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.10.3.3.3.2 PUT

The PUT method allows to change (add/update/remove) one ore more CP parameter set(s) resource(s). The SCS/AS shall initiate the HTTP PUT request message and the SCEF shall respond to the message.

This method shall support request and response data structures, and response codes, as specified in the table 5.14.3.3.3.2-1.

Table 5.10.3.3.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| CpInfo | 1 | Change information in CP parameter set(s). | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| CpInfo | 1 | 200 OK | The subscription was modified successfully.  The SCEF shall return an updated subscription in the response content. CpReport may be included to provide detailed failure information for some CP sets. |
| none |  | 204 No Content | The subscription was modified successfully and no content is to be sent in the response message body. |
| array(CpReport) | 1..N | 500 Internal Server Error | The CP parameters for all CP sets were not created successfully. CpReport is included with detailed information. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply. | | | | |

Table 5.10.3.3.3.2-2: 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 SCEF. |

Table 5.10.3.3.3.2-3: 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 SCEF. |

###### 5.10.3.3.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.10.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.10.3.3.3.5 DELETE

The DELETE method allows to remove an active subscription. The SCS/AS shall initiate the HTTP DELETE request message and the SCEF shall respond to the message.

This method shall support request and response data structures, and response codes, as specified in the table 5.10.3.3.3.5-1.

Table 5.10.3.3.3.5-1.: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The subscription was deleted successfully. The content shall be empty. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.10.3.3.3.5-2: 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 SCEF. |

Table 5.10.3.3.3.5-3: 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 SCEF. |

#### 5.10.3.4 Resource: Individual CP Set Provisioning

##### 5.10.3.4.1 Introduction

This resource allows the SCS/AS to manage resources for CP parameter set provisioning associated with a CP parameter set Id.

##### 5.10.3.4.2 Resource definition

Resource URI: **{apiRoot}/3gpp-cp-parameter-provisioning/v1/{scsAsId}/subscriptions/{subscriptionId}/cpSets/{setId}**

This resource shall support the resource URI variables defined in table 5.10.3.3.2-1.

Table 5.10.3.3.2-1: Resource URI variables for resource "Individual CP Set Provisioning"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| subscriptionId | string | Identifier of the subscription resource. |
| setId | string | Identifier of the CP parameter set |

##### 5.10.3.4.3 Resource methods

###### 5.10.3.4.3.1 GET

The GET method allows to read a CP parameter set resource. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.10.3.4.3.1-1 and table 5.10.3.4.3.1-2.

Table 5.10.3.4.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.10.3.4.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| CpParameterSet | 1 | 200 OK | The subscription information related to the request URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.10.3.4.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.10.3.4.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.10.3.4.3.2 PUT

The PUT method allows to update a CP parameter set resource. The SCS/AS shall initiate the HTTP PUT request message and the SCEF shall respond to the message.

This method shall support request and response data structures, and response codes, as specified in the table 5.10.3.4.3.2-1.

Table 5.10.3.4.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| CpParameterSet | 1 | Change information in CP parameter set. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| CpParameterSet | 1 | 200 OK | The CP parameter set resource was modified successfully.  The SCEF shall return an updated CP parameter set resource in the response content. |
| none |  | 204 No Content | The CP parameter set resource was modified successfully and no content is to be sent in the response message body. |
| CpReport | 1 | 409 Conflict | The CP parameters for the CP set were not updated successfully, applicable for error SET\_ID\_DUPLICATED in table 5.10.2.3.5-1. |
| CpReport | 1 | 500 Internal Server Error | The CP parameters for the CP set were not updated successfully, applicable for other errors in table 5.10.2.3.5-1. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply. | | | | |

Table 5.10.3.4.3.2-2: 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 SCEF. |

Table 5.10.3.4.3.2-3: 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 SCEF. |

###### 5.10.3.4.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.10.3.4.3.4 POST

This HTTP method is not supported for the resource.

###### 5.10.3.4.3.5 DELETE

The DELETE method allows to remove an active subscription. The SCS/AS shall initiate the HTTP DELETE request message and the SCEF shall respond to the message.

This method shall support request and response data structures, and response codes, as specified in the table 5.10.3.4.3.5-1.

Table 5.10.3.4.3.5-1.: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The subscription was deleted successfully. The content shall be empty. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.10.3.4.3.5-2: 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 SCEF. |

Table 5.10.3.4.3.5-3: 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 SCEF. |

### 5.10.4 Used Features

The table below defines the features applicable to the CpProvisioning API. Those features are negotiated as described in clause 5.2.7.

Table 5.10.4-1: Features used by CpProvisioning API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | ExpectedUMT\_5G | The UE's expected geographical movement is supported. This feature may only be supported in 5G. |
| 2 | ExpectedUmtTime\_5G | The UE's expected geographical movement with recurrence time is supported. This feature requires the ExpectedUMT\_5G feature support and may only be supported in 5G. |
| 3 | ScheduledCommType\_5G | Support of scheduled communication type. This feature may only be supported in 5G. |
| 4 | UEId\_retrieval | This feature supports AF specific UE ID retrieval.  The feature is not applicable to pre-5G (e.g. 4G). |
| 5 | ExpectedUmtTime\_Add | This feature supports expected UMT days indication. This feature requires the ExpectedUmtTime\_5G feature support. |
| 6 | AppExpUeBehaviour | This feature indicates the support of Application-Specific Expected UE Behaviour parameters.  The feature is not applicable to pre-5G (e.g. 4G). |
| 7 | ConfAccuLevels | This feature indicates the support of confidence and accuracy levels for the parameters provisioned.  The feature is not applicable to pre-5G (e.g. 4G). |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

### 5.10.5 Error handling

#### 5.10.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.10.5.2 Protocol Errors

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

#### 5.10.5.3 Application Errors

The application errors defined for CpProvisioning API are listed in table 5.10.5.3-1.

Table 5.10.5.3-1: Application errors

|  |  |  |  |
| --- | --- | --- | --- |
| Application Error | HTTP status code | Description | Applicability |
| REQUEST\_NOT\_AUTHORIZED | 403 Forbidden | Indicates that the the AF specific UE ID retrieval request is not authorized. | UEId\_retrieval |
| UE\_ID\_NOT\_AVAILABLE | 404 Not Found | Indicates that the AF specific UE ID is not available. | UEId\_retrieval |
| UE\_NOT\_FOUND | 404 Not Found | Indicates that the requested UE address is not found. | UEId\_retrieval |
| CONFIDENCE\_LEVEL\_OUT\_OF\_RANGE | 403 Forbidden | Confidence Level of the Expected UE Behaviour Parameter is out or range (e.g. <0.00 or >1.00) | ConfAccuLevels |
| ACCURACY\_LEVEL\_ OUT\_OF\_RANGE | 403 Forbidden | Confidence Level of the Expected UE Behaviour Parameter is out or range (e.g. <0.00 or >1.00) | ConfAccuLevels |

## 5.11 PfdManagement API

### 5.11.1 Overview

The PfdManagement API allows the SCS/AS to manage the PFDs via the SCEF. The PfdManagement API defines a set of data models, resources and the related procedures for the creation and management of the PFD management request. The corresponding JSON schema for the representation of the resources and operations defined by the PfdManagement API is provided in its complete form in Annex A.11.

### 5.11.2 Data model

#### 5.11.2.1 Resource data types

##### 5.11.2.1.1 Introduction

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

Table 5.11.2.1.1-1 specifies data types re-used by the PfdManagement API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the PfdManagement API.

Table 5.11.2.1.1-1: PfdManagement API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.11.4-1. |
| Dnai | 3GPP TS 29.571 [45] | DNAI |

Table 5.11.2.1.1-2 specifies the data types defined for the PfdManagement API.

Table 5.11.2.1.1-2: PfdManagement API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| DomainNameProtocol | 5.11.2.2.4 | Indicates the additional protocol and protocol field for domain names to be matched. | DomainNameProtocol |
| FailureCode | 5.11.2.2.3 | Represents the failure reason of the PFD management. |  |
| Pfd | 5.11.2.1.4 | Represents a PFD for an external Application Identifier. |  |
| PfdData | 5.11.2.1.3 | Represents a PFD request to add, update or remove PFD(s) for one external application identifier. |  |
| PfdManagement | 5.11.2.1.2 | Represents a PFD management resource for a PFD management request. |  |
| PfdManagementPatch | 5.11.2.1.7 | Represents the parameters to request the modification of a PFD management transaction resource. | PatchUpdate |
| PfdReport | 5.11.2.1.5 | Represents a PFD report indicating the external application identifier(s) which PFD(s) are not added or modified successfully and the corresponding failure cause(s). |  |
| UserPlaneLocationArea | 5.11.2.1.6 | Represents location area(s) of the user plane functions which are unable to enforce the provisioned PFD(s) successfully. |  |

##### 5.11.2.1.2 Type: PfdManagement

This type represents a PFD management resource for a PFD management request.

Table 5.11.2.1.2-1: Definition of type PfdManagement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| self | Link | 0..1 | Link to the resource "Individual PFD Management Transaction".  This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| pfdDatas | map(PfdData) | 1..N | Each element uniquely identifies the PFDs for an external application identifier. Each element is identified in the map via an external application identifier as key. The response shall include successfully provisioned PFD data of application(s). |  |
| pfdReports | map(PfdReport) | 0..N | Supplied by the SCEF and contains the external application identifiers for which PFD(s) are not added or modified successfully. The failure reason is also included. Each element provides the related information for one or more external application identifier(s) and is identified in the map via the failure identifier as key. (NOTE 2) |  |
| notificationDestination | Link | 0..1 | A URI indicating the notification destination for T8 notifications. | PfdMgmtNotification |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 5.2.5.4. | Notification\_websocket |
| NOTE 1: Properties marked with a feature as defined in clause 5.11.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 2: The failure identifier is a string encoded map key. | | | | |

##### 5.11.2.1.3 Type: PfdData

This type represents a PFD request to add, update or remove PFD(s) for one external application identifier provided by the SCS/AS to the SCEF via T8 interface.

Table 5.11.2.1.3-1: Definition of type PfdData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| externalAppId | string | 1 | Each element uniquely external application identifier  (NOTE 2) |  |
| self | Link | 0..1 | Link to the resource "Individual Application PFD Management". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| pfds | map(Pfd) | 1..N | Contains the PFDs of the external application identifier. Each PFD is identified in the map via a key containing the PFD identifier. (NOTE 3) |  |
| allowedDelay | DurationSecRm | 0..1 | Indicates that the list of PFDs in this request should be deployed within the time interval indicated by the Allowed Delay |  |
| cachingTime | DurationSecRo | 0..1 | SCEF supplied property, inclusion of this property means the allowed delayed cannot be satisfied, i.e. it is smaller than the caching time, but the PFD data is still stored. |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.11.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: An externalAppId can only belong to one "individual PFD Management Transaction" resource.  NOTE 3: When multiple PFDs are associated with application identifier, the application is detected when any of the PFDs associated with the application identifier is matched. | | | | |

##### 5.11.2.1.4 Type: Pfd

This data type represents a PFD for an external Application Identifier.

Table 5.11.2.1.4-1: Definition of type Pfd

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| pfdId | string | 1 | Identifies a PFD of an application identifier. |  |
| flowDescriptions | array(string) | 0..N | Represents a 3-tuple with protocol, server ip and server port for UL/DL application traffic. The content of the string has the same encoding as the IPFilterRule AVP value as defined in IETF RFC 6733 [46].  (NOTE 2) |  |
| urls | array(string) | 0..N | Indicates a URL or a regular expression which is used to match the significant parts of the URL. (NOTE 2) |  |
| domainNames | array(string) | 0..N | Indicates an FQDN or a regular expression as a domain name matching criteria.  (NOTE 2) |  |
| dnProtocol | DomainNameProtocol | 0..1 | Indicates the additional protocol and protocol field for domain names to be matched, it may only be provided when domainNames attribute is present. | DomainNameProtocol |
| NOTE 1: Properties marked with a feature as defined in clause 5.11.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: At least one of the properties "flowDescriptions", "urls" or "domainNames" shall be included. If a PFD contains multiple filter types, the PFD is only matched when every filter type contained in the PFD has a matching value. | | | | |

##### 5.11.2.1.5 Type: PfdReport

This type represents a PFD report to indicate the external application identifier(s) which PFD(s) are not added or modified successfully and corresponding failure reason.

Table 5.11.2.1.5-1: Definition of type PfdReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| externalAppIds | array(string) | 1..N | Identifies the external application identifier(s) which PFD(s) are not added or modified successfully |  |
| failureCode | FailureCode | 1 | Identifies the failure reason |  |
| cachingTime | DurationSec | 0..1 | It shall be included when the allowed delayed cannot be satisfied, i.e. it is smaller than the caching time configured in fetching PFD. |  |
| locationArea | UserPlaneLocationArea | 0..1 | Identifies a location area of the user plane(s) which are unable to enforce the PFD(s). |  |
| NOTE: Properties marked with a feature as defined in clause 5.11.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

##### 5.11.2.1.6 Type: UserPlaneLocationArea

This data type represents location area(s) of the user plane which is unable to enforce the provisioned PFD(s) successfully. It is sent from the SCEF to the SCS/AS.

Table 5.11.2.1.6-1: Definition of the UserPlaneLocationArea data Type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| locationArea | LocationArea | 0..1 | Identifies the network area information served by the user planes functions which are unable to enforce the provisioned PFD(s) successfully. It can be either a list of cell IDs, or a list of Tracking Areas, or civic addresses, or a geographic area, or a combination of any of the above. |  |
| locationArea5G | LocationArea5G | 0..1 | Identifies the network area information served by the user planes functions which are unable to enforce the provisioned PFD(s) successfully. It can be either a list of E-UTRA cell IDs, or a list of NR cell ID, or a list of Tracking Areas, or civic addresses, or a geographic area, or a combination of any of the above. | FailureLocation\_5G |
| dnais | array(DNAI) | 0..N | Identifies a list of DNAI supported by the user plane functions which are unable to enforce the provisioned PFD(s) successfully. | FailureLocation\_5G |

##### 5.11.2.1.7 Type: PfdManagementPatch

This type represents the parameters to request the modification of a PFD management transaction resource.

Table 5.11.2.1.7-1: Definition of type PfdManagementPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| pfdDatas | map(PfdData) | 1..N | Each element uniquely identifies the PFDs for an external application identifier. Each element is identified in the map via an external application identifier as the key. |  |
| notificationDestination | Link | 0..1 | A URI indicating the notification destination for T8 notifications. |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.11.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

#### 5.11.2.2 Referenced simple data types and enumerations

##### 5.11.2.2.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 5.2.1 can be referenced.

##### 5.11.2.2.2 Simple data types

The simple data types defined in table 5.11.2.2.2-1 shall be supported.

Table 5.11.2.2.2-1: Simple data types

|  |  |
| --- | --- |
| Type name | Description |
|  |  |
|  |  |

##### 5.11.2.2.3 Enumeration: FailureCode

The enumeration FailureCode represents the failure reason of the PFD management.

Table 5.11.2.2.3-1: Enumeration FailureCode

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| MALFUNCTION | This value indicates that something functions wrongly in PFD provisioning or the PFD provisioning does not function at all. |  |
| RESOURCE\_LIMITATION | This value indicates there is resource limitation for PFD storage. |  |
| SHORT\_DELAY | This value indicates that the allowed delay is too short and PFD(s) are not stored. |  |
| APP\_ID\_DUPLICATED | The received external application identifier(s) are already provisioned. |  |
| PARTIAL\_FAILURE | The PFD(s) are not provisioned to all PCEFs/TDFs/SMFs. | PfdMgmtNotification |
| OTHER\_REASON | Other reason unspecified. |  |
| NOTE: Properties marked with a feature as defined in clause 5.11.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | |

##### 5.11.2.2.4 Enumeration: DomainNameProtocol

Table 5.14.2.2.4-1: Enumeration DomainNameProtocol

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| DNS\_QNAME | Identifies the DNS protocol and the question name in DNS query. |  |
| TLS\_SNI | Identifies the Server Name Indication in TLS ClientHello message. |  |
| TLS\_SAN | Identifies the Subject Alternative Name in TLS ServerCertificate message. |  |
| TSL\_SCN | Identifies the Subject Common Name in TLS ServerCertificate message. (NOTE 2) |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.10.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: The enumeration value “TSL\_SCN” refers to “TLS\_SCN” value in domain name protocol. This enumeration value is however kept as currently defined in this specification for backward compatibility considerations. | | |

### 5.11.3 Resource structure

#### 5.11.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-pfd-management/v1**

"apiRoot" is set as described in clause 5.2.4. "apiName" shall be set to "3gpp-pfd-management" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.11.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| PFD Management Transactions | /{scsAsId}/transactions | GET | Read all or queried PFDs for a given SCS/AS |
| POST | Create PFDs for a given SCS/AS and one or more external Application Identifier(s) |
| Individual PFD Management Transaction | /{scsAsId}/transactions/{transactionId} | GET | Read all PFDs for a given SCS/AS and a transaction for one or more external Application Identifier(s) |
| PUT | Update PFD(s) for a given SCS/AS and a transaction for one or more external Application Identifier(s) |
| PATCH | Modify PFD(s) for a given SCS/AS and a transaction for one or more external Application Identifier(s). |
| DELETE | Delete PFDs for a given SCS/AS and a transaction for one or more external Application Identifier(s) |
| Individual Application PFD Management | /{scsAsId}/transactions/{transactionId}/applications/{appId}  (NOTE) | PUT | Update PFDs at individual application level |
| PATCH | Update PFDs at individual application level |
| GET | Read PFDs at individual application level |
| DELETE | Delete PFDs at individual application level |
| NOTE: The appId as the resource identifier is not necessarily identical as the external application identifier received from the SCS/AS. | | | |

#### 5.11.3.2 Resource: PFD Management Transactions

##### 5.11.3.2.1 Introduction

This resource allows an SCS/AS to read all PFDs for a given SCS/AS or create PFDs for a given SCS/AS with one or more external Application Identifier(s).

##### 5.11.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-pfd-management/v1/{scsAsId}/transactions**

This resource shall support the resource URI variables defined in table 5.11.3.2.2-1.

Table 5.11.3.2.2-1: Resource URI variables for resource "PFD Management Transactions"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.11.3.2.3 Resource methods

###### 5.11.3.2.3.1 GET

The GET method allows to read all or queried active PFDs for a given SCS/AS. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support the URI query parameters as specified in the table 5.11.3.2.3.1-0.

Table 5.11.3.2.3.1-0: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks | Applicability |
| external-app-ids | array(string) | 0..N | The external application identifier(s) of the requested PFD data. | enNB |
| NOTE: If multiple elements are provided in the array data structure, then each element shall be treated as a separate query parameter. | | | | |

This method shall support the request and response data structures, and response codes, as specified in the table 5.11.3.2.3.1-1.

Table 5.11.3.2.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(PfdManagement) | 0..N | 200 OK | All or queried transactions including the PFDs for the SCS/AS in the request URI are returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.2.3.1-2: 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 SCEF. |

Table 5.11.3.2.3.1-3: 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 SCEF. |

###### 5.11.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.11.3.2.3.3 POST

The POST method creates new PFDs resource(s) for a given SCS/AS with one or more external Application Identifier provided by the SCS/AS. It is initiated by the SCS/AS and answered by the SCEF. The SCS/AS shall provide the external Application Identifier in the message body and upon receipt of the HTTP POST message, the SCEF shall generate the resource "Individual PFD Management Transaction" and also the sub-resource(s) "Individual Application PFD Management", the SCEF shall send these resource URI in the HTTP response to the SCS/AS.

This method shall support the request and response data structures, and response codes, as specified in the table 5.11.3.2.3.3-1.

Table 5.11.3.2.3.3-1: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| PfdManagement | 1 |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| PfdManagement | 1 | 201 Created | The PFDs resource was created successfully. PfdReport may be included to provide detailed failure information for some applications. |
| array(PfdReport) | 1..N | 500 Internal Server Error | The PFDs for all applications were not created successfully. PfdReport is included with detailed information. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.2.3.3-2: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-pfd-management/v1/{scsAsId}/transactions/{transactionId} |

###### 5.11.3.2.3.4 PATCH

This HTTP method is not supported for the resource.

###### 5.11.3.2.3.5 DELETE

To remove all PFDs for a given SCS/AS, the SCS/AS shall use the HTTP DELETE method on the "PFD Management Transactions" resource.

The possible response messages from the SCEF, depending on whether the DELETE request is successful or unsuccessful, are shown in table 5.11.3.2.3.5-1.

Table 5.11.3.2.3.5-1: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | All PFDs were removed successfully. The SCEF shall not return a response content. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.2.3.5-2: 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 SCEF. |

Table 5.11.3.2.3.5-3: 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 SCEF. |

#### 5.11.3.3 Resource: Individual PFD Management Transaction

##### 5.11.3.3.1 Introduction

This resource allows an SCS/AS to read, or update or delete PFDs for a given SCS/AS and a transaction Id for one or more application identifier(s) at the SCEF.

##### 5.11.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-pfd-management/v1/{scsAsId}/transactions/{transactionId}**

This resource shall support the resource URI variables defined in table 5.11.3.3.2-1.

Table 5.11.3.3.2-1: Resource URI variables for resource "Individual PFD Management Transaction"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| transactionId | string | Identifier of the transaction. The transactionId corresponds to the stage 2 TLTRI. |

##### 5.11.3.3.3 Resource methods

###### 5.11.3.3.3.1 GET

The GET method allows to read all PFDs for a given SCS/AS and a transaction Id generated by the SCEF. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.11.3.3.3.1-1.

Table 5.11.3.3.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| PfdManagement | 1 | 200 OK | The PFDs for the SCS/AS and the transaction Id for one or more application identifier(s) in the request URI are returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.3.3.1-2: 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 SCEF. |

Table 5.11.3.3.3.1-3: 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 SCEF. |

###### 5.11.3.3.3.2 PUT

The PUT method modifies the PFDs for a given SCS/AS and an existing transaction Id generated by the SCEF. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support the request and response data structures, and response codes, as specified in the table 5.11.3.3.3.2-1.

Table 5.11.3.3.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| PfdManagement | 1 | Update of PFD(s) for an existing transaction Id. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| PfdManagement | 1 | 200 OK | The PFDs were updated successfully and a representation is returned. PfdReport may be included to provide detailed failure information for some applications. |
| none |  | 204 No Content | The PFDs were updated successfully. |
| array(PfdReport) | 1..N | 500 Internal Server Error | The PFDs for all applications were not updated successfully. PfdReport is included with detailed information. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.3.3.2-2: 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 SCEF. |

Table 5.11.3.3.3.2-3: 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 SCEF. |

###### 5.11.3.3.3.3 PATCH

The PATCH method modifies an existing PFD Management Transaction resource. The SCS/AS shall initiate the HTTP PATCH request message and the SCEF shall respond to the message.

This method shall support the request and response data structures, and response codes, as specified in the table 5.11.3.3.3.3-1.

Table 5.11.3.3.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| PfdManagementPatch | 1 | Modify of PFD(s) for an existing transaction ID. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| PfdManagement | 1 | 200 OK | The PFDs were modified successfully and a representation of the modified resource is returned. The PfdReport data structure may be included in the response to provide the detailed failure information if the modification failed for some applications. |
| none |  | 204 No Content | The PFDs were modified successfully. |
| array(PfdReport) | 1..N | 500 Internal Server Error | The PFDs for all applications were not modified successfully. PFD Report(s) shall be included in the response body with the detailed information. |
| none |  | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.3.3.3-2: 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 SCEF. |

Table 5.11.3.3.3.3-3: 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 SCEF. |

###### 5.11.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.11.3.3.3.5 DELETE

The DELETE method deletes the PFDs for a given SCS/AS and an transaction Id generated by the SCEF. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.11.3.3.3.5-1 and table 5.11.3.3.3.5-2.

Table 5.11.3.3.3.5-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| N/A |  |  |  |

Table 5.11.3.3.3.5-2: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| None |  | 204 No Content | The PFDs for an existing transaction Id were removed successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.3.3.5-3: Headers supported by the 307 Response Code on this resource

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

Table 5.11.3.3.3.5-4: Headers supported by the 308 Response Code on this resource

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

#### 5.11.3.4 Resource: Individual Application PFD Management

##### 5.11.3.4.1 Introduction

This resource allows an SCS/AS to read, update or remove the PFDs for a given SCS/AS and an external Application Identifier at the SCEF.

##### 5.11.3.4.2 Resource definition

Resource URI: **{apiRoot}/3gpp-pfd-management/v1/{scsAsId}/transactions/{transactionId}/applications/{appId}**

This resource shall support the resource URI variables defined in table 5.11.3.4.2-1.

Table 5.11.3.3.4-1: Resource URI variables for resource "Individual Application PFD Management"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| transactionId | string | Identifier of the transaction. |
| appId | string | External Application Identifier. |

##### 5.11.3.4.3 Resource methods

###### 5.11.3.4.3.1 GET

The GET method allows to read all PFDs at individual application level. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support request and response data structures, and response codes, as specified in the table 5.11.3.4.3.1-1.

Table 5.11.3.4.3.1-1: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| None |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| PfdData | 1 | 200 OK | The PFDs at individual application level in the request URI are returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.4.3.1-2: 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 SCEF. |

Table 5.11.3.4.3.1-3: 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 SCEF. |

###### 5.11.3.4.3.2 PUT

The PUT method modifies the PFDs at individual application level. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support the request and response data structures, and response codes, as specified in the table 5.11.3.4.3.2-1.

Table 5.11.3.4.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| PfdData | 1 | Update of PFD(s) for an existing external application identifier. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| PfdData | 1 | 200 OK | The PFDs for the existing external application identifier were updated successfully and a representation is returned. |
| none |  | 204 No Content | The PFDs for the existing external application identifier were updated successfully. |
| PfdReport | 1 | 403 Forbidden | The PFDs for the application were not updated successfully, applicable for error SHORT\_DELAY in table 5.11.2.2.3-1. |
| PfdReport | 1 | 409 Conflict | The PFDs for the application were not updated successfully, applicable for error APP\_ID\_DUPLICATED in table 5.11.2.2.3-1. |
| PfdReport | 1 | 500 Internal Server Error | The PFDs for the application were not updated successfully, applicable for other errors in table 5.11.2.2.3-1. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.4.3.2-2: 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 SCEF. |

Table 5.11.3.4.3.2-3: 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 SCEF. |

###### 5.11.3.4.3.3 PATCH

The PATCH method modifies the PFDs at individual application level. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support the request and response data structures, and response codes, as specified in the table 5.11.3.4.3.3-1.

Table 5.11.3.4.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| PfdData | 1 | Update of PFD(s) for an existing external application identifier. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| PfdData | 1 | 200 OK | The PFDs for the existing external application identifier were updated successfully and a representation is returned. |
| none |  | 204 No Content | The PFDs for the existing external application identifier were updated successfully. |
| PfdReport | 1 | 403 Forbidden | The PFDs for the application were not updated successfully, applicable for error SHORT\_DELAY in table 5.11.2.2.3-1. |
| PfdReport | 1 | 409 Conflict | The PFDs for the application were not updated successfully, applicable for error APP\_ID\_DUPLICATED in table 5.11.2.2.3-1. |
| PfdReport | 1 | 500 Internal Server Error | The PFDs for the application were not updated successfully, applicable for other errors in table 5.11.2.2.3-1. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.4.3.3-2: 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 SCEF. |

Table 5.11.3.4.3.3-3: 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 SCEF. |

###### 5.11.3.4.3.4 POST

This HTTP method is not supported for the resource.

###### 5.11.3.4.3.5 DELETE

The DELETE method deletes all the PFDs at individual application level. It is initiated by the SCS/AS and answered by the SCEF.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.11.3.4.3.5-1 and table 5.11.3.4.3.5-2.

Table 5.11.3.4.3.5-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| N/A |  |  |  |

Table 5.11.3.4.3.5-2: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The PFDs were removed successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during transaction termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during transaction termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.11.3.4.3.5-3: Headers supported by the 307 Response Code on this resource

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

Table 5.11.3.4.3.5-4: Headers supported by the 308 Response Code on this resource

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

#### 5.11.3.5 Void

### 5.11.3A Notifications

#### 5.11.3A.1 General

The notifications provided by the PfdManagement API are specified in this clause.

Table 5.11.3A-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| PFD Management Notification | {notificationDestination} | POST | Send asynchronous PFD management result. |

#### 5.11.3A.2 PFD Management Notification

##### 5.11.3A.2.1 Description

The PFD Management Notification allows the SCEF to send notification about PFD management result to the SCS/AS, if the PFD provisioning fails within the allowed delay.

##### 5.11.3A.2.2 Target URI

The Callback URI **"{**notificationDestination**}"** shall be used with the callback URI variables defined in table 5.11.3A.2.2-1.

Table 5.11.3A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notificationDestination | Link | Callback reference provided by the SCS/AS during creation or modification of the PFD management transaction. |

##### 5.11.3A.2.3 Standard Methods

###### 5.11.3A.2.3.1 Notification via POST

The HTTP POST method reports the asynchronous PFD management result. The SCEF shall initiate the HTTP POST request message and the SCS/AS shall respond to the message.

This method shall support the request data structures specified in table 5.11.3A.2.3.1-1 and the response data structures and response codes specified in table 5.11.3A.2.3.1-2.

Table 5.11.3A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| PfdReport | 1..N | The PFD management notification provided by the SCEF. |

Table 5.11.3A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| none |  | 204 No Content | The PFD management notification is received successfully. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCS/AS instance where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.11.3A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.11.3A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.11.3A.2.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the PfdReport may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

### 5.11.4 Used Features

The table below defines the features applicable to the PfdManagement API. Those features are negotiated as described in clause 5.2.7.

Table 5.11.4-1: Features used by PfdManagement API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | DomainNameProtocol | This feature supports the additional protocol matching condition for the domain name in PFD data. |
| 2 | PfdMgmtNotification | This feature supports PFD management notification. |
| 3 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 4 | Notification\_test\_event | The testing of notification connection is supported according to clause 5.2.5.3. |
| 5 | FailureLocation\_5G | This feature supports the notification of specific failure location area of UPF for PFD management in 5G. This feature is applicable only if PfdMgmtNotification feature is also supported. The feature supports the 5G requirement and may only be supported in 5G. |
| 6 | enNB | Indicates the support of enhancements to the northbound interfaces. |
| 7 | PatchUpdate | Indicates the support of enhancements to the northbound interfaces (e.g. support the partial modification of an existing PFD Management Transaction resource). |

### 5.11.5 Error handling

#### 5.11.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.11.5.2 Protocol Errors

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

#### 5.11.5.3 Application Errors

The application errors defined for PfdManagement API are listed in table 5.11.5.3-1.

Table 5.11.5.3-1: Application errors

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

## 5.12 ECRControl API

### 5.12.1 Overview

The ECRControl API is a custom API (RPC interaction) that allows the SCS/AS to query or configure the enhanced converage restriction over 3GPP networks. The ECRControl API defines a set of data models and related custom operation procedures for the enhanced coverage restriction control request. The corresponding JSON schema for the representation of the operations defined by the ECRControl API is provided in its complete form in Annex A.12.

### 5.12.2 Data model

#### 5.12.2.1 Data types

##### 5.12.2.1.1 Introduction

This clause defines data structures to be used in the request and response.

Table 5.12.2.1.1-1 specifies data types re-used by the ECRControl API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the ECRControl API.

Table 5.12.2.1.1-1: ECRControl API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| EcRestrictionDataWb | 3GPP TS 29.503 [63] | Contains the Enhance Coverage Restriction Data. |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.12.4-1. |

Table 5.12.2.1.1-2 specifies the data types defined for the ECRControl API.

Table 5.12.2.1.1-2: ECRControl API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| ECRControl | 5.12.2.1.2 | Represents the parameters to request Enhanced Coverage Restriction control. |  |
| ECRData | 5.12.2.1.3 | Represents the current visited PLMN (if any) and the current settings of enhanced coverage restriction. |  |
| PlmnEcRestrictionDataWb | 5.12.2.1.4 | Indicates whether enhanced coverage mode is restricted or not for a PLMN ID. | ECR\_WB\_5G |

##### 5.12.2.1.2 Type: ECRControl

This type represents the Enhanced Coverage Restriction control request. The structure is used only for request.

Table 5.12.2.1.2-1: Definition of type ECRControl

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| supportedFeatures | SupportedFeatures | 1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7. |  |
| mtcProviderId | string | 0..1 | Identifier the MTC Service Provider and/or MTC Application. (NOTE 4). |  |
| scsAsId | string | 0..1 | Identifier of the SCS/AS. |  |
| externalId | ExternalId | 0..1 | Identifies a user as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 2) |  |
| msisdn | Msisdn | 0..1 | Identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 2) |  |
| ecrDataWbs | array(PlmnEcRestrictionDataWb) | 0..N | Identifies whether enhanced coverage mode are restricted or not. This attribute shall not be present for the query custom operation. | ECR\_WB\_5G |
| restrictedPlmnIds | array(PlmnId) | 0..N | Indicates a complete list (and possibly empty) of serving PLMNs where Enhanced Coverage shall be restricted. This attribute shall not be present for the query custom operation. (NOTE 3) |  |
| allowedPlmnIds | array(PlmnId) | 0..N | Indicates a complete list (and possibly empty) of serving PLMNs where Enhanced Coverage shall be allowed. This attribute shall not be present for the query custom operation. (NOTE 3) |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.4.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 2: One of the properties "externalId" or "msisdn" shall be included.  NOTE 3: "restrictedPlmnIds" and "allowedPlmnIds" shall be mutually exclusive.  NOTE 4: The SCEF should check received MTC provider identifier and then the SCEF may: - override it with local configured value and send it to HSS; - send it directly to the HSS; or - reject the Enhanced Coverage Restriction control request | | | | |

##### 5.12.2.1.3 Type: ECRData

This data type represents the current visited PLMN (if any) and the current settings of enhanced coverage restriction. The structure is used only for response.

Table 5.12.2.1.3-1: Definition of type ECRData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| supportedFeatures | SupportedFeatures | 1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7. |  |
| visitedPlmnId | PlmnId | 0..1 | Indicates the current visited PLMN. |  |
| ecrDataWbs | array(PlmnEcRestrictionDataWb) | 0..N | Identifies whether enhanced coverage mode are restricted or not. | ECR\_WB\_5G |
| restrictedPlmnIds | array(PlmnId) | 0..N | Indicates a complete list (and possibly empty) of serving PLMNs where Enhanced Coverage shall be restricted.  (NOTE 2) |  |
| allowedPlmnIds | array(PlmnId) | 0..N | Indicates a complete list (and possibly empty) of serving PLMNs where Enhanced Coverage shall be allowed.  (NOTE 2) |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.4.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 2: "restrictedPlmnIds" and "allowedPlmnIds" shall be mutually exclusive. | | | | |

##### 5.12.2.1.4 Type: PlmnEcRestrictionDataWb

Table 5.12.2.1.4-1: Definition of type PlmnEcRestrictionDataWb

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| plmnId | PlmnId | 1 | Indicates the PLMN where enhanced coverage mode shall be restricted or not. |  |
| plmnEcrDataWb | EcRestrictionDataWb | 0..1 | Identifies whether enhanced coverage mode are restricted or not. |  |

### 5.12.3 Custom Operations without associated resources

#### 5.12.3.1 Overview

Custom operations used for this API are summarized in table 5.12.3.1-1. "apiRoot" is set as described in clause 5.2.4.

Table 5.12.3.1-1: Custom operations without associated resources

|  |  |  |  |
| --- | --- | --- | --- |
| Operation name | Custom operation URI | Mapped HTTP method | Description |
| query | /query | POST | Query the status of enhanced converage restriction for a UE |
| configure | /configure | POST | Configure the enhanced converage restriction for a UE |

#### 5.12.3.2 Operation: query

##### 5.12.3.2.1 Description

This custom operation allows an SCS/AS to query the current status of enhanced converage restriction for a UE via the T8 interface as defined in 3GPP TS 23.682 [2].

##### 5.12.3.2.2 Operation Definition

This operation shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.12.3.2.2-1 and table 5.12.3.2.2-2.

Table 5.12.3.2.2-1: URI query parameters supported by the POST on this operation

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.12.3.2.2-2: Data structures supported by the POST request/response on this operation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| ECRControl | 1 | Parameters to query the current status of Enhanced Coverage Restriction. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| ECRData | 1 | 200 OK | The requested information was returned successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.12.5.3. | | | | |

Table 5.12.3.2.2-3: Headers supported by the 307 Response Code on this resource

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

Table 5.12.3.2.2-4: Headers supported by the 308 Response Code on this resource

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

#### 5.12.3.3 Operation: configure

##### 5.12.3.3.1 Description

This custom operation allows an SCS/AS to configure the current setting of enhanced converage restriction for a UE via the T8 interface as defined in 3GPP TS 23.682 [2].

##### 5.12.3.3.2 Operation Definition

This operation shall support the request data structures specified in table 5.12.3.3.2-1 and the response data structure and response codes specified in table 5.12.3.3.2-2.

Table 5.12.3.3.2-1: URI query parameters supported by the POST on this operation

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.12.3.3.2-2: Data structures supported by the POST request/response on this operation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| ECRControl | 1 | Parameters to configure the setting of Enhanced Coverage Restriction. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| ECRData | 1 | 200 OK | The Enhanced Coverage Restriction setting was configured successfully |
| none |  | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.12.5.3. | | | | |

Table 5.12.3.3.2-3: Headers supported by the 307 Response Code on this resource

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

Table 5.12.3.3.2-4: Headers supported by the 308 Response Code on this resource

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

### 5.12.4 Used Features

The table below defines the features applicable to the ECRControl API. Those features are negotiated as described in clause 5.2.7.

Table 5.12.4-1: Features used by ECRControl API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | ECR\_WB\_5G | The enhanced coverage restriction control information indicates whether the enhanced coverage modes are restricted or not for the WB UE. The feature is not applicable to the pre-5G. |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

### 5.12.5 Error handling

#### 5.12.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.12.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the ECRControl API.

#### 5.12.5.3 Application Errors

The application errors defined for the ECRControl API are listed in table 5.12.5.3-1.

Table 5.12.5.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| QUOTA\_EXCEEDED | 403 Forbidden | Not enough quota for SCS/AS. |

## 5.13 NpConfiguration API

### 5.13.1 Overview

The NpConfiguration API is a RESTful API that allows the SCS/AS to send suggested network parameters to influence certain aspects of UE/network behaviour such as the UE's PSM, extended idle mode DRX, and extended buffering configurations. The NpConfiguration API defines a set of data models, resources and the related procedures for the creation and management of the network parameter configuration. The corresponding JSON schema for the representation of the resources and operations defined by the NpConfiguration API is provided in its complete form in Annex A.13.

### 5.13.2 Data model

#### 5.13.2.1 Resource data types

##### 5.13.2.1.1 Introduction

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

Table 5.13.2.1.1-1 specifies data types re-used by the NetworkParameterConfiguration API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the NetworkParameterConfiguration API.

Table 5.13.2.1.1-1: NetworkParameterConfiguration API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| Dnn | 3GPP TS 29.571 [45] | Identifies a DNN. |
| IpAddr | 3GPP TS 29.571 [45] | UE IP Address. |
| MacAddr48 | 3GPP TS 29.571 [45] | MAC Address. |
| Snssai | 3GPP TS 29.571 [45] | Identifies an S-NSSAI. |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.13.4-1. |

Table 5.13.2.1.1-2 specifies the data types defined for the NpConfiguration API.

Table 5.13.2.1.1-2: NpConfiguration API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| ConfigurationNotification | 5.13.2.1.4 | Represents a configuration result notification. |  |
| NpConfiguration | 5.13.2.1.2 | Represents a network parameters configuration. |  |
| NpConfigurationPatch | 5.13.2.1.3 | Represents parameters used to request the modification of a network parameters configuration resource. |  |

##### 5.13.2.1.2 Type: NpConfiguration

This type represents a configuration of network parameters. The same structure is used in the configuration request and response.

Table 5.13.2.1.2-1: Definition of type NpConfiguration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 2) |
| self | Link | 0..1 | Link to the resource "Individual NP Configuration". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| mtcProviderId | string | 0..1 | Identifies the MTC Service Provider and/or MTC Application. (NOTE 4) |  |
| dnn | Dnn | 0..1 | Identifies a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. | UEId\_retrieval |
| externalId | ExternalId | 0..1 | Identifies a user as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  The attribute may also be present in the NP configuration response message, if the "UEId\_retrieval" feature is supported and the corresponding request message includes the "ueIpAddr" attribute or the "ueMacAddr" attribute.  (NOTE 1) |  |
| msisdn | Msisdn | 0..1 | Identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 1) |  |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 1) |  |
| maximumLatency | DurationSec | 0..1 | This parameter may be included to identify the maximum delay acceptable for downlink data transfers. |  |
| maximumResponseTime | DurationSec | 0..1 | This parameter may be included to identify the length of time for which the UE stays reachable to allow the SCS/AS to reliably deliver the required downlink data. |  |
| suggestedNumberOfDlPackets | integer | 0..1 | This parameter may be included to identify the number of packets that the serving gateway shall buffer in case that the UE is not reachable. |  |
| groupReportingGuardTime | DurationSec | 0..1 | Identifies the time for which the SCEF can aggregate the reports detected by the UEs in a group and report them together to the SCS/AS, as specified in clause 5.6.0 of 3GPP TS 23.682 [2]. |  |
| notificationDestination | Link | 0..1 | A URI indicating the notification destination where T8 notification requests shall be delivered. The attribute shall be provided if the attribute "externalGroupId" is provided. |  |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise.  The attribute may only be provided if the attribute "externalGroupId" is provided. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 5.2.5.4.  The attribute may only be provided if the attribute "externalGroupId" is provided. | Notification\_websocket |
| validityTime | DateTime | 0..1 | Identifies when the network parameter expires and shall be deleted locally if it expires. The attribute is only applicable in 5G. (NOTE 3) | NpExpiry\_5G |
| snssai | Snssai | 0..1 | Indicate the S-NSSAI. | UEId\_retrieval |
| ueIpAddr | IpAddr | 0..1 | UE IP address. | UEId\_retrieval |
| ueMacAddr | MacAddr48 | 0..1 | UE MAC address. | UEId\_retrieval |
| NOTE 1: Only one of the properties "externalId", "msisdn" or "externalGroupId" shall be included.  NOTE 2: Properties marked with a feature as defined in clause 5.13.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features.  NOTE 3: If this attribute is omitted, no expiry for network parameter configuration applies.  NOTE 4: The SCEF should check received MTC provider identifier and then the SCEF may:  - override it with local configured value and send it to HSS; - send it directly to the HSS; or - reject the network parameter configuration request. | | | | |

##### 5.13.2.1.3 Type: NpConfigurationPatch

This type represents a configuration of network parameters provided by the SCS/AS to the SCEF. The structure is used for HTTP PATCH request.

Table 5.13.2.1.3-1: Definition of type NpConfigurationPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| maximumLatency | DurationSecRm | 0..1 | This parameter may be included to identify the maximum delay acceptable for downlink data transfers. |  |
| maximumResponseTime | DurationSecRm | 0..1 | This parameter may be included to identify the length of time for which the UE stays reachable to allow the SCS/AS to reliably deliver the required downlink data. |  |
| suggestedNumberOfDlPackets | integer | 0..1 | This parameter may be included to identify the number of packets that the serving gateway shall buffer in case that the UE is not reachable. |  |
| groupReportGuardTime | DurationSecRm | 0..1 | Identifies the time for which the SCEF can aggregate the reports detected by the UEs in a group and report them together to the SCS/AS, as specified in clause 5.6.0 of 3GPP TS 23.682 [2]. |  |
| validityTime | DateTimeRm | 0..1 | Identifies when the network parameter expires and shall be deleted locally if it expires. The attribute is only applicable in 5G. | NpExpiry\_5G |
| notificationDestination | Link | 0..1 | A URI indicating the notification destination where T8 notification requests shall be delivered. |  |
| NOTE: Properties marked with a feature as defined in clause 5.13.4 are applicable as described in clause 5.2.7. If no feature are indicated, the related property applies for all the features. | | | | |

##### 5.13.2.1.4 Type: ConfigurationNotification

This type represents a configuration result notification.

Table 5.13.2.1.4-1: Definition of the ConfigurationNotification data type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| configuration | Link | 1 | Link to the configuration resource to which this notification is related. |  |
| configResults | array(ConfigResult) | 0..N | Each element identifies a notification of grouping configuration result. |  |
| appliedParam | AppliedParameterConfiguration | 0..1 | Indicates the applied parameter configuration in the network. The "maximumDetectionTime" attribute in AppliedParameterConfiguration data type is not applicable for Network Parameter configuration. | Enhanced\_param\_config |
| NOTE: Properties marked with a feature as defined in clause 5.13.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

### 5.13.3 Resource structure

#### 5.13.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-network-parameter-configuration/v1**

"apiRoot" is set as described in clause 5.2.4. "apiName" shall be set to "3gpp-network-parameter-configuration" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.13.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| NP Configurations | /{scsAsId}/configurations | GET | Read all NP configurations for a given SCS/AS |
| POST | Create a new NP configuration |
| Individual NP Configuration | /{scsAsId}/configurations/{configurationId} | PUT | Replace all of the properties in an existing NP configuration |
| PATCH | Modify some properties in an existing NP configuration |
| GET | Read an existing NP configuration |
| DELETE | Delete a NP configuration |

#### 5.13.3.2 Resource: NP Configurations

##### 5.13.3.2.1 Introduction

This resource allows an SCS/AS to read all active network parameter configurations or create a new configuration to configure network parameters.

##### 5.13.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-network-parameter-configuration/v1/{scsAsId}/configurations**

This resource shall support the resource URI variables defined in table 5.13.3.2.2-1.

Table 5.13.3.2.2-1: Resource URI variables for resource "NP Configurations"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.13.3.2.3 Resource methods

###### 5.13.3.2.3.1 GET

The GET method allows to read all active configurations indicated by the resource URI as defined in clause 5.13.3.2.2. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.13.3.2.3.1-1 and table 5.13.3.2.3.1-2.

Table 5.13.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.13.3.2.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(NpConfiguration) | 0..N | 200 OK | The NP configuration information related to the request URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.13.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.13.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.13.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.13.3.2.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.13.3.2.3.4 POST

The POST method creates a new configuration resource for a given SCS/AS. The SCS/AS shall initiate the HTTP POST request message and the SCEF shall respond to the message. The SCEF shall construct the URI of the created resource.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.13.3.2.3.4-1 and table 5.13.3.2.3.4-2.

Table 5.13.3.2.3.4-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.13.3.2.3.4-2: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NpConfiguration | 1 | Parameters to create a new configuration to configure network parameters with the SCEF. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NpConfiguration | 1 | 201 Created | The configuration was created successfully.  The URI of the created resource shall be returned in the "Location" HTTP header. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| ProblemDetails | 0..1 | 404 Not Found | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.13.5.3. | | | | |

Table 5.13.3.2.3.4-3: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure:  {apiRoot}/3gpp-network-parameter-configuration/v1/{scsAsId}/configurations/{configurationId} |

###### 5.13.3.2.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.13.3.3 Resource: Individual NP Configuration

##### 5.13.3.3.1 Introduction

This resource allows an SCS/AS to query, update and delete a network parameter configuration indicated by the resource URI as defined in clause 5.13.3.3.2.

##### 5.13.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-network-parameter-configuration/v1/{scsAsId}/configurations/{configurationId}**

This resource shall support the resource URI variables defined in table 5.13.3.3.2-1.

Table 5.13.3.2.2-1: Resource URI variables for resource "Individual NP Configuration"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |
| configurationId | string | Identifier of the configuration resource. |

##### 5.13.3.3.3 Resource methods

###### 5.13.3.3.3.1 GET

The GET method allows to read an active configuration indicated by the resource URI as defined in subclause 5.13.3.3.2. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.13.3.3.3.1-1 and table 5.13.3.3.3.1-2.

Table 5.13.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
|  |  |  |  |

Table 5.13.3.3.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NpConfiguration | 1 | 200 OK | The configuration information related to the request URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during configuration retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.13.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.13.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.13.3.3.3.2 PUT

The PUT method modifies an existing configuration indicated by the resource URI as defined in clause 5.13.3.3.2. The SCS/AS shall initiate the HTTP PUT request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.13.3.3.3.2-1 and table 5.13.3.3.3.2-2.

Table 5.13.3.3.3.2-1: URI query parameters supported by the PUT method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.13.3.3.3.2-2: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NpConfiguration | 1 | Update of network parameter(s) for an existing Configuration. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NpConfiguration | 1 | 200 OK | The resource was updated successfully.  The SCEF shall return an updated Configuration information in the response. |
| none |  | 204 No Content | The resource was updated successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.13.5.3. | | | | |

Table 5.13.3.3.3.2-3: Headers supported by the 307 Response Code on this resource

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

Table 5.13.3.3.3.2-4: Headers supported by the 308 Response Code on this resource

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

###### 5.13.3.3.3.3 PATCH

The PATCH method shall be used to update some properties in an existing configuration indicated by the Resource URI as defined in clause 5.13.3.3.2. The SCS/AS shall initiate the HTTP PATCH request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.13.3.3.3.3-1 and table 5.13.3.3.3.3-2.

Table 5.13.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.13.3.3.3.3-2: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| NpConfigurationPatch | 1 | Partial update an existing network parameter configuration. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| NpConfiguration | 1 | 200 OK | The configuration was updated successfully.  The SCEF shall return an updated configuration information in the response. |
| none |  | 204 No Content | The configuration was updated successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during configuration modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.13.5.3. | | | | |

Table 5.13.3.3.3.3-3: Headers supported by the 307 Response Code on this resource

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

Table 5.13.3.3.3.3-4: Headers supported by the 308 Response Code on this resource

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

###### 5.13.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.13.3.3.3.5 DELETE

The DELETE method deletes an existing configuration resource "Individual NP Configuration". The SCS/AS shall initiate the HTTP DELETE request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.13.3.3.3.5-1 and table 5.13.3.3.3.5-2.

Table 5.13.3.3.3.5-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| N/A |  |  |  |

Table 5.13.3.3.3.5-2: Data structures supported by the DELETE request/response on the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(ConfigResult) | 1..N | 200 OK | The configuration was terminated successfully, the configuration failure information for group members shall be included if received. |
| none |  | 204 No Content | The configuration was terminated successfully.  The response body shall be empty. |
| none |  | 307 Temporary Redirect | Temporary redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during configuration termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.13.3.3.3.5-3: Headers supported by the 307 Response Code on this resource

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

Table 5.13.3.3.3.5-4: Headers supported by the 308 Response Code on this resource

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

#### 5.13.3.4 Void

### 5.13.3A Notifications

#### 5.13.3A.1 General

The notifications provided by the NpConfiguration API are specified in this clause.

Table 5.13.3A-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| Configuration Notification | {notificationDestination} | POST | Report a grouping configuration result from the SCEF to the SCS/AS |

#### 5.13.3A.2 Configuration Notification

##### 5.13.3A.2.1 Description

The Configuration Notification allows the SCEF to send notifications about grouping configuration result to the SCS/AS.

##### 5.13.3A.2.2 Target URI

The Callback URI **"{**notificationDestination**}"** shall be used with the callback URI variables defined in table 5.13.3a.2.2-1.

Table 5.13.3A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notificationDestination | Link | Callback reference provided by the SCS/AS during creation or modification of the NP configuration subscription. |

##### 5.13.3A.2.3 Standard Methods

###### 5.13.3A.2.3.1 Notification via POST

The HTTP POST method reports the grouping configuration results for a NP configuration subscription. The SCEF shall initiate the HTTP POST request message and the SCS/AS shall respond to the message.

This method shall support the request data structures specified in table 5.13.3A.2.3.1-1 and the response data structures and response codes specified in table 5.13.3A.2.3.1-2.

Table 5.13.3A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| ConfigurationNotification | 1 | The grouping configuration result notification provided by the SCEF. |

Table 5.13.3A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| none |  | 204 No Content | The notification is received successfully. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.13.3A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.13.3A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.13.3a.2.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the ConfigurationNotification may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

### 5.13.4 Used Features

The table below defines the features applicable to the NpConfiguration API. Those features are negotiated as described in clause 5.2.7.

Table 5.13.4-1: Features used by NpConfiguration API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 2 | Notification\_test\_event | The testing of notification connection is supported according to clause 5.2.5.3. |
| 3 | NpExpiry\_5G | The network parameter expiry is supported. This feature may only be supported in 5G. |
| 4 | Enhanced\_param\_config | This feature supports the co-existence of multiple event configurations for target UE(s) if there are parameters affecting periodic RAU/TAU timer and/or Active Time. |
| 5 | UEId\_retrieval | This feature supports AF specific UE ID retrieval.  The feature is not applicable to pre-5G (e.g. 4G). |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

### 5.13.5 Error handling

#### 5.13.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.13.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the NpConfiguration API.

#### 5.13.5.3 Application Errors

The application errors defined for the NpConfiguration API are listed in table 5.13.5.3-1.

Table 5.13.5.3-1: Application errors

|  |  |  |  |
| --- | --- | --- | --- |
| Application Error | HTTP status code | Description | Applicability |
| PARAMETER\_OUT\_OF\_RANGE | 403 Forbidden | Indicates that the resource is not allowed to be created since one or more of the received parameters are out of range defined by operator policies. |  |
| REQUEST\_NOT\_AUTHORIZED | 403 Forbidden | Indicates that the AF specific UE ID retrieval request is not authorized. | UEId\_retrieval |
| UE\_ID\_NOT\_AVAILABLE | 404 Not Found | Indicates that the AF specific UE ID is not available. | UEId\_retrieval |
| UE\_NOT\_FOUND | 404 Not Found | Indicates that the requested UE address is not found. | UEId\_retrieval |

## 5.14 AsSessionWithQoS API

### 5.14.1 Overview

The AsSessionWithQoS API is a RESTful API that allows the SCS/AS to set up a session with SCEF with required QoS based on the application and service requirement. The AsSessionWithQoS API defines a set of data models, resources and the related procedures for the creation and management of the AS sessions with required QoS. The corresponding JSON schema for the representation of the resources and operations defined by the AsSessionWithQoS API is provided in its complete form in Annex A.14.

### 5.14.2 Data model

#### 5.14.2.1 Resource data types

##### 5.14.2.1.1 Introduction

This clause defines data structures to be used in resource representations, including subscription resources.

Table 5.14.2.1.1-1 specifies data types re-used by the AsSessionWithQoS API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the AsSessionWithQoS API.

Table 5.14.2.1.1-1: AsSessionWithQoS API re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AcceptableServiceInfo | 3GPP TS 29.514 [52] | Acceptable maximum requested bandwidth. |  |
| AlternativeServiceRequirementsData | 3GPP TS 29.514 [52] | Contains alternative QoS related parameters and a reference to them. |  |
| AverWindow | 3GPP TS 29.571 [45] | Averaging Window. | EnQoSMon |
| AverWindowRm | 3GPP TS 29.571 [45] | This data type is defined in the same way as the "AverWindow" data type, but with the OpenAPI "nullable: true" property. | EnQoSMon |
| BatOffsetInfo | 3GPP TS 29.514 [52] | Contains the offset of the BAT and the optionally adjusted periodicity. |  |
| BitRate | 3GPP TS 29.571 [45] | String representing a bit rate that shall be formatted as follows:  Pattern: '^\d+(\.\d+)? (bps|Kbps|Mbps|Gbps|Tbps)$'  Examples:  "125 Mbps", "0.125 Gbps", "125000 Kbps" |  |
| BitRateRm | 3GPP TS 29.571 [45] | This data type is defined in the same way as the "BitRate" data type, but with the OpenAPI "nullable: true" property. |  |
| Dnn | 3GPP TS 29.571 [45] | Identifies a DNN. |  |
| EthFlowDescription | 3GPP TS 29.514 [52] | Defines a packet filter for an Ethernet flow.(NOTE 1) |  |
| EventsSubscReqData | 3GPP TS 29.514 [52] | Identifies the events the application subscribes to. | EnQoSMon |
| EventsSubscReqDataRm | 3GPP TS 29.514 [52] | This data type is defined in the same way as the "EventsSubscReqDatal" data type, but with the OpenAPI "nullable: true" property | EnQoSMon |
| ExtMaxDataBurstVol | 3GPP TS 29.571 [45] | Unsigned integer indicating Maximum Data Burst Volume (see clauses 5.7.3.7 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in Bytes.  Minimum = 4096. Maximum = 2000000. |  |
| ExtMaxDataBurstVolRm | 3GPP TS 29.571 [45] | This data type is defined in the same way as the "ExtMaxDataBurstVol" data type, but with the OpenAPI "nullable: true" property. |  |
| ExternalGroupId | 5.2.1.3.2 | Represents an external group identifier. | GMEC\_5G |
| Gpsi | 3GPP TS 29.571 [45] | Represents a GPSI. | GMEC\_5G |
| IpAddr | 3GPP TS 29.571 [45] | UE IP Address. |  |
| MacAddr48 | 3GPP TS 29.571 [45] | MAC Address. |  |
| MediaType | 3GPP TS 29.514 [52] | Indicates the media type of a single-modal data flow of a multi-modal service. | MultiMedia |
| MultiModalId | 3GPP TS 29.514 [52] | Represents multi-modal service identifier. | MultiMedia |
| PacketDelBudget | 3GPP TS 29.571 [45] | Unsigned integer indicating Packet Delay Budget (see clauses 5.7.3.4 and 5.7.4 of 3GPP TS 23.501 [8])), expressed in milliseconds.  Minimum = 1. |  |
| PacketDelBudgetRm | 3GPP TS 29.571 [45] | This data type is defined in the same way as the "PacketDelBudget" data type, but with the OpenAPI "nullable: true" property. |  |
| PacketErrRate | 3GPP TS 29.571 [45] | String representing Packet Error Rate (see clauses 5.7.3.5 and 5.7.4 of 3GPP TS 23.501 [8]), expressed as a "*scalar* x 10-k" where the scalar and the *exponent k are each encoded as one decimal digit*.  Pattern: '^([0-9]E-[0-9])$'  Examples:  Packer Error Rate 4x10-6 shall be encoded as "4E-6".  Packer Error Rate 10-2 shall be encoded as "1E-2". |  |
| PacketErrRateRm | 3GPP TS 29.571 [45] | This data type is defined in the same way as the "PacketErrRate" data type, but with the OpenAPI "nullable: true" property. |  |
| PdvMonitoringReport | 3GPP TS 29.514 [52] | Represents a PDV monitoring report. |  |
| PeriodicityInfo | 3GPP TS 29.514 [52] | Indicates the time period between the start of the two data bursts in Uplink and/or Downlink direction. |  |
| PduSetQosPara | 3GPP TS 29.571 [45] | Represents the PDU Set level QoS parameters. |  |
| PduSetQosParaRm | 3GPP TS 29.571 [45] | Represents the PDU Set level QoS parameters to be modified. |  |
| PlmnIdNid | 3GPP TS 29.571 [45] | Identifies the network: the PLMN Identifier (the mobile country code and the mobile network code) or the SNPN Identifier (the PLMN Identifier and the NID). |  |
| Port | 5.2.1.3.2 | Unsigned integer with valid values between 0 and 65535 representing a port. | ListUE\_5G |
| ProblemDetails | 5.2.1.2.12 | Problem Details when returning an error response. |  |
| ProtoDesc | 3GPP TS 29.514 [52] | Represents Protocol description of the media flow |  |
| RatType | 3GPP TS 29.571 [45] | Identifies the RAT Type. |  |
| ReportingFrequency | 3GPP TS 29.512 [8] | Indicates the frequency for the reporting, such as event triggeredand/or periodic. (NOTE 2) |  |
| RequestedQosMonitoringParameter | 3GPP TS 29.512 [8] | Indicates the QoS information to be measured, e.g.UL packet delay, DL packet delay or round trip packet delay between the UE and the UPF is to be monitored when the QoS Monitoring for packet delay is enabled for the service data flow. (NOTE 2) |  |
| ServAuthInfo | 3GPP TS 29.514 [52] | The authorization result of a request for QoS / QoS monitoring. | EnQoSMon |
| Snssai | 3GPP TS 29.571 [45] | Identifies the S-NSSAI. |  |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.14.4-1. |  |
| TscaiInputContainer | 3GPP TS 29.514 [52] | TSCAI Input information container. | TSC\_5G, MultiMedia |
| TscPriorityLevel | 3GPP TS 29.514 [52] | Represents priority of TSC Flows. | TSC\_5G, MultiMedia |
| TscPriorityLevelRm | 3GPP TS 29.514 [52] | Represents the same as the TscPriorityLevel data type, but with the OpenAPI "nullable: true" property. | TSC\_5G, MultiMedia |
| TsnQosContainer | 3GPP TS 29.514 [52] | Represents individual QoS parameters | MultiMedia |
| TsnQosContainerRm | 3GPP TS 29.514 [52] | Represents the same as the TsnQosContainer data type, but with the OpenAPI "nullable: true" property. | MultiMedia |
| Uinteger | 3GPP TS 29.571 [45] | Unsigned Integer, i.e. only value 0 and integers above 0 are permissible.  Minimum = 0. |  |
| UintegerRm | 3GPP TS 29.571 [45] | This data type is defined in the same way as the "Uinteger" data type, but with the OpenAPI "nullable: true" property. |  |
| UplinkDownlinkSupport | 3GPP TS 29.514 [52] | Provides L4S support information. | L4S |
| NOTE 1: In order to support a set of MAC addresses with a specific range in the traffic filter, feature MacAddressRange\_5G as specified in clause 5.14.4 shall be supported.  NOTE 2: In order to support QoS Monitoring, feature QoSMonitoring\_5G as specified in clause 5.14.4 shall be supported. | | |  |

Table 5.14.2.1.1-2 specifies the data types defined for the AsSessionWithQoS API.

Table 5.14.2.1.1-2: AsSessionWithQoS API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| AdditionalInfoAsSessionWithQos | 5.14.2.1.10 | Describes additional error information specific for this API. |  |
| AsSessionWithQoSSubscription | 5.14.2.1.2 | Represents an individual AS session with required QoS subscription resource. |  |
| AsSessionWithQoSSubscriptionPatch | 5.14.2.1.3 | Represents parameters to modify an AS session with specific QoS subscription. |  |
| AsSessionMediaComponent | 5.14.2.1.13 | Represents media component data for a multi-modal service. It contains service data flow information for a single modal data flow of a multi-modal service. | MultiMedia |
| AsSessionMediaComponentRm | 5.14.2.1.14 | Represents the same as the AsSessMediaComponent data type but with the "nullable: true" property. | MultiMedia |
| MultiModalFlows | 5.14.2.1.15 | Represents flow information within a single-modal data flow for a multi-modal service. | MultiMedia |
| ProblemDetailsAsSessionWithQos | 5.14.2.1.11 | ProblemDetails as defined in clause 5.2.12.12 extended with specific error information for this API, as described in AdditionalInfoAsSessionWithQos. |  |
| QosMonitoringInformation | 5.14.2.1.6 | Represents QoS monitoring information. | QoSMonitoring\_5G |
| QosMonitoringInformationRm | 5.14.2.1.7 | Represents the same as the QosMonitoringInformation data type but with the "nullable: true" property. | QoSMonitoring\_5G |
| QosMonitoringReport | 5.14.2.1.8 | Represents a QoS monitoring report. | QoSMonitoring\_5G |
| TscQosRequirement | 5.14.2.1.9 | Represents QoS requirements for time sensitive communication. | TSC\_5G  XRM\_5G |
| TscQosRequirementRm | 5.14.2.1.10 | Represents the same as the TscQosRequirement data type but with the "nullable: true" property. | TSC\_5G  XRM\_5G |
| UserPlaneEvent | 5.14.2.2.3 | Represents the user plane event. | enNB |
| UserPlaneEventReport | 5.14.2.1.5 | Represents an event report for user plane. | enNB |
| UserPlaneNotificationData | 5.14.2.1.4 | Represents the parameters to be conveyed in a user plane event(s) notification. | enNB |
| UeAddInfo | 5.14.2.1.16 | Represents the UE address information. | ListUE\_5G |

##### 5.14.2.1.2 Type: AsSessionWithQoSSubscription

This type represents an AS session request with specific QoS for the service provided by the SCS/AS to the SCEF via T8 interface. The structure is used for subscription request and response.

Table 5.14.2.1.2-1: Definition of type AsSessionWithQoSSubscription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| self | Link | 0..1 | Link to the resource "Individual AS Session with Required QoS Subscription".  This parameter shall be supplied by the SCEF in HTTP responses. |  |
| dnn | Dnn | 0..1 | Identifies a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. (NOTE 3) |  |
| snssai | Snssai | 0..1 | Identifies an S-NSSAI. (NOTE 3) |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| notificationDestination | Link | 1 | Contains the URL to receive the notification bearer level event(s) from the SCEF. |  |
| exterAppId | string | 0..1 | Identifies the external Application Identifier. (NOTE 2) (NOTE 9) (NOTE 11) | AppId  ListUE\_5G  GMEC\_5G |
| extGroupId | ExternalGroupId | 0..1 | Identifies a group of UE(s).  (NOTE 10) | GMEC\_5G |
| gpsi | Gpsi | 0..1 | Identifies a UE using its GPSI.  (NOTE 10) | GMEC\_5G |
| flowInfo | array(FlowInfo) | 0..N | Describe the IP data flow which requires QoS.  (NOTE 2) (NOTE 7) (NOTE 9) (NOTE 11) |  |
| ethFlowInfo | array(EthFlowDescription) | 0..N | Identifies Ethernet packet flows.  (NOTE 2) (NOTE 6) (NOTE 11) | EthAsSessionQoS\_5G  GMEC\_5G |
| enEthFlowInfo | array(EthFlowInfo) | 0..N | Identifies the Ethernet flows which require QoS. Each Ethernet flow consists of a flow identifier and the corresponding UL and/or DL flows.  (NOTE 2) (NOTE 6) (NOTE 11) | EnEthAsSessionQoS\_5G  GMEC\_5G |
| qosReference | string | 0..1 | Identifies a pre-defined QoS information. (NOTE 4) (NOTE 5) |  |
| altQoSReferences | array(string) | 0..N | Identifies an ordered list of pre-defined QoS information. The lower the index of the array for a given entry, the higher the priority. (NOTE 4) | AlternativeQoS\_5G |
| altQosReqs | array(AlternativeServiceRequirementsData) | 0..N | Identifies an ordered list of alternative service requirements that include individual QoS parameter sets. The lower the index of the array for a given entry, the higher the priority. (NOTE 4) | AltQosWithIndParams\_5G |
| disUeNotif | boolean | 0..1 | Indicates whether to disable QoS flow parameters signalling to the UE when the SMF is notified by the NG-RAN of changes in the fulfilled QoS situation. The fulfilled situation is either the QoS profile or an Alternative QoS Profile.  - true: the QoS flow parameters signalling to the UE is disabled;  - false (default): the QoS flow parameters signalling to the UE is not disabled. | DisableUENotification\_5G |
| ueIpv4Addr | Ipv4Addr | 0..1 | The Ipv4 address of the UE.  (NOTE 2) |  |
| ipDomain | string | 0..1 | The IPv4 address domain identifier.  The attribute may only be provided if the ueIpv4Addr attribute is present. |  |
| ueIpv6Addr | Ipv6Addr | 0..1 | The Ipv6 address of the UE.  (NOTE 2) |  |
| macAddr | MacAddr48 | 0..1 | Identifies the MAC address.  (NOTE 2) | EthAsSessionQoS\_5G |
| listUeAddrs | array(UeAddInfo) | 0..N | Identifies the list of UE address(es).  (NOTE 9) (NOTE 12) | ListUE\_5G |
| usageThreshold | UsageThreshold | 0..1 | Time period and/or traffic volume in which the QoS is to be applied. |  |
| sponsorInfo | SponsorInformation | 0..1 | Indicates a sponsor information |  |
| qosMonInfo | QosMonitoringInformation | 0..1 | Qos Monitoring information. It can be present when the event "QOS\_MONITORING" is subscribed. | QoSMonitoring\_5G |
| directNotifInd | boolean | 0..1 | Indicates whether the direct event notification is requested.  - true: the direct event notification is requested;  - false (default): the direct event notification is not requested. | ExposureToEAS |
| tscQosReq | TscQosRequirement | 0..1 | Contains the QoS requirements for time sensitive communication. (NOTE 5) | TSC\_5G  XRM\_5G |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 5.2.5.4. | Notification\_websocket |
| events | array(UserPlaneEvent) | 0..N | Corresponds to the list of user plane event(s) to which the SCS/AS requests to subscribe to. | enNB |
| multiModalId | MultiModalId | 0..1 | Multi-modal Service Identifier, as defined in 3GPP TS 29.514 [52]. | MultiMedia |
| multiModDatFlows | map(AsSessionMediaComponent) | 0..N | Each element of the map represents Media Component data for a single-modal data flow(s) of a multi-modal service. The key of the map is the attribute "medCompN". (NOTE 8) | MultiMedia |
| l4sInfo | UplinkDownlinkSupport | 0..1 | Provides L4S support information. | L4S |
| pduSetQos | PduSetQosPara | 0..1 | Contains the PDU Set QoS Parameters which are used to support PDU Set based QoS handling. | PDUSetHandling |
| rTLatencyInd | boolean | 0..1 | Indicates the service data flow needs to meet the Round-Trip (RT) latency requirement of the service, when it is included and set to "true". The default value is "false" if omitted. | RTLatency |
| protoDesc | ProtoDesc | 0..1 | Protocol description for PDU Set identification and end of Data burst indication in UPF | PDUSetHandling  PowerSaving |
| periodInfo | PeriodicityInfo | 0..1 | Indicates the time period between the start of the two data bursts in Uplink and/or Downlink direction. | PowerSaving |
| pdvMon | QosMonitoringInformation | 0..1 | Contains the Packet Delay Variation information for the subscribed report. It shall be present when the event "PACK\_DELAY\_VAR" is subscribed. | EnQoSMon |
| qosDuration | DurationSec | 0..1 | Contains the QoS duration to transfer data traffic transmission (e.g., AI/ML transmission). The minimum value of the QoS duration shall be 60 sec. | QoSTiming\_5G |
| qosInactInt | DurationSec | 0..1 | Contains the QoS inactivity interval for the given data traffic transmission (e.g., AI/ML transmission). The minimum value of the QoS inactivity interval shall be 60 sec. | QoSTiming\_5G |
| rttMon | QosMonitoringInformation | 0..1 | Contains the round-trip delay over two service data flow information for the subscribed report.  It shall be provided for "RT\_DELAY\_TWO\_QOS\_FLOWS" event. | EnQoSMon |
| qosMonDatRate | QosMonitoringInformation | 0..1 | Contains the data rate measurements information for the subscribed report. It shall be present when the event "QOS\_MONITORING" is subscribed and data rate measurements are required.  (NOTE 12) | EnQoSMon  ListUE\_5G |
| avrgWndw | AverWindow | 0..1 | Averaging window for the calculation of the data rate for the service data flow. It may be present when the "qosMonDatRate" attribute is present. | XRM\_5G |
| servAuthInfo | ServAuthInfo | 0..1 | Indicates the authorization result for the QoS monitoring request.  Supplied by the NEF. | EnQoSMon |
| qosMonConReq | QosMonitoringInformation | 0..1 | Contains the requirements of the congestion information (ECN marking percentage) monitoring and reporting. It shall be present when the event "QOS\_MONITORING" is subscribed and congestion information measurements are required. | EnQoSMon |
| listUeConsDtRt | array(IpAddr) | 0..N | Identifies the list of UE addresses subject for Consolidated Data Rate monitoring.  (NOTE 12) | ListUE\_5G |
| NOTE 1: Properties marked with a feature as defined in clause 5.14.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: When the GMEC\_5G feature is not supported, one of "ueIpv4Addr", "ueIpv6Addr" or "macAddr" or "listUeAddrs" shall be included. If ipv4 or ipv6 address is provided, IP flow information shall be provided. If MAC address is provided and the AppId feature is not supported, Ethernet flow information (either "ethFlowInfo", or if the feature EnEthAsSessionQoS\_5G is supported, "enEthFlowInfo") shall be provided. If the AppId feature is supported, one of IP flow information, Ethernet flow information (if EthAsSessionQoS\_5G and/or EnEthAsSessionQoS\_5G is supported) or External Application Identifier shall be provided.  NOTE 3: The property is only applicable for the NEF.  NOTE 4: The attributes "altQoSReferences" and "altQosReqs" are mutually exclusive. The attributes "qosReference" and "altQosReqs" are also mutually exclusive.  NOTE 5: The attributes "reqGbrDl", "reqGbrUl", "reqMbrDl", "reqMbrUl", "maxTscBurstSize", "req5Gsdelay", "reqPer" (if the ExtQoS\_5G feature is supported), and "priority" within the "tscQosReq" attribute may be provided only if the "qosReference" attribute is not provided.  NOTE 6: When the Ethernet flow information is provided and, the EthAsSessionQoS\_5G and EnEthAsSessionQoS\_5G features are supported, either the "ethFlowInfo" or the "enEthFlowInfo" shall be provided, but not both simultenously.  NOTE 7: The "tosTC" attribute of the "flowInfo" attribute may only be present if the "ToSTC\_5G" feature is supported.  NOTE 8: The attributes "exterAppId", "flowInfo", "ethFlowInfo", "enEthFlowInfo", "qosReference", "altQoSReferences", "altQosReqs", "tscQosReq", "qosMonInfo" may be provided only if the "multiModDatFlows" attribute is not provided.  NOTE 9: When the "ListUE\_5G" feature is supported, the "listUeAddrs" attribute shall be provided, and either "exterAppId" attribute or "flowInfo" attribute shall be provided.  NOTE 10: When the GMEC\_5G feature is supported and the target UE(s) are not identified by UE address(es) ("ueIpv4Addr", "ueIpv6Addr", "macAddr", or "listUEAddrs"), the "extGroupId" attribute and the "gpsi" attribute are mutually exclusive. Either one of them shall be provided. If either the "gpsi" attribute or the "extGroupId" attribute are present, then neither the "ueIpv4Addr" attribute, the "ueIpv6Addr" attribute nor the "macAddr" attribute shall be included.  NOTE 11: When the GMEC\_5G feature is supported, either the "exterAppId" attribute, "flowInfo" attribute or Ethernet flow information (either "ethFlowInfo" attribute or "enEthFlowInfo" attribute) shall be provided.  NOTE 12: When the "ListUE\_5G" feature is supported and the "qosMonDatRate" attribute is provided, the "consDataRateThrDl" and "consDataRateThrUl" attributes contained in "qosMonDatRate" attribute indicate the upper bound of the aggregated DL/UL data rate and by default, are applicable to the list of UEs specified by the "listUeAddrs" attribute. If the "listUeConsDtRt" attribute is also provided, then it has to be the subset of "listUeAddrs" attribute. | | | | |

Editor’s Note: It is FFS whether other IEs within the "tscQosReq" attribute than "req5Gsdealy" attribute can apply for multi-modal communication services.

Editor’s Note: It is FFS whether the port number requires the transport protocol (like UDP, TCP) for completion or not.

Editor’s Note: Whether the rttMon attribute is needed or the qosMonInfo attribute can be used instead to convey both, packet delay and RTT measurements information requires further discussion.

Editor’s Note: Whether the applicable reporting frequency for the Data Rate QoS monitoring can be event triggered and/or periodic is FFS.

Editor’s Note: It is FFS whether the QoS monitoring requirements for congestion measurements are different than the ones for packet delay, i.e., it is FFS whether reporting period and reporting frequency apply, or different criteria needs to be applied.

##### 5.14.2.1.3 Type: AsSessionWithQoSSubscriptionPatch

This type represents an AS session request with specific QoS for the service provided by the SCS/AS to the SCEF via T8 interface. The structure is used for PATCH request.

Table 5.14.2.1.3-1: Definition of type AsSessionWithQoSSubscriptionPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| exterAppId | string | 0..1 | Identifies the external Application Identifier. (NOTE 2) (NOTE 8) | AppId  ListUE\_5G |
| flowInfo | array(FlowInfo) | 0..N | Describe the data flow which requires QoS. (NOTE 2)(NOTE 5) (NOTE 8) |  |
| ethFlowInfo | array(EthFlowDescription) | 0..N | Describes Ethernet packet flows. (NOTE 2) | EthAsSessionQoS\_5G |
| enEthFlowInfo | array(EthFlowInfo) | 0..N | Identifies the Ethernet flows which require QoS. Each Ethernet flow consists of a flow identifier and the corresponding UL and/or DL flows.  (NOTE 2) | EnEthAsSessionQoS\_5G |
| listUeAddrs | array(UeAddInfo) | 0..N | Identifies the list of UE address(es).  (NOTE 8) (NOTE 9) | ListUE\_5G |
| qosReference | string | 0..1 | Pre-defined QoS reference. (NOTE 3) (NOTE 4) |  |
| altQoSReferences | array(string) | 0..N | Identifiers an ordered list of pre-defined QoS information. The lower the index of the array for a given entry, the higher the priority. (NOTE 3) | AlternativeQoS\_5G |
| altQosReqs | array(AlternativeServiceRequirementsData) | 1..N | Identifies an ordered list of alternative service requirements that include individual QoS parameter sets. The lower the index of the array for a given entry, the higher the priority. (NOTE 3) | AltQosWithIndParams\_5G |
| disUeNotif | boolean | 0..1 | Indicates whether to disable QoS flow parameters signalling to the UE when the SMF is notified by the NG-RAN of changes in the fulfilled QoS situation. The fulfilled situation is either the QoS profile or an Alternative QoS Profile.  - true: the QoS flow parameters signalling to the UE is disabled;  - false: the QoS flow parameters signalling to the UE is not disabled. | DisableUENotification\_5G |
| usageThreshold | UsageThresholdRm | 0..1 | Time period and/or traffic volume in which the QoS is to be applied. |  |
| qosMonInfo | QosMonitoringInformationRm | 0..1 | Qos Monitoring information. It can be present when the event "QOS\_MONITORING" is subscribed. | QoSMonitoring\_5G |
| directNotifInd | boolean | 0..1 | Indicates whether the direct event notification is requested.  - true: the direct event notification is requested;  - false: the direct event notification is not requested. | ExposureToEAS |
| tscQosReq | TscQosRequirementRm | 0..1 | Contains the QoS requirements for time sensitive communication. (NOTE 4) | TSC\_5G  MultiMedia |
| notificationDestination | Link | 0..1 | Contains the URL to receive the notification event(s) from the SCEF. |  |
| events | array(UserPlaneEvent) | 0..N | Corresponds to the list of user plane event(s) to which the SCS/AS requests to subscribe to. | enNB |
| multiModDatFlows | map(AsSessionMediaComponentRm) | 0..N | Each element of the map represents Media Component data for a single-modal data flow(s) of a multi-modal service. The key of the map is the attribute "medCompN". (NOTE 6) | MultiMedia |
| l4sInfo | UplinkDownlinkSupport | 0..1 | Provides L4S support information. | L4S |
| pduSetQos | PduSetQosParaRm | 0..1 | Contains the PDU Set QoS Parameters which are used to support PDU Set based QoS handling. | PDUSetHandling |
| rTLatencyInd | boolean | 0..1 | Indicates the service data flow needs to meet the Round-Trip (RT) latency requirement of the service, when it is included and set to "true". The default value is "false" if omitted. | RTLatency |
| protoDesc | ProtoDesc | 0..1 | Protocol description for PDU Set identification and end of Data burst indication in UPF | PDUSetHandling  PowerSaving |
| periodInfo | PeriodicityInfo | 0..1 | Indicates the time period between the start of the two data bursts in Uplink and/or Downlink direction. | PowerSaving |
| pdvMon | QosMonitoringInformationRm | 0..1 | Packet Delay Variation information for the subscribed report. | EnQoSMon |
| qosDuration | DurationSecRm | 0..1 | Contains the QoS duration to transfer data transmission (e.g., AI/ML transmission). The minimum value of the QoS duration shall be 60 sec.. | QoSTiming\_5G |
| qosInactInt | DurationSecRm | 0..1 | Contains the QoS inactivity interval for the given data transfer transmission (e.g., AI/ML transmission). The minimum value of the QoS inactivity interval shall be 60 sec. | QoSTiming\_5G |
| rttMon | QosMonitoringInformationRm | 0..1 | Contains the round-trip delay over two QoS flows information for the subscribed report.  It shall be provided for "RT\_DELAY\_TWO\_QOS\_FLOWS" event. | EnQoSMon |
| qosMonDatRate | QosMonitoringInformationRm | 0..1 | Contains the data rate measurements information for the subscribed report. It shall be present when the event "QOS\_MONITORING" is subscribed and data rate measurements are modified.  (NOTE 9) | EnQoSMon  ListUE\_5G |
| avrgWndw | AverWindowRm | 0..1 | Averaging window for the calculation of the data rate for the service data flow. | XRM\_5G |
| qosMonConReq | QosMonitoringInformationRm | 0..1 | Contains the requirements of the congestion information (ECN marking percentage) monitoring and reporting. It shall be present when the event "QOS\_MONITORING" is subscribed and congestion information measurements are required. | EnQoSMon |
| listUeConsDtRt | array(IpAddr) | 0..N | Identifies the list of UE addresses subject for Consolidated Data Rate monitoring.  (NOTE 9) | ListUE\_5G |
| NOTE 1: Properties marked with a feature as defined in clause 5.14.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: One of "exterAppId", "flowInfo" or either "ethFlowInfo" or "enEthFlowInfo" may be provided.  NOTE 3 The attributes "altQoSReferences" and "altQosReqs" are mutually exclusive. The attributes "qosReference" and "altQosReqs" are also mutually exclusive.  NOTE 4: The attributes "reqGbrDl", "reqGbrUl", "reqMbrDl", "reqMbrUl", "maxTscBurstSize", "req5Gsdelay", "reqPer" (if the ExtQoS\_5G feature is supported), and "priority" within the "tscQosReq" attribute may be provided only if the "qosReference" attribute is not provided.  NOTE 5: The "tosTC" attribute of the "flowInfo" attribute may only be present if the "ToSTC\_5G" feature is supported.  NOTE 6: The attributes "exterAppId", "flowInfo", "ethFlowInfo", "enEthFlowInfo", "qosReference", "altQoSReferences", "altQosReqs", "tscQosReq", "qosMonInfo" may be provided only if the "multiModDatFlows" attribute is not provided.  NOTE 8: When the "ListUE\_5G" feature is supported, the "listUeAddrs" attribute may be provided, and/or either "exterAppId" attribute or "flowInfo" attribute may be provided.  NOTE 9: When the "ListUE\_5G" feature is supported and the "qosMonDatRate" attribute is provided, the "consDataRateThrDl" and "consDataRateThrUl" attributes contained in "qosMonDatRate" attribute indicate the upper bound of the aggregated DL/UL data rate and by default, are applicable to the list of UEs specified by the "listUeAddrs" attribute. If the "listUeConsDtRt" attribute is also provided, then it has to be the subset of "listUeAddrs" attribute. | | | | |

Editor’s Note: It is FFS whether other IEs within the "tscQosReq" attribute than "req5Gsdealy" attribute can apply for multi-modal communication services.

Editor’s Note: Whether the applicable reporting frequency for the Data Rate QoS monitoring can be event triggered and/or periodic is FFS.

Editor’s Note: It is FFS whether the QoS monitoring requirements for congestion measurements are different than the ones for packet delay, i.e., it is FFS whether reporting period and reporting frequency apply, or different criteria needs to be applied.

##### 5.14.2.1.4 Type: UserPlaneNotificationData

This type represents the parameters which shall be notify the SCS/AS for user plane event(s).

Table 5.14.2.1.4-1: Definition of the UserPlaneNotificationData data type

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| transaction | Link | 1 | Link to the transaction resource to which this notification is related. |
| eventReports | array(UserPlaneEventReport) | 1..N | Contains the reported event and applicable information |

##### 5.14.2.1.5 Type: UserPlaneEventReport

This type represents an event report for user plane. It shall comply with the provisions defined in table 5.14.2.1.5-1.

Table 5.14.2.1.5-1: Definition of the UserPlaneEventReport data type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| event | UserPlaneEvent | 1 | Indicates the event reported by the SCEF. |  |
| accumulatedUsage | AccumulatedUsage | 0..1 | Contains the applicable information corresponding to the event. |  |
| flowIds | array(integer) | 0..N | Identifies the affected flows that were sent during event subscription. It may be omitted when the reported event applies to all the flows sent during the subscription.  (NOTE 2) |  |
| multiModFlows | array(MultiModalFlows) | 0..N | Each element of the array identifies the flow filters for the multi-modal data flows that were sent during event subscription and that are affected by the reported event. It may be omitted when the reported event applies to all the multi-modal data flows sent during the subscription.  (NOTE 2) | MultiMedia |
| appliedQosRef | string | 0..1 | The currently applied QoS reference (or applied individual QoS parameter set, if AltQosWithIndParams\_5G is supported). Applicable for event QOS\_NOT\_GUARANTEED or SUCCESSFUL\_RESOURCES\_ALLOCATION.  When it is omitted and the "event" attribute is QOS\_NOT\_GUARANTEED, the event report indicates that the lowest priority alternative QoS profile could not be fulfilled either. | AlternativeQoS\_5G, AltQosWithIndParams\_5G |
| altQosNotSuppInd | boolean | 0..1 | It may be set to true when the "event" attribute is QOS\_NOT\_GUARANTEED to indicate that alternative service requirements are not supported by the access network. The default value false shall apply if the attribute is not present. | AltQoSProfilesSupportReport |
| plmnId | PlmnIdNid | 0..1 | PLMN Identifier or the SNPN Identifier.  It may be present when the reported event is "PLMN\_CHG" and which is allowed to be exposured to the AF based on the local policy or local configuration. | enNB\_5G |
| qosMonReports | array(QosMonitoringReport) | 0..N | Contains the QoS Monitoring Reporting information. | QoSMonitoring\_5G |
| pdvMonReports | array(PdvMonitoringReport) | 0..N | Contains the PDV Monitoring Reporting information.  (NOTE 3) | EnQoSMon |
| ratType | RatType | 0..1 | RAT type may be present if applicable, when the notified event is "ACCESS\_TYPE\_CHANGE" and which is allowed to be exposured to the AF based on the local policy or local configuration. | enNB\_5G |
| batOffsetInfo | BatOffsetInfo | 0..1 | The BAT offset and the optionally adjusted periodicity. | EnTSCAC |
| aggrDataRateRpts | array(QosMonitoringReport) | 0..1 | Contains QoS Monitoring for aggregated data rate reporting information. It shall be present when the notified event is "QOS\_MONITORING" and data rate measurements are available. | ListUE\_5G |
| rttMonReports | array(QosMonitoringReport) | 0..N | Round-Trip delay for the indicated UL and DL QoS flows. It shall be present when the notified event is "RT\_DELAY\_TWO\_QOS\_FLOWS". | EnQoSMon |
| qosMonDatRateReps | array(QosMonitoringReport) | 0..1 | Contains QoS Monitoring for data rate reporting information. It shall be present when the notified event is "QOS\_MONITORING" and data rate measurements are available. | EnQoSMon |
| qosMonConInfoReps | array(QosMonitoringReport) | 0..N | Contains QoS Monitoring for congestion information (ECN marking percentage). It shall be present when the notified event is "QOS\_MONITORING" and congestion measurements are available. | EnQoSMon |
| NOTE 1: Properties marked with a feature as defined in clause 5.14.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: The attributes "flowIds" and "multiModFlows" are mutually exclusive.  NOTE 3: The PdvMonitoringReport API does not include the "flows" attribute in this API. | | | | |

Editor’s Note: Whether the rttMonReports attribute is needed or the qosMonReports attribute can be used instead to convey both, packet delay and RTT measurements reports requires further discussion.

Editor’s Note: If the pdvReport can include maximum and minimu UL delay variation and pdmf indication it is FFS whether the QosMonitoringReport can be used instead.

##### 5.14.2.1.6 Type: QosMonitoringInformation

Table 5.14.2.1.6-1: Definition of type QosMonitoringInformation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| reqQosMonParams | array(RequestedQosMonitoringParameter) | 1..N | Indicates the QoS information to be measured, e.g.UL packet delay, DL packet delay and/or round trip packet delay between the UE and the UPF is to be monitored when the QoS Monitoring for packet delay is enabled for the service data flow. |  |
| repFreqs | array(ReportingFrequency) | 1..N | Indicates the frequency for the reporting, such as event triggeredand/or periodic. |  |
| repThreshDl | Uinteger | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for DL packet delay for packet delay or packet delay variation measurement reports. It shall be present when the "reqQosMonParams" attribute includes "DOWNLINK". |  |
| repThreshUl | Uinteger | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for UL packet delay for packet delay or packet delay variation measurement reports. It shall be present when the "reqQosMonParams" attribute includes "UPLINK". |  |
| repThreshRp | Uinteger | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for round trip packet delay for packet delay or packet delay variation measurement reports. It shall be present when the "reqQosMonParams" attribute includes "ROUND\_TRIP". |  |
| conThreshDl | Uinteger | 0..1 | Indicates the downlink threshold for congestion reporting, i.e. for the reporting of the received ECN marking percentage for DL. Only applicable when the "repFreqs" attribute is not supplied or the "repFreqs" is set to "EVENT\_DETECTION".  Minimum = 0%. | EnQoSMon |
| conThreshUl | Uinteger | 0..1 | Indicates the uplink threshold for the congestion reporting, i.e. for the reporting of the received ECN marking percentage for UL. Only applicable when the "repFreqs" attribute is not supplied or the "repFreqs" is set to "EVENT\_DETECTION".  Minimum = 0%. | EnQoSMon |
| waitTime | DurationSec | 0..1 | Indicates the minimum waiting time between subsequent reports. It shall be present when the "repFreqs" attribute includes "EVENT\_TRIGGERED". |  |
| repPeriod | DurationSec | 0..1 | Indicates the time interval between successive reporting. It shall be present when the "repFreqs" attribute includes "PERIODIC".  If the feature "PacketDelayFailureReport" is supported, it also indicates the time interval at which a measurement failure needs to be reported if no measurement result is provided. It shall be present when the "repFreqs" attribute includes "PERIODIC" or "EVENT\_TRIGGERED". |  |
| repThreshDatRateDl | BitRate | 0..1 | Indicates the bit rate threshold for the DL. It shall be present when the "reqQosMonParams" attribute includes "DOWNLINK\_DATA\_RATE". | EnQoSMon |
| repThreshDatRateUl | BitRate | 0..1 | Indicates the bit rate threshold for the UL. It shall be present when the "reqQosMonParams" attribute includes "UPLINK\_DATA\_RATE". | EnQoSMon |
| consDataRateThrDl | BitRate | 0..1 | Indicates the Downlink Consolidated Data Rate Threshold. | ListUE\_5G |
| consDataRateThrUl | BitRate | 0..1 | Indicates the Uplink Consolidated Data Rate Threshold. | ListUE\_5G |

Editor’s Note: It is FFS whether the event reporting frequency applies for congestion (ECN marking percentage) information.

##### 5.14.2.1.7 Type: QosMonitoringInformationRm

This type represents a QoS Monitoring Information which is defined in clause 5.14.2.1.7 but defined with "nullable: true" property so it can be removed in "JSON Merge Patch", as defined in IETF RFC 7396 [39]. It shall comply with the provisions defined in table 5.14.2.1.7-1.

Duration and volume are also removable in "JSON Merge Patch".

Table 5.14.2.1.7-1: Definition of type QosMonitoringInformationRm

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| reqQosMonParams | array(RequestedQosMonitoringParameter) | 0..N | Indicates the QoS information to be measured, e.g.UL packet delay, DL packet delay and/or round trip packet delay between the UE and the UPF is to be monitored when the QoS Monitoring for packet delay is enabled for the service data flow. |  |
| repFreqs | array(ReportingFrequency) | 0..N | Indicates the frequency for the reporting, such as event triggeredand/or periodic. |  |
| repThreshDl | UintegerRm | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for DL packet delay for packet delay or packet delay variation measurement reports. It shall be present when the "reqQosMonParams" attribute includes "DOWNLINK". |  |
| repThreshUl | UintegerRm | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for UL packet delay for packet delay or packet delay variation measurement reports. It shall be present when the "reqQosMonParams" attribute includes "UPLINK". |  |
| repThreshRp | UintegerRm | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for round trip packet delay for packet delay or packet delay variation measurement reports. It shall be present when the "reqQosMonParams" attribute includes "ROUND\_TRIP". |  |
| conThreshDl | UintegerRm | 0..1 | Indicates the downlink threshold for congestion reporting, i.e. for the reporting of the received ECN marking percentage for DL. Only applicable when the "repFreqs" attribute is not supplied or the "repFreqs" is set to "EVENT\_DETECTION".  Minimum = 0%. | EnQoSMon |
| conThreshUl | UintegerRm | 0..1 | Indicates the uplink threshold for congestion reporting, i.e. for the reporting of the received ECN marking percentage for UL. Only applicable when the "repFreqs" attribute is not supplied or the "repFreqs" is set to "EVENT\_DETECTION".  Minimum = 0%. | EnQoSMon |
| waitTime | DurationSecRm | 0..1 | Indicates the minimum waiting time between subsequent reports. It shall be present when the "repFreqs" attribute includes "EVENT\_TRIGGERED". |  |
| repPeriod | DurationSecRm | 0..1 | Indicates the time interval between successive reporting. It shall be present when the "repFreqs" attribute includes "PERIODIC".  If the feature "PacketDelayFailureReport" is supported, it also indicates the time interval at which a measurement failure needs to be reported if no measurement result is provided. It shall be present when the "repFreqs" attribute includes "PERIODIC" or "EVENT\_TRIGGERED". |  |
| repThreshDatRateDl | BitRateRm | 0..1 | Indicates the bit rate threshold for the DL. It shall be present when the "reqQosMonParams" attribute includes "DOWNLINK\_DATA\_RATE". | EnQoSMon |
| repThreshDatRateUl | BitRateRm | 0..1 | Indicates the bit rate threshold for the UL. It shall be present when the "reqQosMonParams" attribute includes "UPLINK\_DATA\_RATE". | EnQoSMon |
| consDataRateThrDl | BitRateRm | 0..1 | Indicates the Downlink Consolidated Data Rate Threshold. | ListUE\_5G |
| consDataRateThrUl | BitRateRm | 0..1 | Indicates the Uplink Consolidated Data Rate Threshold. | ListUE\_5G |

Editor’s Note: It is FFS whether the event reporting frequency applies for congestion (ECN marking percentage) information.

##### 5.14.2.1.8 Type: QosMonitoringReport

Table 5.14.2.1.8-1: Definition of type QosMonitoringReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| ulDelays | array(Uinteger) | 0..N | Uplink packet delay in units of milliseconds. (NOTE 1) |  |
| dlDelays | array(Uinteger) | 0..N | Downlink packet delay in units of milliseconds. (NOTE 1) |  |
| rtDelays | array(Uinteger) | 0..N | Round trip delay in units of milliseconds. (NOTE 1) |  |
| pdmf | boolean | 0..1 | Packet delay measurement failure indicator. When set to true, it indicates that a packet delay failure has occurred.  Default value is false if omitted. (NOTE 2) | PacketDelayFailureReport |
| ulDataRate | BitRate | 0..1 | UL data rate.  (NOTE 3) | EnQoSMon |
| dlDataRate | BitRate | 0..1 | DL data rate.  (NOTE 3) | EnQoSMon |
| ulAggrDataRate | BitRate | 0..1 | Indicates the uplink aggregated Data Rate for the applicable list of UEs provided by AF. | ListUE\_5G |
| dlAggrDataRate | BitRate | 0..1 | Indicates the downlink aggregated Data Rate for the applicable list of UEs provided by AF. | ListUE\_5G |
| ulConInfo | Uinteger | 0..1 | Uplink congestion information, i.e., percentage of ECN marked packets for the UL. | EnQoSMon |
| dlConInfo | Uinteger | 0..1 | Downlink congestion information, i.e., percentage of ECN marked packets for the DL. | EnQoSMon |
| cimf | boolean | 0..1 | Represents the congestion information measurement failure indicator. When set to "true", it indicates that a congestion information measurement failure has occurred. Default value is "false" if omitted. | EnQoSMon |
| NOTE 1: In this release of the specification the maximum number of elements in the array is 2.  NOTE 2: When the "pdmf" attribute is set to true, "ulDelays", "dlDelays" and "rtDelays" and when the feature "EnQoSMon" is supported, "ulDataRate" and "dlDataRate" shall not be present.  NOTE 3: When the "ulDataRate" and/or the "dlDataRate" attribute are included, the parameters related to packet delay and/or congestion information shall not be present. | | | | |

Editor’s Note: The presence conditions of the parameters of QosMonitoringReport are to be consolidated/detailed once all the possible reports are specified.

Editor’s Note: Whether the maximum and minimum data rate measurements are reported for the data rates calculated during the waiting time is FFS.

Editor's Note: It is FFS whether the "cimf" attribute is needed.

Editor's Note: Whether the "ulCongInfo" and "dlCongInfo" attributes are single or plural is FFS.

##### 5.14.2.1.9 Type: TscQosRequirement

Table 5.14.2.1.9-1: Definition of type TscQosRequirement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| reqGbrDl | BitRate | 0..1 | Requested GBR in downlink. |  |
| reqGbrUl | BitRate | 0..1 | Requested GBR in uplink. |  |
| reqMbrDl | BitRate | 0..1 | Requested MBR in downlink. |  |
| reqMbrUl | BitRate | 0..1 | Requested MBR in uplink. |  |
| maxTscBurstSize | ExtMaxDataBurstVol | 0..1 | Maximum burst size of the TSC traffic in units of Bytes. Minimum = 4096, Maximum = 2000000. |  |
| req5Gsdelay | PacketDelBudget | 0..1 | Requested Delay of the TSC traffic. |  |
| reqPer | PacketErrRate | 0..1 | Requested Packet Error Rate of the TSC traffic. | ExtQoS\_5G |
| priority | TscPriorityLevel | 0..1 | Unsigned integer indicating the TSC traffic priority in relation to other TSC and non-TSC traffic. |  |
| tscaiTimeDom | Uinteger | 0..1 | Indicates the (g)PTP domain that the (TSN)AF is located in. |  |
| tscaiInputUl | TscaiInputContainer | 0..1 | Transports the input parameters for TSC traffic to construct the TSC Assistance Container in uplink direction.  (NOTE) |  |
| tscaiInputDl | TscaiInputContainer | 0..1 | Transports the input parameters for TSC traffic to construct the TSC Assistance Container in downlink direction.  (NOTE) |  |
| capBatAdaptation | boolean | 0..1 | Indicates the capability for AF to adjust the burst sending time, when it is supported and set to "true".  The default value is "false" if omitted.  (NOTE) | EnTSCAC |
| NOTE: The "burstArrivalTimeWnd" attribute, within the "tscaiInputUl" and/or "tscaiInputDl" attributes, and the "capBatAdaptation attribute are mutually exclusive. | | | | |

##### 5.14.2.1.10 Type: TscQosRequirementRm

Table 5.14.2.1.10-1: Definition of type TscQosRequirementRm

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| reqGbrDl | BitRateRm | 0..1 | Requested GBR in downlink. |  |
| reqGbrUl | BitRateRm | 0..1 | Requested GBR in uplink. |  |
| reqMbrDl | BitRateRm | 0..1 | Requested MBR in downlink. |  |
| reqMbrUl | BitRateRm | 0..1 | Requested MBR in uplink. |  |
| maxTscBurstSize | ExtMaxDataBurstVolRm | 0..1 | Maximum burst size of the TSC traffic in units of Bytes. Minimum = 4096, Maximum = 2000000. |  |
| req5Gsdelay | PacketDelBudgetRm | 0..1 | Requested Delay of the TSC traffic. |  |
| reqPer | PacketErrRateRm | 0..1 | Requested Packet Error Rate of the TSC traffic. | ExtQoS\_5G |
| priority | TscPriorityLevelRm | 0..1 | Unsigned integer indicating the TSC traffic priority in relation to other TSC and non-TSC traffic. |  |
| tscaiTimeDom | UintegerRm | 0..1 | Indicates the (g)PTP domain that the (TSN)AF is located in. |  |
| tscaiInputUl | TscaiInputContainer | 0..1 | Transports the input parameters for TSC traffic to construct the TSC Assistance Container in uplink direction.  (NOTE) |  |
| tscaiInputDl | TscaiInputContainer | 0..1 | Transports the input parameters for TSC traffic to construct the TSC Assistance Container in downlink direction.  (NOTE) |  |
| capBatAdaptation | boolean | 0..1 | Indicates the capability for AF to adjust the burst sending time, when it is supported and set to "true".  The default value is "false" if omitted.  (NOTE) | EnTSCAC |
| NOTE: The "burstArrivalTimeWnd" attribute, within the "tscaiInputUl" and/or "tscaiInputDl" attributes, and the "capBatAdaptation attribute are mutually exclusive. | | | | |

##### 5.14.2.1.11 Type AdditionalInfoAsSessionWithQos

Table 5.14.2.1.11-1: Definition of type AdditionalInfoAsSessionWithQos

| Attribute name | Data type | P | Cardinality | Description | Applicability |
| --- | --- | --- | --- | --- | --- |
| acceptableServInfo | AcceptableServiceInfo | O | 0..1 | Describes information related to the acceptable service information, i.e., the maximum acceptable bandwidth for an AF session and/or for specific media components. |  |

##### 5.14.2.1.12 Type: ProblemDetailsAsSessionWithQos

Table 5.14.2.1.12-1: Definition of type ProblemDetailsAsSessionWithQos as a list of to be combined data types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Description | Applicability |
| ProblemDetails | 1 | Problem details as specified in clause 5.2.12.12 to include an error response |  |
| AdditionalInfoAsSessionWithQos | 1 | Describes additional error information specific for this API. |  |

##### 5.14.2.1.13 Type AsSessionMediaComponent

This type represents media component data for a single-modal data flow of a multi-modal service. It shall comply with the provisions defined in table 5.14.2.1.13-1.

Table 5.14.2.1.13-1: Definition of type AsSessionMediaComponent

| Attribute name | Data type | Cardinality | Description | Applicability |
| --- | --- | --- | --- | --- |
| flowInfos | array(FlowInfo) | 0..N | Contains the IP data flow(s) description for a single-modal data flow. |  |
| qosReference | string | 0..1 | Identifies a pre-defined QoS information. |  |
| altSerReqs | array(string) | 0..N | Ordered list of alternative service requirements that include a set of QoS references. The lower the index of the array for a given entry, the higher the priority.(NOTE) |  |
| altSerReqsData | array(AlternativeServiceRequirementsData) | 0..N | Ordered list of alternative service requirements that include individual QoS parameter sets. The lower the index of the array for a given entry, the higher the priority. (NOTE) |  |
| disUeNotif | boolean | 0..1 | Indicates to disable QoS flow parameters signalling to the UE when the SMF is notified by the NG-RAN of changes in the fulfilled QoS situation when it is included and set to "true". The fulfilled situation is either the QoS profile or an Alternative QoS Profile. The default value "false" shall apply, if the attribute is not present and has not been supplied previously. |  |
| medCompN | integer | 1 | Identifies the media component number, and it contains the ordinal number of the media component. |  |
| medType | MediaType | 0..1 | Indicates the media type of the service. |  |
| marBwUl | BitRate | 0..1 | Maximum requested bandwidth for the Uplink. |  |
| marBwDl | BitRate | 0..1 | Maximum requested bandwidth for the Downlink. |  |
| mirBwUl | BitRate | 0..1 | Minimum requested bandwidth for the Uplink. |  |
| mirBwDl | BitRate | 0..1 | Minimum requested bandwidth for the Downlink. |  |
| tsnQos | TsnQoSContainer | 0..1 | Transports QoS parameters for TSC traffic. |  |
| tscaiInputUl | TscaiInputContainer | 0..1 | Transports TSCAI input parameters for TSC traffic at the ingress interface of the DS-TT/UE (uplink flow direction). |  |
| tscaiInputDl | TscaiInputContainer | 0..1 | Transports TSCAI input parameters for TSC traffic at the ingress of the NW-TT (downlink flow direction). |  |
| rTLatencyReq | boolean | 0..1 | Indicates the service data flow needs to meet the Round-Trip (RT) latency requirement of the service, when it is included and set to "true".  The default value is "false" if omitted. |  |
| pduSetQos | PduSetQosPara | 0..1 | PDU Set QoS parameters for XRM traffic. |  |
| evSubsc | EventsSubscReqData | 0..1 | Identifies the events the application subscribes to at creation of a media component. (NOTE) | EnQoSMon |
| NOTE: If attribute "evSubsc" is present, one or more of the following IEs may be included: "events", "notifUri", "reqQosMonParams", "qosMon", "qosMonDatRate", "pdvReqMonParams", "pdvMon", "congestMon", "notifCorreId", "afAppIds", "directNotifInd", "avrgWndw". In addition, when present the attribute "events", one or more of the following Enumeration "AfEvent" may be included: "QOS\_MONITORING", "PACK\_DEL\_VAR", "RT\_DELAY\_TWO\_QOS\_FLOWS". | | | | |

Editor’s Note: the list of IEs of a AsSessionMediaComponent to complete the QoS parameters developed for the MediaComponent data defined in TS 29.514 and applicable to external AFs is FFS.

Editor’s Note: It is FFS whether the notifUri and notifCorreId attributes may be required for the evSubsc attribute.

##### 5.14.2.1.14 Type AsSessionMediaComponentRm

This type represents the AsSessionMediaComponent with the "nullable: true" property. It shall comply with the provisions defined in table 5.14.2.1.14-1

Table 5.14.2.1.14-1: Definition of type AsSessionMediaComponentRm

| Attribute name | Data type | Cardinality | Description | Applicability |
| --- | --- | --- | --- | --- |
| flowInfos | array(FlowInfo) | 0..N | Contains the IP data flow(s) description for a single-modal data flow. |  |
| qosReference | string | 0..1 | Identifies a pre-defined QoS information. |  |
| altSerReqs | array(string) | 0..N | Ordered list of alternative service requirements that include a set of QoS references. The lower the index of the array for a given entry, the higher the priority.(NOTE) |  |
| altSerReqsData | array(AlternativeServiceRequirementsData) | 0..N | Ordered list of alternative service requirements that include individual QoS parameter sets. The lower the index of the array for a given entry, the higher the priority. (NOTE) |  |
| disUeNotif | boolean | 0..1 | Indicates to disable QoS flow parameters signalling to the UE when the SMF is notified by the NG-RAN of changes in the fulfilled QoS situation when it is included and set to "true". The fulfilled situation is either the QoS profile or an Alternative QoS Profile. The default value "false" shall apply, if the attribute is not present and has not been supplied previously. |  |
| medCompN | integer | 1 | Identifies the media component number, and it contains the ordinal number of the media component. |  |
| medType | MediaType | 0..1 | Indicates the media type of the service. |  |
| marBwUl | BitRateRm | 0..1 | Maximum requested bandwidth for the Uplink. |  |
| marBwDl | BitRateRm | 0..1 | Maximum requested bandwidth for the Downlink. |  |
| mirBwUl | BitRateRm | 0..1 | Minimum requested bandwidth for the Uplink. |  |
| mirBwDl | BitRateRm | 0..1 | Minimum requested bandwidth for the Downlink. |  |
| tsnQos | TsnQoSContainerRm | 0..1 | Transports QoS parameters for TSC traffic. |  |
| tscaiInputUl | TscaiInputContainer | 0..1 | Transports TSCAI input parameters for TSC traffic at the ingress interface of the DS-TT/UE (uplink flow direction). |  |
| tscaiInputDl | TscaiInputContainer | 0..1 | Transports TSCAI input parameters for TSC traffic at the ingress of the NW-TT (downlink flow direction). |  |
| rTLatencyReq | boolean | 0..1 | Indicates the service data flow needs to meet the Round-Trip (RT) latency requirement of the service, when it is included and set to "true". |  |
| pduSetQos | PduSetQosPara | 0..1 | PDU Set QoS parameters for XRM traffic. |  |
| evSubsc | EventsSubscReqDataRm | 0..1 | Identifies the events the application subscribes to at creation of a media component. (NOTE) | EnQoSMon |
| NOTE: If attribute "evSubsc" is present, one or more of the following IEs may be included: "events", "notifUri", "reqQosMonParams", "qosMon", "qosMonDatRate", "pdvReqMonParams", "pdvMon", "congestMon", "notifCorreId", "afAppIds", "directNotifInd", "avrgWndw". In addition, when present the attribute "events", one or more of the following Enumeration "AfEvent" may be included: "QOS\_MONITORING", "PACK\_DEL\_VAR", "RT\_DELAY\_TWO\_QOS\_FLOWS". | | | | |

Editor’s Note: It is FFS whether the notifUri and notifCorreId attributes may be required for the evSubsc attribute.

##### 5.14.2.1.15 Type: MultiModalFlows

This type represents a flow information within a single-modal data flow. It shall comply with the provisions defined in table 5.14.2.1.15-1.

Table 5.14.2.1.15-1: Definition of the type MultiModalFlows

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| medCompN | integer | 1 | It contains the ordinal number of the single-modal data flow. Identifies the single-modal data flow |
| flowIds | array(integer) | 0..N | Identifies the affected flows within the single-modal data flow (identified by the medCompN attribute). It may be omitted when all flows are affected. |

##### 5.14.2.1.16 Type: UeAddInfo

This type represents UEs Address information. It shall comply with the provisions defined in table 5.14.2.1.16-1.

Table 5.14.2.1.16-1: Definition of the type UeAddInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| ueIpAddr | IpAddr | 1 | Identifies the UE IP address. |  |
| portNumber | Port | 0..1 | Indicates the UDP or TCP port number associated with the UE IP address as provided in the "ueIpAddr" attribute |  |

#### 5.14.2.2 Referenced simple data types and enumerations

##### 5.14.2.2.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 5.2.1 can be referenced.

##### 5.14.2.2.2 Simple data types

The simple data types defined in table 5.14.2.2.2-1 shall be supported.

Table 5.14.2.2.2-1: Simple data types

|  |  |
| --- | --- |
| Type name | Description |
|  |  |

##### 5.14.2.2.3 Enumeration: UserPlaneEvent

The enumeration UserPlaneEvent represents the user plane event.

Table 5.14.2.2.3-1: Enumeration UserPlaneEvent

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE) |
| SESSION\_TERMINATION | Indicates that Rx session is terminated. |  |
| LOSS\_OF\_BEARER | Indicates a loss of a bearer. (NOTE 3) |  |
| RECOVERY\_OF\_BEARER | Indicates a recovery of a bearer. (NOTE 3) |  |
| RELEASE\_OF\_BEARER | Indicates a release of a bearer. (NOTE 3) |  |
| USAGE\_REPORT | Indicates the usage report event. |  |
| FAILED\_RESOURCES\_ALLOCATION | Indicates the resource allocation is failed. |  |
| SUCCESSFUL\_RESOURCES\_ALLOCATION | Indicates the resource allocation is successful. |  |
| QOS\_GUARANTEED | The QoS targets of one or more SDFs are guaranteed again. | AlternativeQoS\_5G |
| QOS\_NOT\_GUARANTEED | The QoS targets of one or more SDFs are not being guaranteed. | AlternativeQoS\_5G |
| QOS\_MONITORING | Indicates a QoS monitoring event. | QoSMonitoring\_5G |
| ACCESS\_TYPE\_CHANGE | Indicates an Access type change. (NOTE 2) | enNB\_5G |
| PLMN\_CHG | Indicates a PLMN change. (NOTE 2) | enNB\_5G |
| L4S\_NOT\_AVAILABLE | The ECN marking for L4S of one or more SDFs is not available. | L4S |
| L4S\_AVAILABLE | The ECN marking for L4S of one or more SDFs is available again. | L4S |
| BAT\_OFFSET\_INFO | Indicates the network provided BAT offset and the optionally adjusted periodicity. | EnTSCAC |
| RT\_DELAY\_TWO\_QOS\_FLOWS | Indicates round-trip delay on UL and DL flows over two QoS flows. | EnQoSMon |
| PACK\_DELAY\_VAR | Indicates Packet Delay Variation is enabled for the SDF. | EnQoSMon |
| NOTE 1: Properties marked with a feature as defined in clause 5.14.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: The exposure of such network information to the AF needs to be authorized based on the local policy or local configuration.  NOTE 3: The "LOSS\_OF\_BEARER", RECOVERY\_OF\_BEARER, and RELEASE\_OF\_BEARER only apply to 4G. | | |

### 5.14.3 Resource structure

#### 5.14.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-as-session-with-qos/v1**

"apiRoot" is set as described in clause 5.2.4. "apiName" shall be set to "3gpp**-**as**-**session**-**with**-**qos" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.14.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| AS Session with Required QoS Subscriptions | /{scsAsId}/subscriptions | GET | Get all or queried subscription resources for a given SCS/AS. |
| POST | Create a new AS session. |
| Individual AS Session with Required QoS Subscription | /{scsAsId}/subscriptions/{subscriptionId} | GET | Read a subscription resource for a given SCS/AS and a subscription Id. |
| PUT | Modify a subscription resource for a given SCS/AS and a subscription Id. |
| PATCH | Modify a subscription resource for a given SCS/AS and a subscription Id. |
| DELETE | Delete a subscription resource for a given SCS/AS and a subscription Id. |

#### 5.14.3.2 Resource: AS Session with Required QoS subscriptions

##### 5.14.3.2.1 Introduction

This resource allows the SCS/AS to read all active AS session with required QoS subscription resources, or create a new subscription resource for the SCS/AS.

##### 5.14.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-as-session-with-qos/v1/{scsAsId}/subscriptions**

This resource shall support the resource URI variables defined in table 5.14.3.2.2-1.

Table 5.14.3.2.2-1: Resource URI variables for resource "AS Session with Required QoS Subscriptions"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.14.3.2.3 Resource methods

###### 5.14.3.2.3.1 GET

The GET method allows to read all or queried active subscriptions for a given SCS/AS. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.14.3.2.3.1-1 and table 5.14.3.2.3.1-2.

Table 5.14.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks | Applicability |
| ip-addrs | array(IpAddr) | 0..N | The IP address(es) of the requested UE(s). | enNB |
| ip-domain | string | 0..1 | The IPv4 address domain identifier.  The attribute may only be provided if IPv4 address is included in the ip-addrs query parameter. | enNB |
| mac-addrs | array(MacAddr48) | 0..N | The MAC address(es) of the requested UE(s). | enNB |
| NOTE: Either the "ip-addrs" parameter or the "mac-addrs" parameter may be provided at the same time. If multiple elements are provided in the array structure, then each element shall be treated as a separate query parameter. | | | | |

Table 5.14.3.2.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(AsSessionWithQoSSubscription) | 0..N | 200 OK | The subscription information related to the request URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.14.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.14.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.14.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.14.3.2.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.14.3.2.3.4 POST

The POST method creates a new subscription resource for a given SCS/AS. The SCS/AS shall initiate the HTTP POST request message and the SCEF shall respond to the message. The SCEF shall construct the URI of the created resource using that URI.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.14.3.2.3.4-1 and table 5.14.3.2.3.4-2.

Table 5.14.3.2.3.4-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
|  |  |  |  |

Table 5.14.3.2.3.4-2: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| AsSessionWithQoSSubscription | 1 | Parameters to create a subscription for an AS session with required QoS for the service requirement. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| AsSessionWithQoSSubscription | 1 | 201  Created | The subscription was created successfully.  The URI of the created resource shall be returned in the "Location" HTTP header. |
| ProblemDetailsAsSessionWithQos | 0..1 | 403 Forbidden | (NOTE 2) |
| ProblemDetails | 0..1 | 500 Internal Server Error | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.14.5.3. | | | | |

Table 5.14.3.2.3.4-3: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-as-session-with-qos/v1/{scsAsId}/subscriptions/{subscriptionId} |

Table 5.14.3.2.3.4-4: Headers supported by the 403 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Retry-After | string | M | 1 | Indicates the time the NF service consumer has to wait before making a new request. |

###### 5.14.3.2.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.14.3.3 Resource: Individual AS Session with Required QoS Subscription

##### 5.14.3.3.1 Introduction

This resource allows an SCS/AS to query, update and delete an AS session with required QoS subscription.

##### 5.14.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-as-session-with-qos/v1/{scsAsId}/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 5.14.3.3.2-1.

Table 5.14.3.2.2-1: Resource URI variables for resource "Individual AS Session with Required QoS Subscription"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS of type ScsAsId. |
| subscriptionId | string | Identifier of the subscription resource of type string. The subscriptionId corresponds to the stage 2 TLTRI. |

##### 5.14.3.3.3 Resource methods

###### 5.14.3.3.3.1 GET

The GET method allows to read a subscription resource. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.14.3.3.3.1-1 and table 5.14.3.3.3.1-2.

Table 5.14.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
|  |  |  |  |

Table 5.14.3.3.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| AsSessionWithQoSSubscription | 1 | 200 OK | The subscription information related to the resource URI is returned. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.14.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.14.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.14.3.3.3.2 PUT

The PUT method allows changing the service information of an active subscription. The properties "ueIpv4Addr" or "ueIpv6Addr" shall remain unchanged from previously provided value.

This method shall support request and response data structures, and response codes, as specified in the table 5.14.3.3.3.2-1.

Table 5.14.3.3.3.2-1: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| AsSessionWithQoSSubscription | 1 | Set up AS session with required QoS. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| AsSessionWithQoSSubscription | 1 | 200 OK | The subscription was modified successfully.  The SCEF shall return an updated subscription in the response content. |
| none |  | 204 No Content | The subscription was updated successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetailsAsSessionWithQos | 0..1 | 403 Forbidden | (NOTE 2) |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.14.5.3. | | | | |

Table 5.14.3.3.3.2-2: 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 SCEF. |

Table 5.14.3.3.3.2-3: 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 SCEF. |

Table 5.14.3.3.3.2-4: Headers supported by the 403 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Retry-After | string | M | 1 | Indicates the time the NF service consumer has to wait before making a new request. |

###### 5.14.3.3.3.3 PATCH

The PATCH method allows to change the service information of an active subscription.

This method shall support request and response data structures, and response codes, as specified in the table 5.14.3.3.3.3-1.

Table 5.14.3.3.3.3-1: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| AsSessionWithQoSSubscriptionPatch | 1 | Partial update of an AS session with required QoS. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| AsSessionWithQoSSubscription | 1 | 200 OK | The subscription was modified successfully.  The SCEF shall return an updated subscription in the response content. |
| none |  | 204 No Content | The subscription was modified successfully. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| ProblemDetailsAsSessionWithQos | 0..1 | 403 Forbidden | (NOTE 2) |
| ProblemDetails | 0..1 | 403 Forbidden | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply.  NOTE 2: Failure cases are described in clause 5.14.5.3. | | | | |

Table 5.14.3.3.3.3-2: 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 SCEF. |

Table 5.14.3.3.3.3-3: 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 SCEF. |

Table 5.14.3.3.3.3-4: Headers supported by the 403 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Retry-After | string | M | 1 | Indicates the time the NF service consumer has to wait before making a new request. |

###### 5.14.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.14.3.3.3.5 DELETE

The DELETE method deletes the AsSessionWithQoSSubscription resource and terminates the related subscription. The SCS/AS shall initiate the HTTP DELETE request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.14.3.3.3.5-1 and table 5.14.3.3.3.5-2.

Table 5.14.3.3.3.5-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
|  |  |  |  |

Table 5.14.3.3.3.5-2: Data structures supported by the DELETE request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The subscription was terminated successfully.  The response body shall be empty. |
| UserPlaneNotificationData | 1 | 200 OK | The subscription was terminated successfully. The user plane notification data shall be included in the response. |
| none |  | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.14.3.3.3.5-3: Headers supported by the 307 Response Code on this resource

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

Table 5.14.3.3.3.5-4: Headers supported by the 308 Response Code on this resource

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

#### 5.14.3.4 Void

### 5.14.3A Notifications

#### 5.14.3A.1 General

The notifications provided by the AsSessionWithQoS API are specified in this clause.

Table 5.14.3A-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| Event Notification | {notificationUri} | POST | Notify the bearer level event(s) from the SCEF to the SCS/AS |

#### 5.14.3A.2 Event Notification

##### 5.14.3A.2.1 Description

The Event Notification allows the SCEF to notify the SCS/AS of the bearer level event(s).

##### 5.14.3A.2.2 Target URI

The Callback URI **"{**notificationUri**}"** shall be used with the callback URI variables defined in table 5.14.3A.2.2-1.

Table 5.14.3A.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notificationUri | Link | Reference provided by the SCS/AS when the SCS/AS requests to sponsor the traffic from the beginning or to become the chargeable party at a later point.  This URI shall be provided within the "notificationDestination" attribute in the AsSessionWithQoSSubscription type. |

##### 5.14.3A.2.3 Standard Methods

###### 5.14.3A.2.3.1 Notification via POST

The POST method allows to notify SCS/AS of the bearer level event(s) by the SCEF and the SCS/AS shall respond to the message.

This method shall support the request data structures specified in table 5.14.3A.2.3.1-1 and the response data structures and response codes specified in table 5.14.3A.2.3.1-2.

Table 5.14.3A.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| UserPlaneNotificationData | 1 | Representation of the bearer level notification. |

Table 5.14.3A.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Cardinality | Response codes | Description |
| none |  | 204 No Content | This case represents a successful notification of bearer level event(s). |
| none |  | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none |  | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | |

Table 5.14.3A.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.14.3A.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

###### 5.14.3A.2.3.2 Notification via Websocket

If supported by both SCS/AS and SCEF and successfully negotiated, the UserPlaneNotificationData may alternatively be delivered through the Websocket mechanism as defined in clause 5.2.5.4.

### 5.14.4 Used Features

The table below defines the features applicable to the AsSessionWithQoS API. Those features are negotiated as described in subclause 5.2.7.

**Table 5.14.4-1: Features used by AsSessionWithQoS API**

|  |  |  |
| --- | --- | --- |
| **Feature Number** | **Feature** | **Description** |
| 1 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 2 | Notification\_test\_event | The testing of notifications connections is supported according to clause 5.2.5.3. |
| 3 | EthAsSessionQoS\_5G | Setting up required QoS for Ethernet UE. This feature may only be supported in 5G. |
| 4 | MacAddressRange\_5G | Indicates the support of a set of MAC addresses with a specific range in the traffic filter. This feature may only be supported in 5G. |
| 5 | AlternativeQoS\_5G | Indicates the support of alternative QoS requirements and the QoS notification (i.e. whether the QoS targets for SDF(s) are not guaranteed or guaranteed again). This feature may only be supported in 5G. |
| 6 | QoSMonitoring\_5G | Indicates the support of QoS Monitoring functionality and the report for packet delay monitoring. This feature may only be supported in 5G. |
| 7 | DisableUENotification\_5G | Indicates the support of disabling QoS flow parameters signalling to the UE when the SMF is notified by the NG-RAN of changes in the fulfilled QoS situation. This feature may only be supported in 5G. This feature requires that the AlternativeQoS\_5G feature is also supported. |
| 8 | TSC\_5G | Indicates the support of Time Sensitive Communication. This feature may only be supported in 5G. |
| 9 | AppId | Indicates the support of dynamically providing the Application Identifier via the API. |
| 10 | ExposureToEAS | This feature indicates the support of direct notification in 5GC. This feature requires that the QoSMonitoring\_5G feature is also supported. |
| 11 | enNB | Indicates the support of enhancements to the northbound interfaces. |
| 12 | AltQosWithIndParams\_5G | This feature indicates the support of provisioning Alternative Service Requirements with individual QoS parameters. This feature requires that the AlternativeQoS\_5G feature is also supported. |
| 13 | EnEthAsSessionQoS\_5G | Indicates the support of required QoS for Ethernet UE, allowing to indicate separately different UL and/or DL Ethernet flows. This feature may only be supported in 5G. |
| 14 | enNB\_5G | Indicates the support of enhancements to the northbound interfaces and only applicable to 5G. |
| 15 | PacketDelayFailureReport | Indicates the support of packet delay failure report as part of QoS Monitoring procedures. This feature requires that QoSMonitoring\_5G is supported. This feature may only be supported in 5G. |
| 16 | ToSTC\_5G | Indicates the support of Type of Service or Traffic Class. This feature may only be supported in 5G. |
| 17 | EnTSCAC | Indicates the support of extensions to TSCAC and the RAN feedback for BAT offset and adjusted periodicity.  This feature may only be supported in 5G, and requires that the TSC\_5G feature is also supported. |
| 18 | AltQoSProfilesSupportReport | This feature indicates the support of the report of whether Alternative QoS parameters are supported by the access network. This feature requires that AlternativeQoS\_5G and/or AltQosWithIndParams\_5G features are also supported. |
| 19 | ExtQoS\_5G | This feature indicates the support of extended QoS parameters. This feature may only be supported in 5G. |
| 20 | MultiMedia | Indicates the support for multi-modal or multimedia flows for single UE and multiple UE. This feature may only be supported in 5G. This feature may be used in eXtend Reality (XR) use cases. |
| 21 | ExtErrors | Indicates the support of additional application errors related to authorization or PDU Session availability. |
| 22 | QoSTiming\_5G | This feature indicates the support of QoS timing information for the transfer and support of data transmission (e.g., AI/ML transmission). This feature may only be supported in 5G. |
| 23 | ListUE\_5G | Indicates the support for the list of UEs This feature may only be supported in 5G. |
| 24 | GMEC\_5G | This feature indicates the support of Generic Group Management Exposure and Communication related enhancements.  The following functionalities are supported:  - Support AF requested QoS for a UE or group of UE(s) not identified by the UE address.  This feature may only be supported in 5G. |
| 25 | PDUSetHandling | This feature indicates the support of PDU Set handling. This feature may be used for eXtended Reality (XR) and interactive media services.  This feature may only be supported in 5G. |
| 26 | RTLatency | This feature indicates the support of Round-Trip latency. This feature may be used for eXtended Reality (XR) and interactive media services.  This feature may only be supported in 5G. |
| 27 | EnQoSMon | This feature indicates the support of enhanced QoS monitoring functionality, i.e. the report of the congestion information, and/or, the RTT delay over two QoS flows, and/or, the data rate information, and/or, the Packet Delay Variation monitoring.  This feature may only be supported in 5G |
| 28 | PowerSaving | This feature indicates the support of the Power Saving for different traffic measurement**.**  This feature may only be supported in 5G. |
| 29 | L4S | This feature indicates the support of the AF indication of ECN marking for L4S support.  This feature may only be supported in 5G. |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

Editor's Note: Whether and/how to indicate the support of end of burst indication, and provision the flow periodicity information within the Power Saving feature is FFS.

### 5.14.5 Error handling

#### 5.14.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.14.5.2 Protocol Errors

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

#### 5.14.5.3 Application Errors

The application errors defined for AsSessionWithQoS API are listed in table 5.14.5.3-1.

**Table 5.14.5.3-1: Application errors**

|  |  |  |  |
| --- | --- | --- | --- |
| **Application Error** | **HTTP status code** | **Description** | **Applicability** |
| REQUESTED\_SERVICE\_NOT\_AUTHORIZED | 403 Forbidden | The service information provided in the request is rejected. | ExtErrors |
| REQUESTED\_SERVICE\_TEMPORARILY\_NOT\_AUTHORIZED | 403 Forbidden | The service information provided in the request is temporarily rejected. | ExtErrors |
| UNAUTHORIZED\_SPONSORED\_DATA\_CONNECTIVITY | 403 Forbidden | The request for sponsored data connectivity is not authorized. | ExtErrors |
| PDU\_SESSION\_NOT\_AVAILABLE | 500 Internal Server Error | The PDU session is not found for the provided UE address. | ExtErrors |
| INVALID\_SESSION\_UPDATE | 403 Forbidden | Indicates that the session is not allowed to be updated since one or more of the received parameters can not be served in current session. The AF can retry with a new session. | TSC\_5G |

## 5.15 MsisdnLessMoSms API

### 5.15.1 Overview

The MsisdnLessMoSms API allows the delivery of MSISDN-less mobile originated SMSs from the SCEF to the SCS/AS. The corresponding JSON schema for the representation of the resources and operations defined by the MsisdnLessMoSms API is provided in its complete form in Annex A.15.

### 5.15.2 Data model

#### 5.15.2.1 Notification data types

##### 5.15.2.1.1 Introduction

This clause defines data structures to be used in notifications.

Table 5.15.2.1.1-1 specifies data types re-used by the MsisdnLessMoSms API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the MsisdnLessMoSms API.

Table 5.15.2.1.1-1: MsisdnLessMoSms API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.15.4-1. |

Table 5.15.2.1.1-2 specifies the data types defined for the MsisdnLessMoSms API.

Table 5.15.2.1.1-2: MsisdnLessMoSms API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| MsisdnLessMoSmsNotification | 5.15.2.1.2 | Represents a MSISDN-less MO SMS notification. |  |
| MsisdnLessMoSmsNotificationReply | 5.15.2.1.3 | Represents a reply to a MSISDN-less MO SMS notification. |  |

##### 5.15.2.1.2 Type: MsisdnLessMoSmsNotification

This data type represents a MSISDN-less MO SMS, which is sent from the SCEF to the SCS/AS.

Table 5.15.2.1.2-1: Definition of type MsisdnLessMoSmsNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| supportedFeatures | SupportedFeatures | 1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7. |  |
| sms | Bytes | 1 | The MSISDN-less MO SMS containing a short message transfer protocol data unit (TPDU) which is defined in 3GPP TS 23.040 [43] and represents the user data field carried by the short message service relay sub-layer protocol. |  |
| externalId | string | 1 | External identifier has the form username@realm. |  |
| applicationPort | Port | 1 | Unsigned integer used to uniquely identify the triggering application addressed in the device, see clause 9.2.3.24.4 in TS 23.040 [43] for further details. |  |
| NOTE: Properties marked with a feature as defined in clause 5.15.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

##### 5.15.2.1.3 Type: MsisdnLessMoSmsNotificationReply

This data type represents a reply to an MSISDN-less MO SMS notification and is sent from the SCS/AS to the SCEF.

Table 5.15.2.1.3-1: Definition of type MsisdnLessMoSmsNotificationReply

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| supportedFeatures | SupportedFeatures | 1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7. |  |
| NOTE: Properties marked with a feature as defined in clause 5.3.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

### 5.15.3 Resource structure

#### 5.15.3.1 General

All resource URIs of this API should have the following root:

**{notificationDestination}**

"{notificationDestination}" is determined based on preconfigured information in the SCEF as described in clause 4.4.14.2. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.15.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| MSISDN-less MO SMS Notification | {notificationDestination} | POST | Deliver a received MSIDN-less MO SMS from the SCEF to the SCS/AS |

#### 5.15.3.2 MSISDN-less MO SMS Notification

##### 5.15.3.2.1 Introduction

The MSISDN-less MO SMS Notification allows the SCEF to deliver a received MSIDN-less MO SMS to the SCS/AS.

##### 5.15.3.2.2 Resource definition

The Callback URI: **{**notificationDestination**}** shall support the callback URI variables defined in table 5.15.3.2.2-1.

Table 5.15.3.2.2-1: Callback URI variables for resource "MSISDN-less MO SMS Notification"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notificationDestination | Link | A URI indicating the notification destination where T8 notification requests shall be delivered to.  This URI shall be preconfigured in the SCEF. |

##### 5.15.3.2.3 Standard methods

###### 5.15.3.2.3.1 Notification via POST

The HTTP POST method delivers a received MSISDN-less MO SMS. The SCEF shall initiate the HTTP POST request message and the SCS/AS shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.15.3.2.3.1-1 and table 5.15.3.2.3.1-2.

Table 5.15.3.2.3.1-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.15.3.2.3.1-2: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| MsisdnLessMoSmsNotification | 1 | The MSISDN-less MO SMS. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| MsisdnLessMoSmsNotificationReply |  | 200 OK | The MSISDN-less MO SMS is received successfully. |
| none | 0..1 | 307 Temporary Redirect | Temporary redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| none | 0..1 | 308 Permanent Redirect | Permanent redirection, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative SCS/AS where the notification should be sent.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | | |

Table 5.15.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

Table 5.15.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative SCS/AS towards which the notification should be redirected. |

### 5.15.4 Used Features

The table below defines the features applicable to the MsisdnLessMoSms API. Those features are negotiated as described in clause 5.2.7.

Table 5.15.4-1: Features used by MsisdnLessMoSms API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
|  |  |  |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

### 5.15.5 Error handling

#### 5.15.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.15.5.2 Protocol Errors

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

#### 5.15.5.3 Application Errors

The application errors defined for MsisdnLessMoSms API are listed in table 5.15.5.3-1.

Table 5.15.5.3-1: Application errors

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

## 5.16 RacsParameterProvisioning API

### 5.16.1 Overview

The RacsParameterProvisioning API is a RESTful API that allows the SCS/AS to provision manufacturer specific UE radio capability parameters. The RacsParameterProvisioning API defines a set of data models, resources and the related procedures for the creation and management of the parameters. The corresponding JSON schema for the representation of the resources and operations defined by the RacsParameterProvisioning API is provided in its complete form in Annex A.16.

### 5.16.2 Data model

#### 5.16.2.1 Resource data types

##### 5.16.2.1.1 Introduction

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

Table 5.16.2.1.1-1 specifies data types re-used by the RacsParameterProvisioning API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the RacsParameterProvisioning API.

Table 5.16.2.1.1-1: RacsParameterProvisioning API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.16.4-1. |
| TypeAllocationCode | 3GPP TS 29.571 [45] | Used to signal UE model's IMEI-TAC values in table 5.16.2.1.4-1. |

Table 5.16.2.1.1-2 specifies the data types defined for the RacsParameterProvisioning API.

Table 5.16.2.1.1-2: RacsParameterProvisioning API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| RacsConfiguration | 5.16.2.1.4 | Represents a single UE radio capability configuration data. |  |
| RacsConfigurationRm | 5.16.2.1.6 | Represents the same as the RacsConfiguration data type but with the "nullable: true" property. |  |
| RacsFailureCode | 5.16.2.2.3 | Represents the failure result of UE radio capability provisioning. |  |
| RacsFailureReport | 5.16.2.1.3 | Represents a radio capability data provisioning failure report. |  |
| RacsProvisioningData | 5.16.2.1.2 | Represents a UE's radio capability data. |  |
| RacsProvisioningDataPatch | 5.16.2.1.5 | Represents parameters to request the modification of a UE's radio capability data. |  |

##### 5.16.2.1.2 Type: RacsProvisioningData

This type represents a UE radio capability data provided by the SCS/AS to the SCEF.

Table 5.16.2.1.2-1: Definition of type RacsProvisioningData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| self | Link | 0..1 | Link to the resource "Individual RACS parameter provisioning". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in clause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| racsConfigs | map(Racs Configuration) | 1..N | Identifies the configuration related to manufacturer specific UE radio capability. Each element uniquely identifies an RACS configuration for an RACS ID and is identified in the map via the RACS ID as key. The response shall include successfully provisioned RACS data. |  |
| racsReports | map(RacsFailureReport) | 0..N | Supplied by the SCEF. Contains the RACS IDs for which the RACS data are not provisioned successfully.  Any string value can be used as a key of the map. |  |
| NOTE: Properties marked with a feature as defined in clause 5.16.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

##### 5.16.2.1.3 Type: RacsFailureReport

This type represents a radio capability data provisioning report provided by the SCEF.

Table 5.16.2.1.3-1: Definition of type RacsFailureReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| racsIds | array(string) | 1..N | Identifies the RACS ID(s) for which the RACS data are not provisioned successfully. |  |
| failureCode | RacsFailureCode | 1 | It indicates the failure reason. |  |
| NOTE: Properties marked with a feature as defined in clause 5.16.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

##### 5.16.2.1.4 Type: RacsConfiguration

This type represents a single UE radio capability configuration data provided by the SCS/AS to the SCEF.

Table 5.16.2.1.4-1: Definition of type RacsConfiguration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| racsId | string | 1 | The UE radio capability ID provided by the SCS/AS to identify the UE radio capability data. See 3GPP TS 23.003 [14] for the encoding. (NOTE 3) |  |
| racsParamEps | string | 0..1 | The UE radio capability data in EPS, its encoding shall comply with the UE-CapabilityRAT-ContainerList as defined in clause 6.3.6 of 3GPP TS 36.331 [59]. (NOTE 2, NOTE 4) |  |
| racsParam5Gs | string | 0..1 | The UE radio capability data in 5GS, its encoding shall comply with the UE-CapabilityRAT-ContainerList as defined in clause 6.3.3 of 3GPP TS 38.331 [60]. (NOTE 2, NOTE 4) |  |
| imeiTacs | array(TypeAllocationCode) | 1..N | Related UE model's IMEI-TAC values |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.16.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: At least one of racsParamEps or racsParam5Gs shall be provided.  NOTE 3: A racsId shall only belong to one "Individual RACS Parameter Provisioning" resource.  NOTE 4: UTRAN capabilities shall not be included within the "racsParamEps" attribute and/or the "racsParam5Gs" attribute. | | | | |

##### 5.16.2.1.5 Type: RacsProvisioningDataPatch

This type represents a UE radio capability data provided by the SCS/AS to the SCEF. This structure is used in the PATCH request.

Table 5.16.2.1.5-1: Definition of type RacsProvisioningDataPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| racsConfigs | map(RacsConfigurationRm) | 0..N | Identifies the configuration related to manufactuer specific UE radio capability. Each element uniquely identifies an RACS configuration for an RACS ID and is identified in the map via the RACS ID as key. |  |
| NOTE: Properties marked with a feature as defined in clause 5.16.4 are applicable as described in clause 5.2.7. If no features are indicated, the related property applies for all the features. | | | | |

##### 5.16.2.1.6 Type: RacsConfigurationRm

This type represents a single UE radio capability configuration data provided by the SCS/AS to the SCEF. It is defined with "nullable: true" property.

Table 5.16.2.1.6-1: Definition of type RacsConfigurationRm

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability |
| racsParamEps | string | 0..1 | The UE radio capability data in EPS, its encoding shall comply with the UE-CapabilityRAT-ContainerList as defined in clause 6.3.6 of3GPP TS 36.331 [59]. |  |
| racsParam5Gs | string | 0..1 | The UE radio capability data in 5GS, its encoding shall comply with the UE-CapabilityRAT-ContainerList as defined in clause 6.3.3 of3GPP TS 38.331 [60]. |  |
| imeiTacs | array(TypeAllocationCode) | 0..N | Related UE model's IMEI-TAC values. |  |

#### 5.16.2.2 Referenced simple data types and enumerations

##### 5.16.2.2.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses. In addition, data types and enumerations defined in clause 5.2.1 can be referenced.

##### 5.16.2.2.2 Simple data types

The simple data types defined in table 5.16.2.2.2-1 shall be supported.

Table 5.16.2.2.2-1: Simple data types

|  |  |
| --- | --- |
| Type name | Description |
|  |  |

##### 5.16.2.2.3 Enumeration: RacsFailureCode

The enumeration RacsFailureCode represents the failure result of UE radio capability provisioning.

Table 5.16.2.2.3-1: Enumeration RacsFailureCode

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| MALFUNCTION | This value indicates that something functions wrongly in RACS provisioning or the RACS provisioning does not function at all. |  |
| RESOURCE\_LIMITATION | This value indicates there is resource limitation for RACS data storage. |  |
| RACS\_ID\_DUPLICATED | The received RACS identifier(s) are already provisioned. |  |
| OTHER\_REASON | Other reason unspecified. |  |

### 5.16.3 Resource structure

#### 5.16.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-racs-pp/v1**

"apiRoot" is set as described in clause 5.2.4. "apiName" shall be set to "3gpp-racs-pp" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the clauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.16.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| RACS Parameter Provisionings | /{scsAsId}/provisionings | GET | Read all RACS parameter provisionings for a given AF |
| POST | Create a new RACS parameter provisioning |
| Individual RACS Parameter Provisioning | /{scsAsId}/provisionings/{provisioningId} | PUT | Modify all properties in an existing RACS parameter provisioning |
| PATCH | Modify some properties in an existing RACS parameter provisioning |
| GET | Read an existing RACS parameter provisioning |
| DELETE | Delete a RACS parameter provisioning |

#### 5.16.3.2 Resource: RACS Parameter Provisionings

##### 5.16.3.2.1 Introduction

This resource allows an SCS/AS to read all active RACS parameter provisionings or create a new RACS parameter provisioning.

##### 5.16.3.2.2 Resource definition

Resource URI: **{apiRoot}/3gpp-racs-pp/v1/{scsAsId}/provisionings**

This resource shall support the resource URI variables defined in table 5.16.3.2.2-1.

Table 5.16.3.2.2-1: Resource URI variables for resource "Parameter Provisioning"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS. |

##### 5.16.3.2.3 Resource methods

###### 5.16.3.2.3.1 GET

The GET method allows to read all active RACS parameter provisionings indicated by the resource URI as defined in clause 5.16.3.2.2. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.16.3.2.3.1-1 and table 5.16.3.2.3.1-2.

Table 5.16.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.16.3.2.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| array(RacsProvisioningData) | 0..N | 200 OK | The provisioning information related to the request URI is returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.16.3.2.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.16.3.2.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.16.3.2.3.2 PUT

This HTTP method is not supported for the resource.

###### 5.16.3.2.3.3 PATCH

This HTTP method is not supported for the resource.

###### 5.16.3.2.3.4 POST

The POST method creates a new parameter provisioning resource for a given SCS/AS. The SCS/AS shall initiate the HTTP POST request message and the SCEF shall respond to the message. The SCEF shall construct the URI of the created resource.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.16.3.2.3.4-1 and table 5.16.3.2.3.4-2.

Table 5.16.3.2.3.4-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.16.3.2.3.4-2: Data structures supported by the POST request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| RacsProvisioningData | 1 | Parameters to create a new provisioning. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| RacsProvisioningData | 1 | 201 Created | The provisioning was created successfully.  The URI of the created resource shall be returned in the "Location" HTTP header. |
| array(RacsFailureReport) | 1..N | 500 Internal Server Error | The RACS data for all RACS IDs were not provisioned successfully. |
|  |  |  |  |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 also apply. | | | | |

Table 5.16.3.2.3.4-3: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/3gpp-racs-pp/v1/{scsAsId}/provisionings/{provisioningId} |

###### 5.16.3.2.3.5 DELETE

This HTTP method is not supported for the resource.

#### 5.16.3.3 Resource: Individual RACS Parameter Provisioning

##### 5.16.3.3.1 Introduction

This resource allows an SCS/AS to query, update and delete a parameter provisioning indicated by the resource URI as defined in clause 5.16.3.3.2.

##### 5.16.3.3.2 Resource definition

Resource URI: **{apiRoot}/3gpp-racs-pp/v1/{scsAsId}/provisionings/{provisioningId}**

This resource shall support the resource URI variables defined in table 5.16.3.3.2-1.

Table 5.16.3.2.2-1: Resource URI variables for resource "Individual RACS Parameter Provisioning"

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2.4. |
| scsAsId | string | Identifier of the SCS/AS of type ScsAsId. |
| provisioningId | string | Identifier of the provisioning resource of type string. |

##### 5.16.3.3.3 Resource methods

###### 5.16.3.3.3.1 GET

The GET method allows to read an active parameter provisioning indicated by the resource URI as defined in clause 5.16.3.3.2. The SCS/AS shall initiate the HTTP GET request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.16.3.3.3.1-1 and table 5.16.3.3.3.1-2.

Table 5.16.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
|  |  |  |  |

Table 5.16.3.3.3.1-2: Data structures supported by the GET request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| RacsProvisioningData | 1 | 200 OK | The provisioning information related to the request URI is returned. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 also apply. | | | | |

Table 5.16.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 5.16.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

###### 5.16.3.3.3.2 PATCH

The PATCH method shall be used to update some properties in an existing provisioning indicated by the Resource URI as defined in clause 5.16.3.3.2. The SCS/AS shall initiate the HTTP PATCH request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.16.3.3.3.2-1 and table 5.16.3.3.3.2-2.

Table 5.16.3.3.3.2-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.16.3.3.3.2-2: Data structures supported by the PATCH request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| RacsProvisioningDataPatch | 1 | Partial update an existing parameter provisioning. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| RacsProvisioningData | 1 | 200 OK | The provisioning data was updated successfully.  The SCEF shall return an updated provisioning information in the response. |
| none |  | 204 No Content | The provisioning data was updated successfully, and no content is to be sent in the response message body. |
| array(RacsFailureReport) | 1..N | 500 Internal Server Error | The RACS data for all RACS IDs were not provisioned successfully. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.6-1 also apply. | | | | |

Table 5.16.3.3.3.2-3: Headers supported by the 307 Response Code on this resource

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

Table 5.16.3.3.3.2-4: Headers supported by the 308 Response Code on this resource

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

###### 5.16.3.3.3.3 PUT

The PUT method shall be used to update all properties in an existing provisioning indicated by the Resource URI as defined in clause 5.16.3.3.2. The SCS/AS shall initiate the HTTP PUT request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.16.3.3.3.3-1 and table 5.16.3.3.3.3-2.

Table 5.16.3.3.3.3-1: URI query parameters supported by the PUT method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| none specified |  |  |  |

Table 5.16.3.3.3.3-2: Data structures supported by the PUT request/response by the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| RacsProvisioningData | 1 | Replace an existing parameter provisioning. | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| RacsProvisioningData | 1 | 200 OK | The provisioning data was replaced successfully.  The SCEF shall return an updated provisioning information in the response. |
| none |  | 204 No Content | The existing RACS Parameter Provisioning has been replaced successfully and no content is to be sent in the response message body. |
| array(RacsFailureReport) | 1..N | 500 Internal Server Error | The RACS data for all RACS IDs were not provisioned successfully. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the PUT method listed in table 5.2.6-1 also apply. | | | | |

Table 5.16.3.3.3.3-3: Headers supported by the 307 Response Code on this resource

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

Table 5.16.3.3.3.3-4: Headers supported by the 308 Response Code on this resource

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

###### 5.16.3.3.3.4 POST

This HTTP method is not supported for the resource.

###### 5.16.3.3.3.5 DELETE

The DELETE method deletes an existing provisioning resource "Individual RACS Parameter Provisioning". The SCS/AS shall initiate the HTTP DELETE request message and the SCEF shall respond to the message.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in the table 5.16.3.3.3.5-1 and table 5.16.3.3.3.5-2.

Table 5.16.3.3.3.5-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| N/A |  |  |  |

Table 5.16.3.3.3.5-2: Data structures supported by the DELETE request/response on the resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| none |  |  | |
| Response body | Data type | Cardinality | Response  codes | Remarks |
| none |  | 204 No Content | The provisioning was terminated successfully.  The response body shall be empty. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| none |  | 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 SCEF.  Redirection handling is described in clause 5.2.10. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.6-1 also apply. | | | | |

Table 5.16.3.3.3.5-3: Headers supported by the 307 Response Code on this resource

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

Table 5.16.3.3.3.5-4: Headers supported by the 308 Response Code on this resource

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

### 5.16.4 Used Features

The table below defines the features applicable to the RacsParameterProvisioning API. Those features are negotiated as described in clause 5.2.7.

Table 5.16.4-1: Features used by RacsParameterProvisioning API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
|  |  |  |
|  |  |  |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

### 5.16.5 Error handling

#### 5.16.5.1 General

HTTP error handling shall be supported as specified in clause 5.2.6.

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

#### 5.16.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the RacsParameterProvisioning API.

#### 5.16.5.3 Application Errors

The application errors defined for the RacsParameterProvisioning API are listed in table 5.16.5.3-1.

Table 5.16.5.3-1: Application errors

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

# 6 Security

TLS shall be used to support the security communication between the SCEF and the SCS/AS over T8 as defined in clause 5.5 of 3GPP TS 33.187 [35]. The access to the SCEF northbound APIs shall be authorized by means of OAuth2 protocol (see IETF RFC 6749 [51]), based on local configuration, using the "Client Credentials" authorization grant. If OAuth2 is used, a client, prior to consuming services offered by the SCEF Northbound APIs, shall obtain a "token" from the authorization server.

# 7 Using Common API Framework

## 7.1 General

When CAPIF is used with the SCEF, the SCEF shall support the following as defined in 3GPP TS 29.222 [48]:

- 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 the security methods for authentication and authorization, and related security mechanisms.

In a centralized deployment as defined in 3GPP TS 23.222 [47], 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 the SCEF, the SCEF shall register all the features for northbound APIs in the CAPIF Core Function.

## 7.2 Security

When CAPIF is used for external exposure, before invoking the API exposed by the SCEF, the SCS/AS as API invoker shall negotiate the security method (PKI, TLS-PSK or OAUTH2) with CAPIF core function and ensure the SCEF has enough credential to authenticate the SCS/AS (see 3GPP TS 29.222 [48], clause 5.6.2.2 and clause 6.2.2.2).

If PKI or TLS-PSK is used as the selected security method between the AF and the NEF, upon API invocation, the NEF shall retrieve the authorization information from the CAPIF core function as described in 3GPP TS 29.222 [48], clause 5.6.2.4.

As indicated in 3GPP TS 33.122 [53], the access to the T8 APIs may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [51]), using the "Client Credentials" authorization grant, where the CAPIF core function (see 3GPP TS 29.222 [48]) 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 SCS/AS and the SCEF, the SCS/AS, prior to consuming services offered by the T8 APIs, shall obtain a "token" from the authorization server, by invoking the Obtain\_Authorization service, as described in 3GPP TS 29.222 [48], clause 5.6.2.3.2.

The T8 APIs do not define any scopes for OAuth2 authorization. It is the SCEF responsibility to check whether the SCS/AS is authorized to use an API based on the "token". Once the SCEF verifies the "token", it shall check whether the NEF identifier in the "token" matches its own published identifier, and whether the API name in the "token" matches its own published API name. If those checks are passed, the AF has full authority to access any resource or operation for the invoked API.

NOTE 2: The security requirement in the current clause does not apply for the MsisdnLessMoSms API since it is the SCEF initiated interaction with the SCS/AS. How the security scheme works for the MsisdnLessMoSms API is left to configuration.

NOTE 3: For aforementioned security methods, the SCEF needs to apply admission control according to access control policies after performing the authorization checks.

Annex A (normative):  
OpenAPI representation for the APIs defined in the present document

# A.1 General

This Annex is based on the OpenAPI Specification [27] and provides corresponding representations of all APIs defined in the present specification.

NOTE 1: An OpenAPIs representation embeds JSON Schema representations of HTTP message bodies.

This Annex shall take precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE 2: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see clause 5B of the 3GPP TR 21.900 [58] and clause 5.3.1 of the 3GPP TS 29.501 [49] for further information).

# A.2 Data Types applicable to several APIs

For the purpose of referencing entities in the Open API file defined in this Annex, it shall be assumed that this Open API file is contained in a physical file named "TS29122\_CommonData.yaml".

NOTE: For the purpose of referencing the error status codes in the Open API file defined in this Annex, this Open API file contains all the mandatory status codes as defined in table 5.2.6-1, all the API specific error status codes defined for T8 APIs, in addition, some error status codes not used in the current release of this specification but for the purpose of referencing by other specifications.

openapi: 3.0.0

info:

title: TS 29.122 Common Data Types

version: 1.3.0-alpha.4

description: |

Data types applicable to several APIs.

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externalDocs:

description: 3GPP TS 29.122 V18.4.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

paths: {}

components:

schemas:

SponsorInformation:

description: Represents a sponsor information.

type: object

properties:

sponsorId:

type: string

description: It indicates Sponsor ID.

aspId:

type: string

description: It indicates Application Service Provider ID.

required:

- sponsorId

- aspId

UsageThreshold:

description: Represents a usage threshold.

type: object

properties:

duration:

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

totalVolume:

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

downlinkVolume:

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

uplinkVolume:

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

UsageThresholdRm:

description: >

Represents the same as the UsageThreshold data type but with the nullable:true property.

type: object

properties:

duration:

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

totalVolume:

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

downlinkVolume:

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

uplinkVolume:

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

nullable: true

TimeWindow:

description: Represents a time window identified by a start time and a stop time.

type: object

properties:

startTime:

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

stopTime:

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

required:

- startTime

- stopTime

Acknowledgement:

description: Represents a successful acknowledgement of a notification.

type: object

properties:

details:

type: string

description: A human-readable explanation specific to this successful acknowledgement

required:

- details

NotificationData:

description: >

Represents the information to be conveyed in a bearer level event(s) notification.

type: object

properties:

transaction:

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

eventReports:

type: array

items:

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

minItems: 1

description: Contains the reported event and applicable information

required:

- transaction

- eventReports

EventReport:

description: Represents an event report.

type: object

properties:

event:

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

accumulatedUsage:

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

flowIds:

type: array

items:

type: integer

minItems: 1

description: Identifies the IP flows that were sent during event subscription

required:

- event

AccumulatedUsage:

description: Represents an accumulated usage.

type: object

properties:

duration:

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

totalVolume:

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

downlinkVolume:

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

uplinkVolume:

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

FlowInfo:

description: Represents IP flow information.

type: object

properties:

flowId:

type: integer

description: Indicates the IP flow identifier.

flowDescriptions:

type: array

items:

type: string

description: >

Indicates the packet filters of the IP flow. Refer to clause 5.3.8 of 3GPP TS 29.214 for

encoding. It shall contain UL and/or DL IP flow description.

minItems: 1

maxItems: 2

tosTC:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TosTrafficClass'

required:

- flowId

TestNotification:

description: >

Represents a notification that can be sent to test whether a chosen notification mechanism

works.

type: object

properties:

subscription:

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

required:

- subscription

WebsockNotifConfig:

description: >

Represents the configuration information for the delivery of notifications over Websockets.

type: object

properties:

websocketUri:

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

requestWebsocketUri:

type: boolean

description: Set by the SCS/AS to indicate that the Websocket delivery is requested.

LocationArea:

description: Represents a user location area.

type: object

properties:

cellIds:

type: array

items:

type: string

minItems: 1

description: >

Indicates a list of Cell Global Identities of the user which identifies the cell the UE

is registered.

enodeBIds:

type: array

items:

type: string

minItems: 1

description: Indicates a list of eNodeB identities in which the UE is currently located.

routingAreaIds:

type: array

items:

type: string

minItems: 1

description: >

Identifies a list of Routing Area Identities of the user where the UE is located.

trackingAreaIds:

type: array

items:

type: string

minItems: 1

description: >

Identifies a list of Tracking Area Identities of the user where the UE is located.

geographicAreas:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

minItems: 1

description: Identifies a list of geographic area of the user where the UE is located.

civicAddresses:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/CivicAddress'

minItems: 1

description: Identifies a list of civic addresses of the user where the UE is located.

LocationArea5G:

description: Represents a user location area when the UE is attached to 5G.

type: object

properties:

geographicAreas:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

minItems: 0

description: Identifies a list of geographic area of the user where the UE is located.

civicAddresses:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/CivicAddress'

minItems: 0

description: Identifies a list of civic addresses of the user where the UE is located.

nwAreaInfo:

$ref: 'TS29554\_Npcf\_BDTPolicyControl.yaml#/components/schemas/NetworkAreaInfo'

ProblemDetails:

description: Represents additional information and details on an error response.

type: object

properties:

type:

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

title:

type: string

description: >

A short, human-readable summary of the problem type. It should not change from occurrence

to occurrence of the problem.

status:

type: integer

description: The HTTP status code for this occurrence of the problem.

detail:

type: string

description: A human-readable explanation specific to this occurrence of the problem.

instance:

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

cause:

type: string

description: >

A machine-readable application error cause specific to this occurrence of the problem.

This IE should be present and provide application-related error information, if

available.

invalidParams:

type: array

items:

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

minItems: 1

description: >

Description of invalid parameters, for a request rejected due to invalid parameters.

supportedFeatures:

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

InvalidParam:

description: >

Represents the description of invalid parameters, for a request rejected due to invalid

parameters.

type: object

properties:

param:

type: string

description: Attribute's name encoded as a JSON Pointer, or header's name.

reason:

type: string

description: A human-readable reason, e.g. "must be a positive integer".

required:

- param

PlmnId:

description: Represents the identifier of a PLMN.

type: object

properties:

mcc:

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

mnc:

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

required:

- mcc

- mnc

ConfigResult:

description: Represents one configuration processing result for a group's members.

type: object

properties:

externalIds:

type: array

items:

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

minItems: 1

description: Each element indicates an external identifier of the UE.

msisdns:

type: array

items:

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

minItems: 1

description: >

Each element identifies the MS internal PSTN/ISDN number allocated for the UE.

resultReason:

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

required:

- resultReason

oneOf:

- required: [externalIds]

- required: [msisdns]

Bandwidth:

type: integer

minimum: 0

description: integer indicating a bandwidth in bits per second.

BdtReferenceId:

type: string

description: string identifying a BDT Reference ID as defined in clause 5.3.3 of 3GPP TS 29.154.

Binary:

type: string

description: string with format "binary" as defined in OpenAPI Specification.

Bytes:

type: string

description: >

String with format "byte" as defined in OpenAPI Specification, i.e, base64-encoded

characters.

DayOfWeek:

type: integer

minimum: 1

maximum: 7

description: >

integer between and including 1 and 7 denoting a weekday. 1 shall indicate Monday, and the

subsequent weekdays shall be indicated with the next higher numbers. 7 shall indicate

Sunday.

DateTime:

format: date-time

type: string

description: string with format "date-time" as defined in OpenAPI.

DateTimeRm:

format: date-time

type: string

description: >

string with format "date-time" as defined in OpenAPI with "nullable=true" property.

nullable: true

DateTimeRo:

format: date-time

type: string

description: >

string with format "date-time" as defined in OpenAPI with "readOnly=true" property.

readOnly: true

DurationSec:

type: integer

minimum: 0

description: Unsigned integer identifying a period of time in units of seconds.

DurationSecRm:

type: integer

minimum: 0

description: >

Unsigned integer identifying a period of time in units of seconds with "nullable=true"

property.

nullable: true

DurationSecRo:

type: integer

minimum: 0

description: >

Unsigned integer identifying a period of time in units of seconds with "readOnly=true"

property.

readOnly: true

DurationMin:

type: integer

format: int32

minimum: 0

description: Unsigned integer identifying a period of time in units of minutes.

ExternalId:

type: string

description: >

string containing a local identifier followed by "@" and a domain identifier. Both the local

identifier and the domain identifier shall be encoded as strings that do not contain any "@"

characters. See Clause 4.6.2 of 3GPP TS 23.682 for more information.

ExternalGroupId:

type: string

description: >

string containing a local identifier followed by "@" and a domain identifier. Both the local

identifier and the domain identifier shall be encoded as strings that do not contain any "@"

characters. See Clauses 4.6.2 and 4.6.3 of 3GPP TS 23.682 for more information.

Ipv4Addr:

type: string

description: >

string identifying a Ipv4 address formatted in the "dotted decimal" notation as defined in

IETF RFC 1166.

Ipv6Addr:

type: string

description: >

string identifying a Ipv6 address formatted according to clause 4 in IETF RFC 5952.

The mixed Ipv4 Ipv6 notation according to clause 5 of IETF RFC 5952 shall not be used.

Ipv4AddrRo:

type: string

description: >

string identifying a Ipv4 address formatted in the "dotted decimal" notation

as defined in IETF RFC 1166, with "readOnly=true" property.

readOnly: true

Ipv6AddrRo:

type: string

description: >

string identifying a Ipv6 address formatted according to clause 4 in IETF RFC 5952,

with "readOnly=true" property. The mixed Ipv4 Ipv6 notation according to clause 5 of

IETF RFC 5952 shall not be used.

readOnly: true

Link:

type: string

description: string formatted according to IETF RFC 3986 identifying a referenced resource.

LinkRm:

type: string

description: >

String formatted according to IETF RFC 3986 identifying a referenced resource,

but with the nullable property set to true.

nullable: true

Mcc:

type: string

description: >

String encoding a Mobile Country Code part of the PLMN, comprising 3 digits,

as defined in 3GPP TS 38.413.

Mnc:

type: string

description: >

String encoding a Mobile Network Code part of the PLMN, comprising 2 or 3 digits,

as defined in 3GPP TS 38.413.

Msisdn:

type: string

description: >

string formatted according to clause 3.3 of 3GPP TS 23.003 that describes an MSISDN.

Port:

type: integer

description: Unsigned integer with valid values between 0 and 65535.

minimum: 0

maximum: 65535

PortRo:

type: integer

description: >

Unsigned integer with valid values between 0 and 65535, with "readOnly=true" property.

minimum: 0

maximum: 65535

readOnly: true

ResourceId:

type: string

description: string chosen by the SCEF to serve as identifier in a resource URI.

ScsAsId:

type: string

description: string that identifies an SCS/AS.

TimeOfDay:

type: string

description: >

String with format partial-time or full-time as defined in clause 5.6 of IETF RFC 3339.

Examples, 20:15:00, 20:15:00-08:00 (for 8 hours behind UTC).

Uri:

type: string

description: string providing an URI formatted according to IETF RFC 3986.

Volume:

type: integer

format: int64

minimum: 0

description: Unsigned integer identifying a volume in units of bytes.

VolumeRm:

type: integer

format: int64

minimum: 0

description: >

Unsigned integer identifying a volume in units of bytes with "nullable=true" property.

nullable: true

EthFlowInfo:

description: Represents Ethernet flow information.

type: object

properties:

flowId:

type: integer

description: Indicates the Ethernet flow identifier.

ethFlowDescriptions:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'

description: >

Indicates the packet filters of the Ethernet flow. It shall contain UL and/or DL

Ethernet flow description.

minItems: 1

maxItems: 2

required:

- flowId

Event:

anyOf:

- type: string

enum:

- SESSION\_TERMINATION

- LOSS\_OF\_BEARER

- RECOVERY\_OF\_BEARER

- RELEASE\_OF\_BEARER

- USAGE\_REPORT

- FAILED\_RESOURCES\_ALLOCATION

- SUCCESSFUL\_RESOURCES\_ALLOCATION

- 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 event reported by the SCEF.

Possible values are:

- SESSION\_TERMINATION: Indicates that Rx session is terminated.

- LOSS\_OF\_BEARER : Indicates a loss of a bearer.

- RECOVERY\_OF\_BEARER: Indicates a recovery of a bearer.

- RELEASE\_OF\_BEARER: Indicates a release of a bearer.

- USAGE\_REPORT: Indicates the usage report event.

- FAILED\_RESOURCES\_ALLOCATION: Indicates the resource allocation is failed.

- SUCCESSFUL\_RESOURCES\_ALLOCATION: Indicates the resource allocation is successful.

ResultReason:

anyOf:

- type: string

enum:

- ROAMING\_NOT\_ALLOWED

- 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 a failure result reason.

Possible values are:

- ROAMING\_NOT\_ALLOWED: Identifies the configuration parameters are not allowed by roaming

agreement.

- OTHER\_REASON: Identifies the configuration parameters are not configured due to other

reason.

#

# HTTP responses

#

responses:

'307':

description: Temporary Redirect

headers:

Location:

description: 'An alternative URI of the resource.'

required: true

schema:

type: string

'308':

description: Permanent Redirect

headers:

Location:

description: 'An alternative URI of the resource.'

required: true

schema:

type: string

'400':

description: Bad request

content:

application/problem+json:

schema:

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

'401':

description: Unauthorized

content:

application/problem+json:

schema:

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

'403':

description: Forbidden

content:

application/problem+json:

schema:

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

'404':

description: Not Found

content:

application/problem+json:

schema:

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

'406':

description: Not Acceptable

content:

application/problem+json:

schema:

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

'409':

description: Conflict

content:

application/problem+json:

schema:

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

'411':

description: Length Required

content:

application/problem+json:

schema:

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

'412':

description: Precondition Failed

content:

application/problem+json:

schema:

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

'413':

description: Content Too Large

content:

application/problem+json:

schema:

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

'414':

description: URI Too Long

content:

application/problem+json:

schema:

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

'415':

description: Unsupported Media Type

content:

application/problem+json:

schema:

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

'429':

description: Too Many Requests

content:

application/problem+json:

schema:

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

'500':

description: Internal Server Error

content:

application/problem+json:

schema:

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

'503':

description: Service Unavailable

content:

application/problem+json:

schema:

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

default:

description: Generic Error

# A.3 MonitoringEvent API

openapi: 3.0.0

info:

title: 3gpp-monitoring-event

version: 1.3.0-alpha.4

description: |

API for Monitoring Event.

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externalDocs:

description: 3GPP TS 29.122 V18.4.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-monitoring-event/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/subscriptions:

get:

summary: Read all or queried active subscriptions for the SCS/AS.

operationId: FetchAllMonitoringEventSubscriptions

tags:

- Monitoring Event Subscriptions

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: ip-addrs

in: query

description: The IP address(es) of the requested UE(s).

required: false

content:

application/json:

schema:

type: array

items:

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

minItems: 1

- name: ip-domain

in: query

description: >

The IPv4 address domain identifier. The attribute may only be provided if IPv4 address

is included in the ip-addrs query parameter.

required: false

schema:

type: string

- name: mac-addrs

in: query

description: The MAC address(es) of the requested UE(s).

required: false

schema:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

minItems: 1

responses:

'200':

description: OK (Successful get all or queried active subscriptions for the SCS/AS)

content:

application/json:

schema:

type: array

items:

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

minItems: 0

description: Monitoring event subscriptions

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

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

'500':

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

'503':

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

default:

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

post:

summary: Creates a new subscription resource for monitoring event notification.

operationId: CreateMonitoringEventSubscription

tags:

- Monitoring Event Subscriptions

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

requestBody:

description: Subscription for notification about monitoring event

required: true

content:

application/json:

schema:

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

callbacks:

notificationDestination:

'{request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

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

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'

UserConsentRevocationNotif:

'{request.body#/revocationNotifUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: No Content (successful notification).

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

responses:

'201':

description: Created (Successful creation of subscription)

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource'

required: true

schema:

type: string

'200':

description: The operation is successful and immediate report is included.

content:

application/json:

schema:

oneOf:

- $ref: '#/components/schemas/MonitoringEventReport'

- $ref: '#/components/schemas/MonitoringEventReports'

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

/{scsAsId}/subscriptions/{subscriptionId}:

get:

summary: Read an active subscriptions for the SCS/AS and the subscription Id.

operationId: FetchIndMonitoringEventSubscription

tags:

- Individual Monitoring Event Subscription

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

responses:

'200':

description: OK (Successful get the active subscription)

content:

application/json:

schema:

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

'307':

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

'308':

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

'400':

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

'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: Updates/replaces an existing subscription resource.

operationId: UpdateIndMonitoringEventSubscription

tags:

- Individual Monitoring Event Subscription

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

requestBody:

description: Parameters to update/replace the existing subscription

required: true

content:

application/json:

schema:

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

responses:

'200':

description: OK (Successful update of the subscription)

content:

application/json:

schema:

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

'204':

description: No Content (Successful update of the subscription)

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

patch:

summary: Modifies an existing subscription of monitoring event.

operationId: ModifyIndMonitoringEventSubscription

tags:

- Individual Monitoring Event Subscription

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS.

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource.

required: true

schema:

type: string

requestBody:

description: >

This is used for PATCH request for partial cancellation and/or partial addition of certain

UE(s) within an active group.

required: true

content:

application/json-patch+json:

schema:

type: array

items:

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

minItems: 1

responses:

'204':

description: The resource was modified successfully.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

delete:

summary: Deletes an already existing monitoring event subscription.

operationId: DeleteIndMonitoringEventSubscription

tags:

- Individual Monitoring Event Subscription

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

responses:

'204':

description: No Content (Successful deletion of the existing subscription)

'200':

description: OK (Successful deletion of the existing subscription)

content:

application/json:

schema:

type: array

items:

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

minItems: 1

description: >

The subscription was terminated successfully, the monitoring event report(s)

shall be included if 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'

'429':

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

'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:

MonitoringEventSubscription:

description: Represents a subscription to event(s) monitoring.

type: object

properties:

self:

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

supportedFeatures:

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

mtcProviderId:

type: string

description: Identifies the MTC Service Provider and/or MTC Application.

appIds:

type: array

items:

type: string

description: Identifies the Application Identifier(s)

minItems: 1

externalId:

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

msisdn:

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

addedExternalIds:

type: array

items:

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

minItems: 1

description: Indicates the added external Identifier(s) within the active group.

addedMsisdns:

type: array

items:

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

minItems: 1

description: Indicates the added MSISDN(s) within the active group.

excludedExternalIds:

type: array

items:

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

minItems: 1

description: Indicates cancellation of the external Identifier(s) within the active group.

excludedMsisdns:

type: array

items:

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

minItems: 1

description: Indicates cancellation of the MSISDN(s) within the active group.

externalGroupId:

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

addExtGroupId:

type: array

items:

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

minItems: 2

ipv4Addr:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv4Addr'

ipv6Addr:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv6Addr'

dnn:

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

notificationDestination:

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

requestTestNotification:

type: boolean

description: >

Set to true by the SCS/AS to request the SCEF to send a test notification

as defined in clause 5.2.5.3. Set to false by the SCS/AS indicates not request SCEF to

send a test notification, default false if omitted otherwise.

websockNotifConfig:

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

monitoringType:

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

maximumNumberOfReports:

type: integer

minimum: 1

description: >

Identifies the maximum number of event reports to be generated by the HSS, MME/SGSN

as specified in clause 5.6.0 of 3GPP TS 23.682.

monitorExpireTime:

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

repPeriod:

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

groupReportGuardTime:

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

maximumDetectionTime:

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

reachabilityType:

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

maximumLatency:

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

maximumResponseTime:

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

suggestedNumberOfDlPackets:

type: integer

minimum: 0

description: >

If "monitoringType" is "UE\_REACHABILITY", this parameter may be included to identify

the number of packets that the serving gateway shall buffer in case that

the UE is not reachable.

idleStatusIndication:

type: boolean

description: >

If "monitoringType" is set to "UE\_REACHABILITY" or "AVAILABILITY\_AFTER\_DDN\_FAILURE",

this parameter may be included to indicate the notification of when a UE, for which PSM

is enabled, transitions into idle mode. "true" indicates enabling of notification;

"false" indicate no need to notify. Default value is "false" if omitted.

locationType:

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

accuracy:

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

minimumReportInterval:

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

maxRptExpireIntvl:

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

samplingInterval:

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

reportingLocEstInd:

type: boolean

description: >

Indicates whether to request the location estimate for event reporting. If

"monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate

whether event reporting requires the location information. If set to true, the location

estimation information shall be included in event reporting. If set to "false",

indicates the location estimation information shall not be included in event reporting.

Default "false" if omitted.

linearDistance:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/LinearDistance'

locQoS:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/LocationQoS'

svcId:

$ref: 'TS29515\_Ngmlc\_Location.yaml#/components/schemas/ServiceIdentity'

ldrType:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/LdrType'

velocityRequested:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/VelocityRequested'

maxAgeOfLocEst:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/AgeOfLocationEstimate'

locTimeWindow:

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

supportedGADShapes:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/SupportedGADShapes'

codeWord:

$ref: 'TS29515\_Ngmlc\_Location.yaml#/components/schemas/CodeWord'

upLocRepIndAf:

description: >

Indicates whether location reporting over user plane is requested or not.

"true" indicates the location reporting over user plane is requested.

"false" indicates the location reporting over user plane is not requested.

Default value is "false" if omitted.

type: boolean

default: false

upLocRepAddrAf:

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

associationType:

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

plmnIndication:

type: boolean

description: >

If "monitoringType" is "ROAMING\_STATUS", this parameter may be included to indicate the

notification of UE's Serving PLMN ID. Value "true" indicates enabling of notification;

"false" indicates disabling of notification. Default value is "false" if omitted.

locationArea:

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

locationArea5G:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

dddTraDescriptors:

type: array

items:

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

minItems: 1

dddStati:

type: array

items:

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

minItems: 1

apiNames:

type: array

items:

type: string

minItems: 1

monitoringEventReport:

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

snssai:

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

tgtNsThreshold:

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

nsRepFormat:

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

afServiceId:

type: string

immediateRep:

type: boolean

description: >

Indicates whether an immediate reporting is requested or not.

"true" indicate an immediate reporting is requested.

"false" indicate an immediate reporting is not requested.

Default value "false" if omitted.

uavPolicy:

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

sesEstInd:

type: boolean

description: >

Set to true by the SCS/AS so that only UAV's with "PDU session established for DNN(s)

subject to aerial service" are to be listed in the Event report. Set to false or default

false if omitted otherwise.

subType:

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

addnMonTypes:

type: array

items:

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

addnMonEventReports:

type: array

items:

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

ueIpAddr:

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

ueMacAddr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

revocationNotifUri:

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

reqRangingSlRes:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/RangingSlResult'

minItems: 1

relatedUEs:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/RelatedUE'

minItems: 1

required:

- notificationDestination

- monitoringType

anyOf:

- required: [maximumNumberOfReports]

- required: [monitorExpireTime]

MonitoringNotification:

description: Represents an event monitoring notification.

type: object

properties:

subscription:

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

configResults:

type: array

items:

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

minItems: 1

description: Each element identifies a notification of grouping configuration result.

monitoringEventReports:

type: array

items:

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

minItems: 1

description: Monitoring event reports.

addedExternalIds:

type: array

items:

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

minItems: 1

description: >

Identifies the added external Identifier(s) within the active group via

the "externalGroupId" attribute within the MonitoringEventSubscription data type.

addedMsisdns:

type: array

items:

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

minItems: 1

description: >

Identifies the added MSISDN(s) within the active group via the "externalGroupId"

attribute within the MonitoringEventSubscription data type.

cancelExternalIds:

type: array

items:

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

minItems: 1

description: >

Identifies the cancelled external Identifier(s) within the active group via

the "externalGroupId" attribute within the MonitoringEventSubscription data type.

cancelMsisdns:

type: array

items:

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

minItems: 1

description: >

Identifies the cancelled MSISDN(s) within the active group via the "externalGroupId"

attribute within the MonitoringEventSubscription data type.

cancelInd:

type: boolean

description: >

Indicates whether to request to cancel the corresponding monitoring subscription.

Set to false or omitted otherwise.

appliedParam:

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

required:

- subscription

MonitoringEventReport:

description: Represents an event monitoring report.

type: object

properties:

imeiChange:

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

externalId:

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

appId:

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

pduSessInfo:

$ref: 'TS29523\_Npcf\_EventExposure.yaml#/components/schemas/PduSessionInformation'

idleStatusInfo:

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

locationInfo:

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

locFailureCause:

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

lossOfConnectReason:

type: integer

description: >

If "monitoringType" is "LOSS\_OF\_CONNECTIVITY", this parameter shall be included

if available to identify the reason why loss of connectivity is reported.

Refer to 3GPP TS 29.336 clause 8.4.58.

unavailPerDur:

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

maxUEAvailabilityTime:

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

msisdn:

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

monitoringType:

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

uePerLocationReport:

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

plmnId:

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

reachabilityType:

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

roamingStatus:

type: boolean

description: >

If "monitoringType" is "ROAMING\_STATUS", this parameter shall be set to "true"

if the new serving PLMN is different from the HPLMN. Set to false or

omitted otherwise.

failureCause:

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

eventTime:

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

pdnConnInfoList:

type: array

items:

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

minItems: 1

dddStatus:

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

dddTrafDescriptor:

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

maxWaitTime:

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

apiCaps:

type: array

items:

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

minItems: 0

nSStatusInfo:

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

afServiceId:

type: string

servLevelDevId:

type: string

description: >

If "monitoringType" is "AREA\_OF\_INTEREST", this parameter may be included

to identify the UAV.

uavPresInd:

type: boolean

description: >

If "monitoringType" is "AREA\_OF\_INTEREST", this parameter shall be set to true

if the specified UAV is in the monitoring area. Set to false or omitted otherwise.

groupMembListChanges:

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

required:

- monitoringType

MonitoringEventReports:

description: Represents a set of event monitoring reports.

type: object

properties:

monitoringEventReports:

type: array

items:

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

minItems: 1

required:

- monitoringEventReports

IdleStatusInfo:

description: Represents the information relevant to when the UE transitions into idle mode.

type: object

properties:

activeTime:

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

edrxCycleLength:

format: float

type: number

minimum: 0

suggestedNumberOfDlPackets:

type: integer

minimum: 0

description: >

Identifies the number of packets shall be buffered in the serving gateway.

It shall be present if the idle status indication is requested by the SCS/AS

with "idleStatusIndication" in the "monitoringEventSubscription" sets to "true".

idleStatusTimestamp:

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

periodicAUTimer:

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

UePerLocationReport:

description: Represents the number of UEs found at the indicated location.

type: object

properties:

ueCount:

type: integer

minimum: 0

description: Identifies the number of UEs.

externalIds:

type: array

items:

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

minItems: 1

description: Each element uniquely identifies a user.

msisdns:

type: array

items:

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

minItems: 1

description: Each element identifies the MS internal PSTN/ISDN number allocated for a UE.

servLevelDevIds:

type: array

items:

type: string

minItems: 1

description: Each element uniquely identifies a UAV.

required:

- ueCount

LocationInfo:

description: Represents the user location information.

type: object

properties:

ageOfLocationInfo:

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

cellId:

type: string

description: >

Indicates the Cell Global Identification of the user which identifies the cell the UE

is registered.

enodeBId:

type: string

description: Indicates the eNodeB in which the UE is currently located.

routingAreaId:

type: string

description: Identifies the Routing Area Identity of the user where the UE is located.

trackingAreaId:

type: string

description: Identifies the Tracking Area Identity of the user where the UE is located.

plmnId:

type: string

description: Identifies the PLMN Identity of the user where the UE is located.

twanId:

type: string

description: Identifies the TWAN Identity of the user where the UE is located.

userLocation:

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

geographicArea:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

civicAddress:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/CivicAddress'

positionMethod:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/PositioningMethod'

qosFulfilInd:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/AccuracyFulfilmentIndicator'

ueVelocity:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/VelocityEstimate'

ldrType:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/LdrType'

achievedQos:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/MinorLocationQoS'

relatedApplicationlayerId:

type: string

rangeDirection:

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

twodrelativeLocation:

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

threedrelativeLocation:

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

relativeVelocity:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/VelocityEstimate'

upCumEvtRep:

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

RangeDirection:

description: Represents a range and direction from a point A to a point B.

type: object

properties:

range:

type: number

azimuthDirection:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/Angle'

elevationDirection:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/Angle'

TwodrelativeLocation:

description: Represents a relative 2D location with uncertainty ellipse.

type: object

properties:

semiMinor:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/Uncertainty'

semiMajor:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/Uncertainty'

orientationAngle:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/Angle'

ThreedrelativeLocation:

description: Represents a relative 3D location with uncertainty ellipsoid.

type: object

properties:

semiMinor:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/Uncertainty'

semiMajor:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/Uncertainty'

verticalUncertainty:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/Uncertainty'

orientationAngle:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/Angle'

FailureCause:

description: Represents the reason of communication failure.

type: object

properties:

bssgpCause:

type: integer

description: >

Identifies a non-transparent copy of the BSSGP cause code. Refer to 3GPP TS 29.128.

causeType:

type: integer

description: Identify the type of the S1AP-Cause. Refer to 3GPP TS 29.128.

gmmCause:

type: integer

description: >

Identifies a non-transparent copy of the GMM cause code. Refer to 3GPP TS 29.128.

ranapCause:

type: integer

description: >

Identifies a non-transparent copy of the RANAP cause code. Refer to 3GPP TS 29.128.

ranNasCause:

type: string

description: >

Indicates RAN and/or NAS release cause code information, TWAN release cause code

information or untrusted WLAN release cause code information. Refer to 3GPP TS 29.214.

s1ApCause:

type: integer

description: >

Identifies a non-transparent copy of the S1AP cause code. Refer to 3GPP TS 29.128.

smCause:

type: integer

description: >

Identifies a non-transparent copy of the SM cause code. Refer to 3GPP TS 29.128.

PdnConnectionInformation:

description: Represents the PDN connection information of the UE.

type: object

properties:

status:

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

apn:

type: string

description: >

Identify the APN, it is depending on the SCEF local configuration whether or

not this attribute is sent to the SCS/AS.

pdnType:

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

interfaceInd:

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

ipv4Addr:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv4Addr'

ipv6Addrs:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv6Addr'

minItems: 1

macAddrs:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

minItems: 1

required:

- status

- pdnType

AppliedParameterConfiguration:

description: Represents the parameter configuration applied in the network.

type: object

properties:

externalIds:

type: array

items:

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

minItems: 1

description: Each element uniquely identifies a user.

msisdns:

type: array

items:

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

minItems: 1

description: Each element identifies the MS internal PSTN/ISDN number allocated for a UE.

maximumLatency:

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

maximumResponseTime:

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

maximumDetectionTime:

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

ApiCapabilityInfo:

description: Represents the availability information of supported API.

type: object

properties:

apiName:

type: string

suppFeat:

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

required:

- apiName

- suppFeat

UavPolicy:

description: >

Represents the policy information included in the UAV presence monitoring request.

type: object

properties:

uavMoveInd:

type: boolean

revokeInd:

type: boolean

required:

- uavMoveInd

- revokeInd

ConsentRevocNotif:

description: >

Represents the user consent revocation information conveyed in a user consent

revocation notification.

type: object

properties:

subscriptionId:

type: string

consentsRevoked:

type: array

items:

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

minItems: 1

required:

- subscriptionId

- consentsRevoked

ConsentRevoked:

description: Represents the information related to a revoked user consent.

type: object

properties:

ucPurpose:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/UcPurpose'

externalId:

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

msisdn:

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

required:

- ucPurpose

oneOf:

- required: [externalId]

- required: [msisdn]

GroupMembListChanges:

description: Represents information on the change(s) to a group's members list.

type: object

properties:

addedUEs:

type: array

items:

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

minItems: 1

removedUEs:

type: array

items:

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

minItems: 1

anyOf:

- required: [addedUEs]

- required: [removedUEs]

UpLocRepAddrAfRm:

description: Represents the user plane addressing information.

type: object

properties:

ipv4Addrs:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

minItems: 1

ipv6Addrs:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

minItems: 1

fqdn:

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

nullable: true

anyOf:

- required: [ipv4Addrs]

- required: [ipv6Addrs]

- required: [fqdn]

UpCumEvtRep:

description: Represents the cumulative event report.

type: object

properties:

upLocRepStat:

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

#

# ENUMS

#

MonitoringType:

anyOf:

- type: string

enum:

- LOSS\_OF\_CONNECTIVITY

- UE\_REACHABILITY

- LOCATION\_REPORTING

- CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION

- ROAMING\_STATUS

- COMMUNICATION\_FAILURE

- AVAILABILITY\_AFTER\_DDN\_FAILURE

- NUMBER\_OF\_UES\_IN\_AN\_AREA

- PDN\_CONNECTIVITY\_STATUS

- DOWNLINK\_DATA\_DELIVERY\_STATUS

- API\_SUPPORT\_CAPABILITY

- NUM\_OF\_REGD\_UES

- NUM\_OF\_ESTD\_PDU\_SESSIONS

- AREA\_OF\_INTEREST

- GROUP\_MEMBER\_LIST\_CHANGE

- APPLICATION\_START

- APPLICATION STOP

- 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 a monitoring event type.

Possible values are

- LOSS\_OF\_CONNECTIVITY: The SCS/AS requests to be notified when the 3GPP network detects

that the UE is no longer reachable for signalling or user plane communication

- UE\_REACHABILITY: The SCS/AS requests to be notified when the UE becomes reachable for

sending either SMS or downlink data to the UE

- LOCATION\_REPORTING: The SCS/AS requests to be notified of the current location or

the last known location of the UE

- CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION: The SCS/AS requests to be notified when the association

of an ME (IMEI(SV)) that uses a specific subscription (IMSI) is changed

- ROAMING\_STATUS: The SCS/AS queries the UE's current roaming status and requests to get

notified when the status changes

- COMMUNICATION\_FAILURE: The SCS/AS requests to be notified of communication failure events

- AVAILABILITY\_AFTER\_DDN\_FAILURE: The SCS/AS requests to be notified when the UE has become

available after a DDN failure

- NUMBER\_OF\_UES\_IN\_AN\_AREA: The SCS/AS requests to be notified the number of UEs in a given

geographic area

- PDN\_CONNECTIVITY\_STATUS: The SCS/AS requests to be notified when the 3GPP network detects

that the UE’s PDN connection is set up or torn down

- DOWNLINK\_DATA\_DELIVERY\_STATUS: The AF requests to be notified when the 3GPP network detects that the downlink data delivery status is changed.

- API\_SUPPORT\_CAPABILITY: The SCS/AS requests to be notified of the availability of support

of service APIs.

- NUM\_OF\_REGD\_UES: The AF requests to be notified of the current number of registered UEs

for a network slice.

- NUM\_OF\_ESTD\_PDU\_SESSIONS: The AF requests to be notified of the current number of

established PDU Sessions for a network slice.

- AREA\_OF\_INTEREST: The SCS/AS requests to be notified when the UAV moves in or

out of the geographic area.

- GROUP\_MEMBER\_LIST\_CHANGE: The AF requests to be notified of the changes to a group members

list.

- APPLICATION\_START: The AF requests to be notified about the start of application traffic

has been detected.

- APPLICATION\_STOP: The AF requests to be notified about the stop of application traffic

has been detected.

ReachabilityType:

anyOf:

- type: string

enum:

- SMS

- DATA

- 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 a reachability type.

Possible values are

- SMS: The SCS/AS requests to be notified when the UE becomes reachable for sending SMS

to the UE

- DATA: The SCS/AS requests to be notified when the UE becomes reachable for sending

downlink data to the UE.

LocationType:

anyOf:

- type: string

enum:

- CURRENT\_LOCATION

- LAST\_KNOWN\_LOCATION

- CURRENT\_OR\_LAST\_KNOWN\_LOCATION

- INITIAL\_LOCATION

- 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 a location type.

Possible values are

- CURRENT\_LOCATION: The SCS/AS requests to be notified for current location

- LAST\_KNOWN\_LOCATION: The SCS/AS requests to be notified for last known location

- CURRENT\_OR\_LAST\_KNOWN\_LOCATION: The AF requests the current or last known location

- INITIAL\_LOCATION: The AF requests the initial location

AssociationType:

anyOf:

- type: string

enum:

- IMEI

- IMEISV

- 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 an IMEI or IMEISV to IMSI association.

Possible values are

- IMEI: The value shall be used when the change of IMSI-IMEI association shall be detected

- IMEISV: The value shall be used when the change of IMSI-IMEISV association shall be

detected

Accuracy:

anyOf:

- type: string

enum:

- CGI\_ECGI

- ENODEB

- TA\_RA

- PLMN

- TWAN\_ID

- GEO\_AREA

- CIVIC\_ADDR

- 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 a desired granularity of accuracy of the requested location information.

Possible values are

- CGI\_ECGI: The SCS/AS requests to be notified using cell level location accuracy.

- ENODEB: The SCS/AS requests to be notified using eNodeB level location accuracy.

- TA\_RA: The SCS/AS requests to be notified using TA/RA level location accuracy.

- PLMN: The SCS/AS requests to be notified using PLMN level location accuracy.

- TWAN\_ID: The SCS/AS requests to be notified using TWAN identifier level location accuracy.

- GEO\_AREA: The SCS/AS requests to be notified using the geographical area accuracy.

- CIVIC\_ADDR: The SCS/AS requests to be notified using the civic address accuracy.

PdnConnectionStatus:

anyOf:

- type: string

enum:

- CREATED

- RELEASED

- 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 PDN connection status.

Possible values are

- CREATED: The PDN connection is created.

- RELEASED: The PDN connection is released.

PdnType:

anyOf:

- type: string

enum:

- IPV4

- IPV6

- IPV4V6

- NON\_IP

- ETHERNET

- 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 PDN connection type.

Possible values are

- IPV4: PDN connection of IPv4 type.

- IPV6: PDN connection of IPv6 type.

- IPV4V6: PDN connection of IPv4v6 type.

- NON\_IP: PDN connection of non-IP type.

- ETHERNET: PDN connection of Ethernet type.

InterfaceIndication:

anyOf:

- type: string

enum:

- EXPOSURE\_FUNCTION

- PDN\_GATEWAY

- 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 entity used for data delivery towards the SCS/AS.

Possible values are

- EXPOSURE\_FUNCTION: SCEF is used for the PDN connection towards the SCS/AS.

- PDN\_GATEWAY: PDN gateway is used for the PDN connection towards the SCS/AS.

LocationFailureCause:

anyOf:

- type: string

enum:

- POSITIONING\_DENIED

- UNSUPPORTED\_BY\_UE

- NOT\_REGISTED\_UE

- UNSPECIFIED

- REQUESTED\_AREA\_NOT\_ALLOWED

- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration but

is not used to encode content defined in the present version of this API.

description: >

Represents the cause of location positioning failure.

Possible values are:

- POSITIONING\_DENIED: Positioning is denied.

- UNSUPPORTED\_BY\_UE: Positioning is not supported by UE.

- NOT\_REGISTED\_UE: UE is not registered.

- UNSPECIFIED: Unspecified.

- REQUESTED\_AREA\_NOT\_ALLOWED: The location request is rejected because the location area

requested by the AF for area event reporting is not allowed.

SubType:

anyOf:

- type: string

enum:

- AERIAL\_UE

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents a subscription type.

Possible values are

- AERIAL\_UE: The UE has Aerial subscription.

SACRepFormat:

anyOf:

- type: string

enum:

- NUMERICAL

- PERCENTAGE

- 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 NSAC reporting format.

# A.4 ResourceManagementOfBdt API

openapi: 3.0.0

info:

title: 3gpp-bdt

version: 1.3.0-alpha.1

description: |

API for BDT resouce management.

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externalDocs:

description: 3GPP TS 29.122 V18.2.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-bdt/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/subscriptions:

parameters:

- name: scsAsId

description: String identifying the SCS/AS.

in: path

required: true

schema:

type: string

get:

summary: Fetch all active background data transfer subscription resources for a given SCS/AS.

operationId: FetchAllActiveBDTSubscriptions

tags:

- BDT Subscription

responses:

'200':

description: all BDT policy subscriptions.

content:

application/json:

schema:

type: array

items:

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

minItems: 0

description: individual BDT policy subscription.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

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

'500':

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

'503':

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

default:

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

post:

summary: Creates a new background data transfer subscription resource.

operationId: CreateBDTSubscription

tags:

- BDT Subscription

requestBody:

description: Contains the data to create a BDT subscription.

required: true

content:

application/json:

schema:

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

callbacks:

bDTWarningNotification:

'{$request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

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

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: Background data transfer policies offered to the SCS/AS.

content:

application/json:

schema:

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

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'

'409':

$ref: 'TS29122\_CommonData.yaml#/components/responses/409'

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

/{scsAsId}/subscriptions/{subscriptionId}:

parameters:

- name: scsAsId

description: String identifying the SCS/AS.

in: path

required: true

schema:

type: string

- name: subscriptionId

description: String identifying the individual BDT policy resource in the SCEF.

in: path

required: true

schema:

type: string

get:

summary: Read a background data transfer subscription resource.

operationId: FetchIndBDTSubscription

tags:

- Individual BDT Subscription

responses:

'200':

description: Background data transfer policies offered to and selected by the SCEF.

content:

application/json:

schema:

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

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

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

'500':

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

'503':

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

default:

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

put:

summary: Update a background data transfer subscription resource for negotiation of background data transfer policy.

operationId: UpdateBDTSubscription

tags:

- Individual BDT Subscription

requestBody:

description: Parameters to update/replace the existing BDT subscription

required: true

content:

application/json:

schema:

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

responses:

'200':

description: OK (Successful update of the BDT subscription)

content:

application/json:

schema:

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

'204':

description: No Content. The Individual BDT Subscription resource 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'

patch:

summary: Modify a background data transfer subscription resource to select one of the transfer policies offered by the SCEF.

operationId: ModifyBDTSubscription

tags:

- Individual BDT Subscription

requestBody:

description: Contains information to be performed on the Bdt data structure to select a transfer policy.

required: true

content:

application/merge-patch+json:

schema:

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

responses:

'200':

description: The Individual BDT Policy resource is modified with a selected policy and a representation of that resource is returned.

content:

application/json:

schema:

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

'204':

description: The Individual BDT Policy resource is modified with a selected policy.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'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 a background data transfer resource.

operationId: DeleteBDTSubscription

tags:

- Individual BDT Subscription

responses:

'204':

description: The Individual BDT Policy resource 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:

Bdt:

description: Represents a Background Data Transfer subscription.

type: object

properties:

self:

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

supportedFeatures:

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

aspId:

type: string

description: Identifies an application service provider.

volumePerUE:

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

numberOfUEs:

type: integer

minimum: 1

description: Identifies the number of UEs.

desiredTimeWindow:

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

locationArea:

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

locationArea5G:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

referenceId:

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

transferPolicies:

type: array

items:

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

minItems: 1

description: Identifies an offered transfer policy.

readOnly: true

selectedPolicy:

type: integer

description: Identity of the selected background data transfer policy. Shall not be present in initial message exchange, can be provided by NF service consumer in a subsequent message exchange.

externalGroupId:

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

notificationDestination:

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

warnNotifEnabled:

type: boolean

description: >

Indicates whether the BDT warning notification is enabled (true) or not (false). Default

value is false.

trafficDes:

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

required:

- volumePerUE

- numberOfUEs

- desiredTimeWindow

BdtPatch:

description: Represents a Background Data Transfer subscription modification request.

type: object

properties:

selectedPolicy:

type: integer

description: Identity of the selected background data transfer policy.

warnNotifEnabled:

type: boolean

description: >

Indicates whether the BDT warning notification is enabled (true) or not (false).

notificationDestination:

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

required:

- selectedPolicy

TransferPolicy:

description: Represents an offered transfer policy sent from the SCEF to the SCS/AS, or a selected transfer policy sent from the SCS/AS to the SCEF.

type: object

properties:

bdtPolicyId:

type: integer

description: Identifier for the transfer policy

maxUplinkBandwidth:

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

maxDownlinkBandwidth:

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

ratingGroup:

type: integer

minimum: 0

description: Indicates the rating group during the time window.

timeWindow:

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

required:

- bdtPolicyId

- ratingGroup

- timeWindow

ExNotification:

description: Represents a Background Data Transfer notification.

type: object

properties:

bdtRefId:

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

locationArea5G:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

timeWindow:

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

candPolicies:

type: array

items:

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

minItems: 1

description: This IE indicates a list of the candidate transfer policies from which the AF may select a new transfer policy due to network performance degradation.

required:

- bdtRefId

TrafficDescriptor:

type: string

description: Identify a traffic descriptor as defined in Figure 5.2.2 of 3GPP TS 24.526, octets v+5 to w.

# A.5 ChargeableParty API

openapi: 3.0.0

info:

title: 3gpp-chargeable-party

version: 1.3.0-alpha.1

description: |

API for Chargeable Party management.

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externalDocs:

description: 3GPP TS 29.122 V18.1.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-chargeable-party/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/transactions:

get:

summary: Read all or queried chargeable party transaction resources for a given SCS/AS.

operationId: FetchAllChargeablePartyTransactions

tags:

- Chargeable Party Transaction Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: ip-addrs

in: query

description: The IP address(es) of the requested UE(s).

required: false

content:

application/json:

schema:

type: array

items:

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

minItems: 1

- name: ip-domain

in: query

description: The IPv4 address domain identifier. The attribute may only be provided if IPv4 address is included in the ip-addrs query parameter.

required: false

schema:

type: string

- name: mac-addrs

in: query

description: The MAC address(es) of the requested UE(s).

required: false

schema:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

minItems: 1

responses:

'200':

description: OK (successful query of Chargeable Party resource)

content:

application/json:

schema:

type: array

items:

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

minItems: 0

description: individual BDT policy subscription.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

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

'500':

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

'503':

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

default:

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

post:

summary: Create a new chargeable party transaction resource.

operationId: CreateChargeablePartyTransaction

tags:

- Chargeable Party Transaction Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

requestBody:

description: representation of the Chargeable Party resource to be Created in the SCEF

required: true

content:

application/json:

schema:

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

callbacks:

eventNotification:

'{$request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

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

responses:

'204':

description: No Content (The successful acknowledgement of the notification)

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

responses:

'201':

description: successful creation of a chargeable party resource

content:

application/json:

schema:

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

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'

/{scsAsId}/transactions/{transactionId}:

get:

summary: Read a chargeable party resource for a given SCS/AS and a transaction Id.

operationId: FetchIndChargeablePartyTransaction

tags:

- Individual chargeable party resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

responses:

'200':

description: OK (successful query of a chargeable party resource)

content:

application/json:

schema:

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

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

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

'500':

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

'503':

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

default:

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

patch:

summary: Updates a existing chargeable party resource for a given SCS/AS and transaction Id.

operationId: UpdateChargeablePartyTransaction

tags:

- Individual chargeable party resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

requestBody:

description: representation of the chargeable party resource to be udpated in the SCEF

required: true

content:

application/merge-patch+json:

schema:

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

responses:

'200':

description: successful update of a chargeable party resource

content:

application/json:

schema:

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

'204':

description: No Content

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

delete:

summary: Deletes a chargeable party resource for a given SCS/AS and a transcation Id.

operationId: DeleteChargeablePartyTransaction

tags:

- Individual chargeable party resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

responses:

'204':

description: successful deletion of an resouce of chargeable party

'200':

description: OK (Successful deletion of the existing subscription)

content:

application/json:

schema:

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

'307':

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

'308':

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

'400':

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

'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:

ChargeableParty:

description: Represents the configuration of a chargeable party.

type: object

properties:

self:

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

supportedFeatures:

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

dnn:

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

snssai:

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

notificationDestination:

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

requestTestNotification:

type: boolean

description: Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise.

websockNotifConfig:

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

exterAppId:

type: string

description: Identifies the external Application Identifier.

ipv4Addr:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv4Addr'

ipDomain:

type: string

ipv6Addr :

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv6Addr'

macAddr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

flowInfo:

type: array

items:

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

minItems: 1

description: Describes the application flows.

ethFlowInfo:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'

minItems: 1

description: Identifies Ethernet packet flows.

sponsorInformation:

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

sponsoringEnabled:

type: boolean

description: >

Indicates whether the sponsoring data connectivity is enabled (true) or not (false).

referenceId:

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

servAuthInfo:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/ServAuthInfo'

usageThreshold:

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

events:

type: array

items:

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

minItems: 1

description: Represents the list of event(s) to which the SCS/AS requests to subscribe to.

required:

- notificationDestination

- sponsorInformation

- sponsoringEnabled

ChargeablePartyPatch:

description: Represents a modification request of a chargeable party resource.

type: object

properties:

flowInfo:

type: array

items:

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

minItems: 1

description: Describes the IP flows.

exterAppId:

type: string

description: Identifies the external Application Identifier.

ethFlowInfo:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'

minItems: 1

description: Identifies Ethernet packet flows.

sponsoringEnabled:

type: boolean

description: >

Indicates whether the sponsoring data connectivity is enabled (true) or not (false).

referenceId:

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

usageThreshold:

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

notificationDestination:

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

events:

description: Represents the list of event(s) to which the SCS/AS requests to subscribe to.

type: array

items:

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

minItems: 1

# A.6 NIDD API

openapi: 3.0.0

info:

title: 3gpp**-**nidd

version: 1.3.0-alpha.1

description: |

API for non IP data delivery.

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externalDocs:

description: 3GPP TS 29.122 V18.1.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp**-**nidd/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/configurations:

parameters:

- name: scsAsId

description: String identifying the SCS/AS.

in: path

required: true

schema:

type: string

get:

summary: Read all NIDD configuration resources for a given SCS/AS.

operationId: FetchAllNIDDConfigurations

tags:

- NIDD configurations

responses:

'200':

description: all NIDD configurations.

content:

application/json:

schema:

type: array

items:

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

minItems: 0

description: individual NIDD configuration.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

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

'500':

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

'503':

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

default:

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

post:

summary: Create a new NIDD configuration resource.

operationId: CreateNIDDConfiguration

tags:

- NIDD configurations

requestBody:

description: Contains the data to create a NIDD configuration.

required: true

content:

application/json:

schema:

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

responses:

'201':

description: NIDD configuration is successfully created.

content:

application/json:

schema:

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

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:

niddNotifications:

'{$request.body#/notificationDestination}':

post:

requestBody:

description: >

Notification for NIDD configuration status, MO NIDD, MT NIDD delivery report.

required: true

content:

application/json:

schema:

oneOf:

- $ref: '#/components/schemas/NiddConfigurationStatusNotification'

- $ref: '#/components/schemas/NiddUplinkDataNotification'

- $ref: '#/components/schemas/NiddDownlinkDataDeliveryStatusNotification'

- $ref: '#/components/schemas/GmdNiddDownlinkDataDeliveryNotification'

- $ref: '#/components/schemas/ManagePortNotification'

responses:

'204':

description: Expected response to a successful callback processing without a body

'200':

description: Expected response to a successful callback processing with a body

content:

application/json:

schema:

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

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

/{scsAsId}/configurations/{configurationId}:

parameters:

- name: scsAsId

description: String identifying the SCS/AS.

in: path

required: true

schema:

type: string

- name: configurationId

description: String identifying the individual NIDD configuration resource in the SCEF.

in: path

required: true

schema:

type: string

get:

summary: Read an NIDD configuration resource.

operationId: FetchIndNIDDConfiguration

tags:

- Individual NIDD configuration

responses:

'200':

description: The individual NIDD configuration is successfully retrieved.

content:

application/json:

schema:

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

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

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

'500':

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

'503':

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

default:

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

patch:

summary: Modify an existing NIDD configuration resource.

operationId: ModifyNIDDConfiguration

tags:

- Individual NIDD configuration

requestBody:

description: Contains information to be applied to the individual NIDD configuration.

required: true

content:

application/merge-patch+json:

schema:

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

responses:

'200':

description: >

The Individual NIDD configuration is modified successfully and a representation

of that resource is returned.

content:

application/json:

schema:

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

'204':

description: >

The Individual NIDD configuration is modified successfully and no content

is to be sent in the response message body.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

delete:

summary: Delete an existing NIDD configuration resource.

operationId: DeleteNIDDConfiguration

tags:

- Individual NIDD configuration

responses:

'204':

description: The Individual NIDD configuration 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'

/{scsAsId}/configurations/{configurationId}/downlink-data-deliveries:

parameters:

- name: scsAsId

description: String identifying the SCS/AS.

in: path

required: true

schema:

type: string

- name: configurationId

description: String identifying the individual NIDD configuration resource in the SCEF.

in: path

required: true

schema:

type: string

get:

summary: Read all pending NIDD downlink data delivery resources related to a particular NIDD configuration resource.

operationId: FetchAllDownlinkDataDeliveries

tags:

- NIDD downlink data deliveries

responses:

'200':

description: all NIDD downlink data deliveries.

content:

application/json:

schema:

type: array

items:

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

minItems: 0

description: individual NIDD downlink data delivery.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

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

'500':

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

'503':

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

default:

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

post:

summary: Create an NIDD downlink data delivery resource related to a particular NIDD configuration resource.

operationId: CreateDownlinkDataDelivery

tags:

- NIDD downlink data deliveries

requestBody:

description: Contains the data to create a NIDD downlink data delivery.

required: true

content:

application/json:

schema:

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

responses:

'200':

description: NIDD downlink data delivery is successful.

content:

application/json:

schema:

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

'201':

description: NIDD downlink data delivery is pending.

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource'

required: true

schema:

type: string

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

description: The NIDD downlink data delivery request was not successful.

content:

application/json:

schema:

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

'503':

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

default:

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

/{scsAsId}/configurations/{configurationId}/downlink-data-deliveries/{downlinkDataDeliveryId}:

parameters:

- name: scsAsId

description: String identifying the SCS/AS.

in: path

required: true

schema:

type: string

- name: configurationId

description: String identifying the individual NIDD configuration resource in the SCEF.

in: path

required: true

schema:

type: string

- name: downlinkDataDeliveryId

description: String identifying the individual NIDD downlink data delivery in the SCEF.

in: path

required: true

schema:

type: string

get:

summary: Read pending NIDD downlink data delivery resource.

operationId: FetchIndDownlinkDataDelivery

tags:

- Individual NIDD downlink data delivery

responses:

'200':

description: The individual NIDD downlink data delivery is successfully retrieved.

content:

application/json:

schema:

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

'307':

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

'308':

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

'400':

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

'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: Replace an NIDD downlink data delivery resource.

operationId: UpdateIndDownlinkDataDelivery

tags:

- Individual NIDD downlink data delivery

requestBody:

description: >

Contains information to be applied to the individual NIDD downlink data delivery.

required: true

content:

application/json:

schema:

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

responses:

'200':

description: >

The pending NIDD downlink data is replaced sucessfully but delivery is pending.

content:

application/json:

schema:

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

'204':

description: >

The NIDD downlink data delivery has been replaced successfully and no content

is to be sent in the response message body.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'409':

$ref: 'TS29122\_CommonData.yaml#/components/responses/409'

'411':

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

'413':

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

'415':

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

'429':

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

'500':

description: The NIDD downlink data replacement request was not successful.

content:

application/json:

schema:

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

'503':

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

default:

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

patch:

summary: Modify an existing Individual NIDD downlink data delivery resource.

operationId: ModifyIndDownlinkDataDelivery

tags:

- Individual NIDD downlink data delivery

requestBody:

description: >

Contains the parameters to update an individual NIDD downlink data delivery resource.

required: true

content:

application/json:

schema:

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

responses:

'200':

description: >

OK. The modification of the Individual NIDD downlink data delivery resource was

successful and an updated representation of the resource within the

NiddDownlinkDataTransfer data structure in the response message body is returned

by the SCEF.

content:

application/json:

schema:

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

'204':

description: >

No Content. The modification of the Individual NIDD downlink data delivery resource

was successful and no content is to be sent in the response message body.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'409':

$ref: 'TS29122\_CommonData.yaml#/components/responses/409'

'411':

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

'413':

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

'415':

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

'429':

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

'500':

description: >

Internal Server Error. The NIDD downlink data modification request was not successful.

content:

application/json:

schema:

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

'503':

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

default:

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

delete:

summary: Delete an NIDD downlink data delivery resource.

operationId: DeleteIndDownlinkDataDelivery

tags:

- Individual NIDD downlink data delivery

responses:

'204':

description: The pending NIDD downlink data 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'

'409':

$ref: 'TS29122\_CommonData.yaml#/components/responses/409'

'429':

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

'500':

description: The NIDD downlink data cancellation request was not successful.

content:

application/json:

schema:

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

'503':

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

default:

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

/{scsAsId}/configurations/{configurationId}/rds-ports:

parameters:

- name: scsAsId

description: String identifying the SCS/AS.

in: path

required: true

schema:

type: string

- name: configurationId

description: String identifying the individual NIDD configuration resource in the SCEF.

in: path

required: true

schema:

type: string

get:

summary: Read all RDS ManagePort Configurations.

operationId: FetchAllManagePortConfigurations

tags:

- ManagePort Configurations

responses:

'200':

description: all ManagePort configurations.

content:

application/json:

schema:

type: array

items:

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

minItems: 0

description: individual ManagePort configuration.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'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'

/{scsAsId}/configurations/{configurationId}/rds-ports/{portId}:

parameters:

- name: scsAsId

description: String identifying the SCS/AS.

in: path

required: true

schema:

type: string

- name: configurationId

description: String identifying the individual NIDD configuration resource in the SCEF.

in: path

required: true

schema:

type: string

- name: portId

description: The UE port number.

in: path

required: true

schema:

type: string

pattern: '^(ue([0-9]|(1[0-5]))-ef([0-9]|(1[0-5])))$'

get:

summary: Read an Individual ManagePort Configuration resource to query port numbers.

operationId: FetchIndManagePortConfiguration

tags:

- Individual ManagePort Configuration

responses:

'200':

description: The individual ManagePort configuration is successfully retrieved.

content:

application/json:

schema:

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

'307':

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

'308':

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

'400':

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

'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 new Individual ManagePort Configuration resource to reserve port numbers.

operationId: UpdateIndManagePortConfiguration

tags:

- Individual ManagePort Configuration

requestBody:

description: Contains information to be applied to the individual ManagePort configuration.

required: true

content:

application/json:

schema:

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

responses:

'201':

description: The individual ManagePort configuration is created.

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource'

required: true

schema:

type: string

'202':

description: The request is accepted and under processing.

'400':

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

'401':

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

'403':

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

'404':

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

'409':

$ref: 'TS29122\_CommonData.yaml#/components/responses/409'

'411':

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

'413':

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

'415':

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

'429':

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

'500':

description: The request was not successful.

content:

application/problem+json:

schema:

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

'503':

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

default:

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

delete:

summary: Delete an Individual ManagePort Configuration resource to release port numbers.

operationId: DeleteIndManagePortConfiguration

tags:

- Individual ManagePort Configuration

responses:

'202':

description: The request is accepted and under processing.

'204':

description: The individual ManagePort configuration 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'

'409':

$ref: 'TS29122\_CommonData.yaml#/components/responses/409'

'429':

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

'500':

description: The request was not successful.

content:

application/problem+json:

schema:

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

'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:

NiddConfiguration:

description: Represents the configuration for NIDD.

type: object

properties:

self:

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

supportedFeatures:

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

mtcProviderId:

type: string

description: Identifies the MTC Service Provider and/or MTC Application.

externalId:

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

msisdn:

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

externalGroupId:

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

duration:

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

reliableDataService:

type: boolean

description: >

Indicates whether the reliable data service (as defined in clause 4.5.14.3 of 3GPP TS

23.682) acknowledgement is requested (true) or not (false). Default value is false.

rdsPorts:

type: array

items:

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

minItems: 1

description: >

Indicates the static port configuration that is used for reliable data transfer between

specific applications using RDS (as defined in clause 5.2.4 and

5.2.5 of 3GPP TS 24.250).

pdnEstablishmentOption:

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

notificationDestination:

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

requestTestNotification:

type: boolean

description: >

Set to true by the SCS/AS to request the SCEF to send a test notification as defined

in clause 5.2.5.3. Set to false or omitted otherwise.

websockNotifConfig:

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

maximumPacketSize:

type: integer

minimum: 1

description: >

The Maximum Packet Size is the maximum NIDD packet size that was transferred to

the UE by the SCEF in the PCO, see clause 4.5.14.1 of 3GPP TS 23.682. If no maximum

packet size was provided to the UE by the SCEF, the SCEF sends a default configured

max packet size to SCS/AS. Unit bit.

readOnly: true

niddDownlinkDataTransfers:

type: array

items:

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

minItems: 1

description: >

The downlink data deliveries that needed to be executed by the SCEF. The cardinality of

the property shall be 0..1 in the request and 0..N in the response (i.e. response may

contain multiple buffered MT NIDD).

status:

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

required:

- notificationDestination

oneOf:

- required: [externalId]

- required: [msisdn]

- required: [externalGroupId]

NiddDownlinkDataTransfer:

description: Represents the received NIDD downlink data from the SCS/AS.

type: object

properties:

externalId:

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

externalGroupId:

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

msisdn:

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

self:

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

data:

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

reliableDataService:

type: boolean

description: >

Indicates whether the reliable data service (as defined in clause 4.5.14.3 of 3GPP TS

23.682) acknowledgement is requested (true) or not (false). Default value is false.

rdsPort:

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

maximumLatency:

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

priority:

type: integer

description: >

It is used to indicate the priority of the non-IP data packet relative to other

non-IP data packets.

pdnEstablishmentOption:

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

deliveryStatus:

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

requestedRetransmissionTime:

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

required:

- data

oneOf:

- required: [externalId]

- required: [msisdn]

- required: [externalGroupId]

NiddUplinkDataNotification:

description: Represents NIDD uplink data to be notified to the SCS/AS.

type: object

properties:

niddConfiguration:

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

externalId:

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

msisdn:

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

data:

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

reliableDataService:

type: boolean

description: >

Indicates whether the reliable data service acknowledgement is requested (true) or

not (false).

rdsPort:

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

required:

- niddConfiguration

- data

oneOf:

- required: [externalId]

- required: [msisdn]

NiddDownlinkDataDeliveryStatusNotification:

description: Represents the delivery status of a specific NIDD downlink data delivery.

type: object

properties:

niddDownlinkDataTransfer:

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

deliveryStatus:

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

requestedRetransmissionTime:

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

required:

- niddDownlinkDataTransfer

- deliveryStatus

NiddConfigurationStatusNotification:

description: Represents an NIDD configuration status notification.

type: object

properties:

niddConfiguration:

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

externalId:

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

msisdn:

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

status:

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

rdsCapIndication:

type: boolean

description: >

It indicates whether the network capability for the reliable data service is enabled

or not.

rdsPort:

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

required:

- niddConfiguration

- status

oneOf:

- required: [externalId]

- required: [msisdn]

GmdNiddDownlinkDataDeliveryNotification:

description: Represents the delivery status of a specific group NIDD downlink data delivery.

type: object

properties:

niddDownlinkDataTransfer:

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

gmdResults:

type: array

items:

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

minItems: 1

description: Indicates the group message delivery result.

required:

- niddDownlinkDataTransfer

- gmdResults

RdsPort:

description: Represents the port configuration for Reliable Data Transfer.

type: object

properties:

portUE:

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

portSCEF:

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

required:

- portUE

- portSCEF

GmdResult:

description: Represents the group message delivery result.

type: object

properties:

externalId:

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

msisdn:

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

deliveryStatus:

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

requestedRetransmissionTime:

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

required:

- deliveryStatus

oneOf:

- required: [externalId]

- required: [msisdn]

NiddDownlinkDataDeliveryFailure:

description: Represents information related to a failure delivery result.

type: object

properties:

problemDetail:

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

requestedRetransmissionTime:

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

required:

- problemDetail

ManagePort:

description: Represents the configuration of a RDS dynamic port management.

type: object

properties:

self:

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

appId:

type: string

description: Identifies the application.

manageEntity:

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

skipUeInquiry:

type: boolean

description: Indicate whether to skip UE inquiry.

supportedFormats:

type: array

items:

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

minItems: 1

description: >

Indicates the serialization format(s) that are supported by the SCS/AS on the associated

RDS port.

configuredFormat:

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

required:

- appId

ManagePortNotification:

description: Represents a ManagePort notification of port numbers that are reserved.

type: object

properties:

niddConfiguration:

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

externalId:

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

msisdn:

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

managedPorts:

type: array

items:

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

minItems: 1

description: Indicates the reserved RDS port configuration information.

required:

- niddConfiguration

oneOf:

- required: [externalId]

- required: [msisdn]

RdsDownlinkDataDeliveryFailure:

description: Represents the failure delivery result for RDS.

allOf:

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

- type: object

properties:

requestedRetransmissionTime:

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

supportedUeFormats:

type: array

items:

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

minItems: 1

description: >

Indicates the serialization format(s) that are supported by the UE on the associated

RDS port.

NiddDownlinkDataTransferPatch:

description: >

Represents the parameters to request the modification of an Individual NIDD Downlink Data

Delivery resource.

type: object

properties:

data:

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

reliableDataService:

type: boolean

description: >

Indicates whether the reliable data service (as defined in clause 4.5.14.3 of 3GPP TS

23.682) acknowledgement is requested (true) or not (false).

rdsPort:

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

maximumLatency:

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

priority:

type: integer

description: >

It is used to indicate the priority of the non-IP data packet relative to other

non-IP data packets.

pdnEstablishmentOption:

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

PdnEstablishmentOptions:

anyOf:

- type: string

enum:

- WAIT\_FOR\_UE

- INDICATE\_ERROR

- SEND\_TRIGGER

- 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 PDN establishment options that describe the network behaviour when

there is no PDN connection towards the addressed UE.

Possible values are:

- WAIT\_FOR\_UE: wait for the UE to establish the PDN connection

- INDICATE\_ERROR: respond with an error cause

- SEND\_TRIGGER: send a device trigger

PdnEstablishmentOptionsRm:

description: >

Represents the same information as the PdnEstablishmentOptions data type with the

difference that it allows also the null value.

anyOf:

- $ref: '#/components/schemas/PdnEstablishmentOptions'

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

DeliveryStatus:

anyOf:

- type: string

enum:

- SUCCESS

- SUCCESS\_NEXT\_HOP\_ACKNOWLEDGED

- SUCCESS\_NEXT\_HOP\_UNACKNOWLEDGED

- SUCCESS\_ACKNOWLEDGED

- SUCCESS\_UNACKNOWLEDGED

- TRIGGERED

- BUFFERING

- BUFFERING\_TEMPORARILY\_NOT\_REACHABLE

- SENDING

- FAILURE

- FAILURE\_RDS\_DISABLED

- FAILURE\_NEXT\_HOP

- FAILURE\_TIMEOUT

- FAILURE\_TEMPORARILY\_NOT\_REACHABLE

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the status of a downlink NIDD data delivery resource.

Possible values are:

- SUCCESS: Success but details not provided

- SUCCESS\_NEXT\_HOP\_ACKNOWLEDGED: Successful delivery to the next hop with acknowledgment.

- SUCCESS\_NEXT\_HOP\_UNACKNOWLEDGED: Successful delivery to the next hop without

acknowledgment

- SUCCESS\_ACKNOWLEDGED: Reliable delivery was acknowledged by the UE

- SUCCESS\_UNACKNOWLEDGED: Reliable delivery was not acknowledged by the UE

- TRIGGERED: The SCEF triggered the device and is buffering the data.

- BUFFERING: The SCEF is buffering the data due to no PDN connection established.

- BUFFERING\_TEMPORARILY\_NOT\_REACHABLE: The SCEF has been informed that the UE is temporarily

not reachable but is buffering the data

- SENDING: The SCEF has forwarded the data, but they may be stored elsewhere

- FAILURE: Delivery failure but details not provided

- FAILURE\_RDS\_DISABLED: RDS was disabled

- FAILURE\_NEXT\_HOP: Unsuccessful delivery to the next hop.

- FAILURE\_TIMEOUT: Unsuccessful delivery due to timeout.

- FAILURE\_TEMPORARILY\_NOT\_REACHABLE: The SCEF has been informed that the UE is temporarily

not reachable without buffering the data.

readOnly: true

NiddStatus:

anyOf:

- type: string

enum:

- ACTIVE

- TERMINATED\_UE\_NOT\_AUTHORIZED

- TERMINATED

- RDS\_PORT\_UNKNOWN

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the status of a NIDD configuration.

Possible values are:

- ACTIVE: The NIDD configuration is active.

- TERMINATED\_UE\_NOT\_AUTHORIZED: The NIDD configuration was terminated because the UE´s

authorisation was revoked.

- TERMINATED: The NIDD configuration was terminated.

- RDS\_PORT\_UNKNOWN: The RDS port is unknown.

readOnly: true

ManageEntity:

anyOf:

- type: string

enum:

- UE

- AS

- 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 origin that manages the RDS port.

Possible values are:

- UE: Representing the UE.

- AS: Representing the Application Server.

readOnly: true

SerializationFormat:

anyOf:

- type: string

enum:

- CBOR

- JSON

- XML

- 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 a serialization format associated with an RDS port which is applicable

for the Rds\_serialization\_format feature.

Possible values are

- CBOR: The CBOR Serialzition format

- JSON: The JSON Serialzition format

- XML: The XML Serialzition format

NiddConfigurationPatch:

description: Represents the parameters to update a NIDD configuration.

type: object

properties:

duration:

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

reliableDataService:

type: boolean

description: >

Indicates whether the reliable data service (as defined in clause 4.5.14.3 of 3GPP TS

23.682) acknowledgement is requested (true) or not (false).

nullable: true

rdsPorts:

type: array

items:

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

minItems: 1

description: >

Indicates the static port configuration that is used for reliable data transfer between

specific applications using RDS (as defined in clause 5.2.4 and 5.2.5

of 3GPP TS 24.250).

pdnEstablishmentOption:

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

notificationDestination:

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

# A.7 DeviceTriggering API

openapi: 3.0.0

info:

title: 3gpp-device-triggering

version: 1.3.0-alpha.1

description: |

API for device trigger.

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externalDocs:

description: 3GPP TS 29.122 V18.1.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-device-triggering/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/transactions:

get:

summary: read all active device triggering transactions for a given SCS/AS.

operationId: FetchAllDeviceTriggeringTransactions

tags:

- Device Triggering Transactions

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

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

responses:

'200':

description: >

OK (Successful get all of the active device triggering transactions for the SCS/AS)

content:

application/json:

schema:

type: array

items:

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

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

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

'500':

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

'503':

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

default:

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

post:

summary: Create a long-term transaction for a device triggering.

operationId: CreateDeviceTriggeringTransaction

tags:

- Device Triggering API Transactions

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

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

requestBody:

description: Parameters to request a device triggering delivery.

required: true

content:

application/json:

schema:

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

callbacks:

notificationDestination:

'{request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

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

responses:

'200':

description: OK (successful notification)

content:

application/json:

schema:

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

'204':

description: No Content (successful notification)

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

responses:

'201':

description: Created (Successful creation of subscription)

content:

application/json:

schema:

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

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'

/{scsAsId}/transactions/{transactionId}:

get:

summary: Read a device triggering transaction resource.

operationId: FetchIndDeviceTriggeringTransaction

tags:

- Individual Device Triggering Transaction

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

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

- name: transactionId

in: path

description: Identifier of the transaction resource

required: true

schema:

type: string

responses:

'200':

description: OK (Successful get the active subscription)

content:

application/json:

schema:

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

'307':

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

'308':

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

'400':

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

'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: Replace an existing device triggering transaction resource and the corresponding device trigger request.

operationId: UpdateIndDeviceTriggeringTransaction

tags:

- Individual Device Triggering Transaction

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

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

- name: transactionId

in: path

description: Identifier of the transaction resource

required: true

schema:

type: string

requestBody:

description: Parameters to update/replace the existing device triggering

required: true

content:

application/json:

schema:

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

responses:

'200':

description: OK (Successful update of the device triggering)

content:

application/json:

schema:

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

'204':

description: No Content (Successful update of the device triggering)

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

patch:

summary: Modify an existing Individual Device Triggering Transaction resource and the corresponding device triggering request.

operationId: ModifyIndDeviceTriggeringTransaction

tags:

- Individual Device Triggering Transaction

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

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

- name: transactionId

in: path

description: Identifier of the transaction resource

required: true

schema:

type: string

requestBody:

description: Parameters to request the modification of the existing Individual Device Triggering Transaction resource.

required: true

content:

application/json:

schema:

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

responses:

'200':

description: >

OK. The Individual Device Triggering Transaction resource was successfully modified

and a representation of the modified Individual Device Triggering Transaction resource

within the DeviceTriggering data structure including the "deliveryResult" attribute is

returned by the SCEF.

content:

application/json:

schema:

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

'204':

description: >

No Content. The Individual Device Triggering Transaction resource was successfully

modified no content is returned in the response message body.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

delete:

summary: Deletes an already existing device triggering transaction.

operationId: DeleteIndDeviceTriggeringTransaction

tags:

- Individual Device Triggering Transaction

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

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

- name: transactionId

in: path

description: Identifier of the transaction resource

required: true

schema:

type: string

responses:

'204':

description: No Content (Successful deletion of the existing subscription)

'200':

description: OK (Successful deletion of the existing subscription)

content:

application/json:

schema:

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

'307':

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

'308':

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

'400':

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

'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:

DeviceTriggering:

description: Represents device triggering related information.

type: object

properties:

self:

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

externalId:

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

msisdn:

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

supportedFeatures:

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

validityPeriod:

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

priority:

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

applicationPortId:

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

appSrcPortId:

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

triggerPayload:

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

notificationDestination:

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

requestTestNotification:

type: boolean

description: >

Set to true by the SCS/AS to request the SCEF to send a test notification as defined in

clause 5.2.5.3. Set to false or omitted otherwise.

websockNotifConfig:

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

deliveryResult:

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

required:

- validityPeriod

- priority

- applicationPortId

- triggerPayload

- notificationDestination

oneOf:

- required: [externalId]

- required: [msisdn]

DeviceTriggeringDeliveryReportNotification:

description: Represents a device triggering delivery report notification.

type: object

properties:

transaction:

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

result:

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

required:

- transaction

- result

DeviceTriggeringPatch:

description: Represents device triggering related information.

type: object

properties:

validityPeriod:

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

priority:

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

applicationPortId:

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

appSrcPortId:

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

triggerPayload:

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

notificationDestination:

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

requestTestNotification:

type: boolean

description: >

Set to true by the SCS/AS to request the SCEF to send a test notification as defined

in clause 5.2.5.3. Set to false or omitted otherwise.

websockNotifConfig:

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

DeliveryResult:

anyOf:

- type: string

enum:

- SUCCESS

- UNKNOWN

- FAILURE

- TRIGGERED

- EXPIRED

- UNCONFIRMED

- REPLACED

- TERMINATE

- 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 result of the delivery of a device triggering request.

Possible values are:

- SUCCESS: This value indicates that the device action request was successfully completed.

- UNKNOWN: This value indicates any unspecified errors.

- FAILURE: This value indicates that this trigger encountered a delivery error and is deemed

permanently undeliverable.

- TRIGGERED: This value indicates that device triggering request is accepted by the SCEF.

- EXPIRED: This value indicates that the validity period expired before the trigger could

be delivered.

- UNCONFIRMED: This value indicates that the delivery of the device action request is not

confirmed.

- REPLACED: This value indicates that the device triggering replacement request is accepted

by the SCEF.

- TERMINATE: This value indicates that the delivery of the device action request is

terminated by the SCS/AS.

readOnly: true

Priority:

anyOf:

- type: string

enum:

- NO\_PRIORITY

- PRIORITY

- 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 priority indication for a trigger payload.

Possible values are:

- NO\_PRIORITY: This value indicates that the device trigger has no priority.

- PRIORITY: This value indicates that the device trigger has priority.

# A.8 GMDViaMBMS APIs

## A.8.1 GMDviaMBMSbyMB2 API

openapi: 3.0.0

info:

title: GMDviaMBMSbyMB2

description: |

API for Group Message Delivery via MBMS by MB2

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version: 1.3.0-alpha.1

externalDocs:

description: 3GPP TS 29.122 V18.4.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-group-message-delivery-mb2/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/tmgi-allocation:

get:

summary: read all TMGI Allocation resource for a given SCS/AS

operationId: FetchAllTMGIAllocations

tags:

- TMGI Allocation Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

responses:

'200':

description: OK (successful query of TMGI Allocation resource)

content:

application/json:

schema:

$ref: '#/components/schemas/TMGIAllocation'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Creates a new TMGI Allocation resource for a given SCS/AS.

operationId: CreateTMGIAllocation

tags:

- TMGI Allocation Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

requestBody:

description: representation of the TMGI Allocation to be created in the SCEF

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/TMGIAllocation'

responses:

'201':

description: successful creation of an TMGI Allocation

content:

application/json:

schema:

$ref: '#/components/schemas/TMGIAllocation'

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'

/{scsAsId}/tmgi-allocation/{tmgi}:

get:

summary: Read a TMGI Allocation resource for a given SCS/AS and a TMGI.

operationId: FetchIndTMGIAllocation

tags:

- Individual TMGI Allocation Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: tmgi

in: path

description: TMGI

required: true

schema:

type: string

responses:

'200':

description: OK (successful query of TMGI Allocation resource)

content:

application/json:

schema:

$ref: '#/components/schemas/TMGIAllocation'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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: Updates an existing TMGI Allocation resource for a given SCS/AS and a TMGI.

operationId: UpdateIndTMGIAllocation

tags:

- Individual TMGI Allocation Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: tmgi

in: path

description: TMGI

required: true

schema:

type: string

requestBody:

description: representation of the TMGI Allocation to be updated in the SCEF

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/TMGIAllocation'

responses:

'200':

description: successful creation of an TMGI Allocation

content:

application/json:

schema:

$ref: '#/components/schemas/TMGIAllocation'

'204':

description: >

The TMGI expiration time renewal is successful, and no content is to be sent in

the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

patch:

summary: Updates an existing TMGI Allocation resource for a given SCS/AS and a TMGI.

operationId: ModifyIndTMGIAllocation

tags:

- Individual TMGI Allocation Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: tmgi

in: path

description: TMGI

required: true

schema:

type: string

requestBody:

description: representation of the TMGI Allocation to be updated in the SCEF

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/TMGIAllocationPatch'

responses:

'200':

description: successful creation of an TMGI Allocation

content:

application/json:

schema:

$ref: '#/components/schemas/TMGIAllocation'

'204':

description: >

The TMGI expiration time renewal is successful, and no content is to be sent

in the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Deletes an existing TMGI Allocation resource for a given SCS/AS and a TMGI.

operationId: DeleteTMGIAllocation

tags:

- Individual TMGI Allocation Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: tmgi

in: path

description: TMGI

required: true

schema:

type: string

responses:

'204':

description: No Content, successful deletion of an TMGI Allocation

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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'

/{scsAsId}/tmgi-allocation/{tmgi}/delivery-via-mbms:

get:

summary: Read all group message delivery via MBMS resource for a given SCS/AS and a TMGI.

operationId: FecthAllGMDViaMBMSByMB2

tags:

- Delivery via MBMS Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: tmgi

in: path

description: TMGI

required: true

schema:

type: string

responses:

'200':

description: OK (successful query of Delivery via MBMS resource)

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByMb2'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Creates a new delivery via MBMS for a given SCS/AS and a TMGI.

operationId: CreateGMDViaMBMSByMB2

tags:

- Delivery via MBMS Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: tmgi

in: path

description: TMGI

required: true

schema:

type: string

requestBody:

description: representation of the GMD via MBMS by MB2 resource to be Created in the SCEF

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByMb2'

callbacks:

gMDByMb2Notification:

'{$request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/GMDByMb2Notification'

responses:

'200':

description: OK (The successful acknowledgement of the notification with a body)

content:

application/json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Acknowledgement'

'204':

description: 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: successful creation of an GMD via MBMS by MB2 resource

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByMb2'

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'

/{scsAsId}/tmgi-allocation/{tmgi}/delivery-via-mbms/{transactionId}:

get:

summary: Read all group message delivery via MBMS resource for a given SCS/AS and a TMGI.

operationId: FetchIndDeliveryViaMBMS

tags:

- Individual Delivery via MBMS resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: tmgi

in: path

description: TMGI

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

responses:

'200':

description: OK (successful query of an Delivery via MBMS resource)

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByMb2'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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: Updates a existing delivery via MBMS for a given SCS/AS, a TMGI and transaction Id.

operationId: UpdateIndDeliveryViaMBMS

tags:

- Individual Delivery via MBMS resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: tmgi

in: path

description: TMGI

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

requestBody:

description: representation of the GMD via MBMS by MB2 resource to be udpated in the SCEF

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByMb2'

responses:

'200':

description: successful update of an individual GMD via MBMS by MB2 resource

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByMb2'

'204':

description: >

The group message delivery is replaced successfully, and no content is to be sent

in the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

patch:

summary: Updates a existing delivery via MBMS for a given SCS/AS, a TMGI and transaction Id.

operationId: ModifyIndDeliveryViaMBMS

tags:

- Individual Delivery via MBMS resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: tmgi

in: path

description: TMGI

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

requestBody:

description: representation of the GMD via MBMS by MB2 resource to be udpated in the SCEF

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByMb2Patch'

responses:

'200':

description: successful update of an individual GMD via MBMS by MB2 resource

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByMb2'

'204':

description: >

The group message delivery is modified successfully, and no content is to be sent

in the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Deletes a delivery via MBMS resource for a given SCS/AS, a TMGI and a transcation Id.

operationId: DeleteIndDeliveryViaMBMS

tags:

- Individual Delivery via MBMS resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: tmgi

in: path

description: TMGI

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

responses:

'204':

description: No Content, successful deletion of an resouce of deliery via MBMS

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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:

TMGIAllocation:

description: Represents an individual TMGI Allocation resource.

type: object

properties:

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

externalGroupId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalGroupId'

mbmsLocArea:

$ref: '#/components/schemas/MbmsLocArea'

tmgiExpiration:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTimeRo'

GMDViaMBMSByMb2:

description: Represents a group message delivery via MBMS by MB2.

type: object

properties:

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

requestTestNotification:

type: boolean

description: >

Set to true by the SCS/AS to request the SCEF to send a test notification as

defined in clause 5.2.5.3. Set to false or omitted otherwise.

websockNotifConfig:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

externalGroupId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalGroupId'

mbmsLocArea:

$ref: '#/components/schemas/MbmsLocArea'

messageDeliveryStartTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

groupMessagePayload:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Bytes'

scefMessageDeliveryIPv4:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv4AddrRo'

scefMessageDeliveryIPv6:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv6AddrRo'

scefMessageDeliveryPort:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/PortRo'

required:

- notificationDestination

GMDByMb2Notification:

description: Represents a group message delivery notification.

type: object

properties:

transaction:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

deliveryTriggerStatus:

type: boolean

description: >

Indicates whether delivery of group message payload corresponding to the TMGI was

successful (TRUE) or not (FALSE)

required:

- transaction

- deliveryTriggerStatus

TMGIAllocationPatch:

description: >

Represents the parameters to request the modification of a TMGI Allocation resource.

type: object

properties:

externalGroupId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalGroupId'

mbmsLocArea:

$ref: '#/components/schemas/MbmsLocArea'

GMDViaMBMSByMb2Patch:

description: Represents a modification request of a group message delivery via MBMS by MB2.

type: object

properties:

externalGroupId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalGroupId'

mbmsLocArea:

$ref: '#/components/schemas/MbmsLocArea'

messageDeliveryStartTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

groupMessagePayload:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Bytes'

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

MbmsLocArea:

description: >

Represents a user location area whithin which is sent a group message delivery

via MBMS request.

type: object

properties:

cellId:

type: array

items:

type: string

minItems: 1

description: >

Indicates a Cell Global Identification of the user which identifies the cell the

UE is registered.

enodeBId:

type: array

items:

type: string

minItems: 1

description: Indicates an eNodeB in which the UE is currently located.

geographicArea:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

minItems: 1

description: Identifies a geographic area of the user where the UE is located.

mbmsServiceAreaId:

type: array

items:

type: string

minItems: 1

description: Identifies an MBMS Service Area Identity of the user where the UE is located.

civicAddress:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/CivicAddress'

minItems: 1

description: Identifies a civic address of the user where the UE is located.

## A.8.2 GMDviaMBMSbyxMB API

openapi: 3.0.0

info:

title: GMDviaMBMSbyxMB

description: |

API for Group Message Delivery via MBMS by xMB

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version: 1.3.0-alpha.1

externalDocs:

description: 3GPP TS 29.122 V18.1.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-group-message-delivery-xmb/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/services:

get:

summary: Read all service resources for a given SCS/AS.

operationId: FetchAllxMBServices

tags:

- Service Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

responses:

'200':

description: OK (successful query of service creation resource)

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/ServiceCreation'

minItems: 0

description: The service resource for the SCS/AS in the request URI is returned.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Creates a new service creation resource for a given SCS/AS.

operationId: CreatexMBService

tags:

- Service Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

requestBody:

description: representation of the service to be created in the SCEF

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ServiceCreation'

responses:

'201':

description: successful creation of a service

content:

application/json:

schema:

$ref: '#/components/schemas/ServiceCreation'

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'

/{scsAsId}/services/{serviceId}:

get:

summary: Read a service resource for a given SCS/AS and a Service Id.

operationId: FetchIndxMBService

tags:

- Individual Service Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: serviceId

in: path

description: Service Id

required: true

schema:

type: string

responses:

'200':

description: OK (successful query of service resource)

content:

application/json:

schema:

$ref: '#/components/schemas/ServiceCreation'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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: Deletes an existing service resource for a given SCS/AS and a service id.

operationId: DeletexMBService

tags:

- Individual Service Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: serviceId

in: path

description: Service Id

required: true

schema:

type: string

responses:

'204':

description: No Content, successful deletion of a service resource

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

/{scsAsId}/services/{serviceId}/delivery-via-mbms:

get:

summary: Read all group message delivery via MBMS resource for a given SCS/AS and a service id.

operationId: FetchAllGMDViaMBMS

tags:

- Delivery via MBMS Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: serviceId

in: path

description: Service Id

required: true

schema:

type: string

responses:

'200':

description: OK (successful query of Delivery via MBMS resource)

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/GMDViaMBMSByxMB'

minItems: 0

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Creates a new delivery via MBMS for a given SCS/AS and a service Id.

operationId: CreateGMDViaMBMS

tags:

- Delivery via MBMS Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: serviceId

in: path

description: Service Id

required: true

schema:

type: string

requestBody:

description: representation of the GMD via MBMS by xMB resource to be Created in the SCEF

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByxMB'

callbacks:

gMDByxMBNotification:

'{$request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/GMDByxMBNotification'

responses:

'200':

description: OK (The successful acknowledgement of the notification with a body)

content:

application/json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Acknowledgement'

'204':

description: 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: successful creation of an GMD via MBMS by xMB resource

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByxMB'

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'

/{scsAsId}/services/{serviceId}/delivery-via-mbms/{transactionId}:

get:

summary: Read all group message delivery via MBMS resource for a given SCS/AS and a service Id.

operationId: FetchIndGMDViaMBMS

tags:

- Individual Delivery via MBMS resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: serviceId

in: path

description: Service Id

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

responses:

'200':

description: OK (successful query of an Delivery via MBMS resource)

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByxMB'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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: Updates an existing delivery via MBMS for a given SCS/AS, a service Id and transaction Id.

operationId: UpdateIndGMDViaMBMS

tags:

- Individual Delivery via MBMS resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: serviceId

in: path

description: Service Id

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

requestBody:

description: representation of the GMD via MBMS by xMB resource to be udpated in the SCEF

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByxMB'

responses:

'200':

description: successful update of an individual GMD via MBMS by xMB resource

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByxMB'

'204':

description: >

The group message delivery was modified successfully, and no content is to be sent

in the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

patch:

summary: Updates an existing delivery via MBMS for a given SCS/AS, a service Id and transaction Id.

operationId: ModifyIndGMDViaMBMS

tags:

- Individual Delivery via MBMS resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: serviceId

in: path

description: Service Id

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

requestBody:

description: representation of the GMD via MBMS by xMB resource to be udpated in the SCEF

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByxMBPatch'

responses:

'200':

description: successful update of an individual GMD via MBMS by xMB resource

content:

application/json:

schema:

$ref: '#/components/schemas/GMDViaMBMSByxMB'

'204':

description: >

The group message delivery was modified successfully, and no content is to be sent

in the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Deletes a delivery via MBMS resource for a given SCS/AS, a service Id and a transcation Id.

operationId: DeleteIndGMDViaMBMS

tags:

- Individual Delivery via MBMS resource Operation

parameters:

- name: scsAsId

in: path

description: Identifier of SCS/AS

required: true

schema:

type: string

- name: serviceId

in: path

description: Service Id

required: true

schema:

type: string

- name: transactionId

in: path

description: Identifier of transaction

required: true

schema:

type: string

responses:

'204':

description: No Content, successful deletion of an resouce of deliery via MBMS

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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:

ServiceCreation:

description: Represents an individual xMB Service resource.

type: object

properties:

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

externalGroupId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalGroupId'

userServiceId:

type: string

description: Identifies the MBMS User Service supplied by the SCEF.

readOnly: true

serviceClass:

type: string

description: The service class that service belongs to supplied by the SCEF.

readOnly: true

serviceLanguages:

type: array

items:

type: string

minItems: 1

description: List of language of the service content supplied by the SCEF.

readOnly: true

serviceNames:

type: array

items:

type: string

minItems: 1

description: List of Service Names supplied by the SCEF.

readOnly: true

receiveOnlyMode:

type: boolean

description: >

When set to 'true', the Content Provider indicates that the service is a Receive Only

Mode service. This parameter is supplied by the SCEF.

readOnly: true

serviceAnnouncementMode:

$ref: '#/components/schemas/ServiceAnnouncementMode'

GMDViaMBMSByxMB:

description: Represents a group message delivery via MBMS by xMB.

type: object

properties:

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

requestTestNotification:

type: boolean

description: >

Set to true by the SCS/AS to request the SCEF to send a test notification as defined

in clause 5.2.5.3. Set to false or omitted otherwise.

websockNotifConfig:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

mbmsLocArea:

$ref: '#/components/schemas/MbmsLocArea'

messageDeliveryStartTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

messageDeliveryStopTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

groupMessagePayload:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Bytes'

scefMessageDeliveryIPv4:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv4AddrRo'

scefMessageDeliveryIPv6:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv6AddrRo'

scefMessageDeliveryPort:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/PortRo'

required:

- notificationDestination

GMDByxMBNotification:

description: Represents a group message delivery notification.

type: object

properties:

transaction:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

deliveryTriggerStatus:

type: boolean

description: >

Indicates whether delivery of group message payload was successful(TRUE) or not (FALSE).

required:

- transaction

- deliveryTriggerStatus

GMDViaMBMSByxMBPatch:

description: Represents a modification request of a group message delivery via MBMS by xMB.

type: object

properties:

mbmsLocArea:

$ref: '#/components/schemas/MbmsLocArea'

messageDeliveryStartTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

messageDeliveryStopTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

groupMessagePayload:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Bytes'

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

MbmsLocArea:

description: >

Represents a user location area whithin which is sent a group message delivery via MBMS

request.

type: object

properties:

cellId:

type: array

items:

type: string

minItems: 1

description: >

Indicates a Cell Global Identification of the user which identifies the cell the UE is

registered.

enodeBId:

type: array

items:

type: string

minItems: 1

description: Indicates an eNodeB in which the UE is currently located.

geographicArea:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

minItems: 1

description: Identifies a geographic area of the user where the UE is located.

mbmsServiceAreaId:

type: array

items:

type: string

minItems: 1

description: Identifies an MBMS Service Area Identity of the user where the UE is located.

civicAddress:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/CivicAddress'

minItems: 1

description: Identifies a civic address of the user where the UE is located.

ServiceAnnouncementMode:

anyOf:

- type: string

enum:

- SACH

- CONTENT\_PROVIDER

- 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 service annoucement mode.

Possible values are:

- SACH: BM-SC performs the service announcement for the current service using the

SACH channel.

- CONTENT\_PROVIDER: BM-SC provides the necessary service access information used by

the Content Provider to create the service announcement information.

readOnly: true

# A.9 ReportingNetworkStatus API

openapi: 3.0.0

info:

title: 3gpp-network-status-reporting

version: 1.3.0-alpha.1

description: |

API for reporting network status.

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externalDocs:

description: 3GPP TS 29.122 V18.1.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-net-stat-report/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/subscriptions:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ScsAsId'

get:

summary: Read all network status reporting subscription resources for a given SCS/AS.

operationId: FetchAllNwStatusReportSubscriptions

tags:

- Network Status Reporting Subscriptions

responses:

'200':

description: The requested information was returned successfully.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/NetworkStatusReportingSubscription'

minItems: 0

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Create a new network status reporting subscription resource.

operationId: CreateNwStatusReportSubscription

tags:

- Network Status Reporting Subscriptions

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/NetworkStatusReportingSubscription'

callbacks:

notificationDestination:

'{request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/NetworkStatusReportingNotification'

responses:

'204':

description: No Content (successful notification)

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

responses:

'201':

description: >

The subscription was created successfully. The URI of the created resource shall be

returned in the "Location" HTTP header.

content:

application/json:

schema:

$ref: '#/components/schemas/NetworkStatusReportingSubscription'

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'

/{scsAsId}/subscriptions/{subscriptionId}:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ScsAsId'

- name: subscriptionId

in: path

description: Identifier of the subscription resource of type string

required: true

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ResourceId'

get:

summary: Read an active network status reporting subscription resource.

operationId: FetchIndNwStatusReportSubscription

tags:

- Individual Network Status Reporting subscription

responses:

'200':

description: The requested information was returned successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/NetworkStatusReportingSubscription'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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: Modify an existing subscription resource to update a subscription.

operationId: UpdateIndNwStatusReportSubscription

tags:

- Individual Network Status Reporting subscription

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/NetworkStatusReportingSubscription'

responses:

'200':

description: The subscription was updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/NetworkStatusReportingSubscription'

'204':

description: No Content. The 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'

patch:

summary: Modify an existing Individual Network Status Reporting Subscription resource.

operationId: ModifyIndNwStatusReportSubscription

tags:

- Individual Network Status Reporting Subscription

requestBody:

description: >

Contains the parameters to modify an existing Individual Network Status Reporting

Subscription resource.

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/NetStatusRepSubsPatch'

responses:

'200':

description: >

OK. The modification of the Individual Network Status Reporting Subscription resource

was successfull. The SCEF shall return an updated representation of the resource within

the NetworkStatusReportingSubscription data structure in the response message body.

content:

application/json:

schema:

$ref: '#/components/schemas/NetworkStatusReportingSubscription'

'204':

description: >

No Content. The modification of the Individual Network Status Reporting Subscription

resource was successfull and no content is to be sent in the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Delete an existing continuous network status reporting subscription resource.

operationId: DeleteIndNwStatusReportSubscription

tags:

- Individual Network Status Reporting subscription

responses:

'204':

description: The 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'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'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:

NetworkStatusReportingSubscription:

description: Represents a subscription to network status information reporting.

type: object

properties:

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

requestTestNotification:

type: boolean

description: >

Set to true by the SCS/AS to request the SCEF to send a test notification as defined in

clause 5.2.5.3. Set to false or omitted otherwise.

websockNotifConfig:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

locationArea:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea'

timeDuration:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

thresholdValues:

type: array

items:

$ref: '#/components/schemas/CongestionValue'

minItems: 1

description: >

Identifies a list of congestion level(s) with exact value that the SCS/AS requests

to be informed of when reached.

thresholdTypes:

type: array

items:

$ref: '#/components/schemas/CongestionType'

minItems: 1

description: Identifies a list of congestion level(s) with abstracted value that the SCS/AS requests to be informed of when reached.

required:

- notificationDestination

- locationArea

not:

required: [thresholdValues, thresholdTypes]

NetStatusRepSubsPatch:

description: >

Represents the parameters to request the modification of network status reporting

subscription.

type: object

properties:

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

locationArea:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea'

timeDuration:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTimeRm'

thresholdValues:

type: array

items:

$ref: '#/components/schemas/CongestionValue'

minItems: 1

thresholdTypes:

type: array

items:

$ref: '#/components/schemas/CongestionType'

minItems: 1

not:

required: [thresholdValues, thresholdTypes]

NetworkStatusReportingNotification:

description: Represents a network status reporting notification.

type: object

properties:

subscription:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

nsiValue:

$ref: '#/components/schemas/CongestionValue'

nsiType:

$ref: '#/components/schemas/CongestionType'

required:

- subscription

not:

required: [nsiValue, nsiType]

CongestionValue:

type: integer

minimum: 0

maximum: 31

description: >

Unsigned integer with valid values between 0 and 31. The value 0 indicates that there is no

congestion. The value 1 is the lowest congestion level and value 31 is the highest

congestion level.

CongestionType:

anyOf:

- type: string

enum:

- HIGH

- MEDIUM

- LOW

- 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 abstracted values for congestion status.

Possible values are:

- HIGH: The congestion status is high.

- MEDIUM: The congestion status is medium.

- LOW: The congestion status is low.

# A.10 CpProvisioning API

openapi: 3.0.0

info:

title: 3gpp-cp-parameter-provisioning

version: 1.3.0-alpha.4

description: |

API for provisioning communication pattern parameters.

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externalDocs:

description: 3GPP TS 29.122 V18.4.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-cp-parameter-provisioning/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/subscriptions:

get:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

summary: Read all active CP parameter provisioning subscription resources for a given SCS/AS.

operationId: FetchAllCPProvisioningSubscriptions

tags:

- CP provisioning Subscriptions

responses:

'200':

description: OK. The subscription information related to the request URI is returned.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/CpInfo'

minItems: 0

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

summary: Create a new subscription resource of provisioning CP parameter set(s).

operationId: CreateCPProvisioningSubscription

tags:

- CP provisioning Subscriptions

requestBody:

description: >

Create new subscriptions for a given SCS/AS and the provisioning CP parameter sets.

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/CpInfo'

responses:

'201':

description: >

Created. The subscription was created successfully. The SCEF shall return the created

subscription in the response content.

content:

application/json:

schema:

$ref: '#/components/schemas/CpInfo'

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':

description: >

The CP parameters for all sets were not created successfully. CpReport may be included

with detailed information.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/CpReport'

minItems: 1

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

/{scsAsId}/subscriptions/{subscriptionId}:

get:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Subscription ID

required: true

schema:

type: string

summary: Read a CP parameter provisioning subscription resource.

operationId: FetchIndCPProvisioningSubscription

tags:

- Individual CP Provisioning Subscription

responses:

'200':

description: OK. The subscription information related to the request URI is returned.

content:

application/json:

schema:

$ref: '#/components/schemas/CpInfo'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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: Modify a CP parameter provisioning subscription resource.

operationId: UpdateIndCPProvisioningSubscription

tags:

- Individual CP Provisioning Subscription

requestBody:

description: Modify a CP parameter provisioning subscription resource.

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/CpInfo'

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Subscription ID

required: true

schema:

type: string

responses:

'200':

description: >

OK. The subscription was modified successfully. The SCEF shall return an updated

subscription in the response content.

content:

application/json:

schema:

$ref: '#/components/schemas/CpInfo'

'204':

description: >

No Content. The subscription was modified successfully and no content is to be sent

in the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

description: >

The CP parameters for all sets were not updated successfully. CpReport may be included

with detailed information.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/CpReport'

minItems: 1

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Subscription ID

required: true

schema:

type: string

summary: Delete a CP parameter provisioning subscription resource.

operationId: DeleteIndCPProvisioningSubscription

tags:

- Individual CP Provisioning Subscription

responses:

'204':

description: >

No Content. The subscription was deleted successfully. The content shall be empty.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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'

/{scsAsId}/subscriptions/{subscriptionId}/cpSets/{setId}:

get:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Subscription ID

required: true

schema:

type: string

- name: setId

in: path

description: Identifier of the CP parameter set

required: true

schema:

type: string

summary: Read CP at individual CP set(s) level associated with a CP parameter set Id.

operationId: FetchIndCPSetProvisioning

tags:

- Individual CP set Provisioning

responses:

'200':

description: OK. The subscription information related to the request URI is returned.

content:

application/json:

schema:

$ref: '#/components/schemas/CpParameterSet'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

put:

summary: Update CP at individual CP set(s) level associated with a CP parameter set Id.

operationId: UpdateIndCPSetProvisioning

tags:

- Individual CP set Provisioning

requestBody:

description: Change information for a CP parameter set.

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/CpParameterSet'

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Subscription ID

required: true

schema:

type: string

- name: setId

in: path

description: Identifier of the CP parameter set

required: true

schema:

type: string

responses:

'200':

description: >

OK. The CP parameter set resource was modified successfully. The SCEF shall return an

updated CP parameter set resource in the response content.

content:

application/json:

schema:

$ref: '#/components/schemas/CpParameterSet'

'204':

description: >

No Content. The CP parameter set resource was modified successfully and no content

is to be sent in the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'409':

description: The CP parameters for the CP set were not updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/CpReport'

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

description: The CP parameters for the CP set were not updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/CpReport'

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Subscription ID

required: true

schema:

type: string

- name: setId

in: path

description: Identifier of the CP parameter set

required: true

schema:

type: string

summary: Delete CP at individual CP set(s) level associated with a CP parameter set Id.

operationId: DeleteIndCPSetProvisioning

tags:

- Individual CP set Provisioning

responses:

'204':

description: >

No Content. The subscription was deleted successfully. The content shall be empty.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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:

CpInfo:

description: Represents the resources for communication pattern parameter provisioning.

type: object

properties:

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

mtcProviderId:

type: string

description: Identifies the MTC Service Provider and/or MTC Application.

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

externalId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalId'

msisdn:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Msisdn'

externalGroupId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalGroupId'

cpParameterSets:

type: object

additionalProperties:

$ref: '#/components/schemas/CpParameterSet'

minProperties: 1

description: >

Identifies a set of CP parameter information that may be part of this CpInfo structure.

Any string value can be used as a key of the map.

cpReports:

type: object

additionalProperties:

$ref: '#/components/schemas/CpReport'

minProperties: 1

description: >

Supplied by the SCEF and contains the CP set identifiers for which CP parameter(s) are

not added or modified successfully. The failure reason is also included. Each element

provides the related information for one or more CP set identifier(s) and is identified

in the map via the failure identifier as key.

readOnly: true

snssai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

ueIpAddr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/IpAddr'

ueMacAddr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

required:

- cpParameterSets

oneOf:

- required: [externalId]

- required: [msisdn]

- required: [externalGroupId]

CpParameterSet:

description: Represents an offered communication pattern parameter set.

type: object

properties:

setId:

type: string

description: >

SCS/AS-chosen correlator provided by the SCS/AS in the request to create a resource

for CP parameter set(s).

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

validityTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

periodicCommunicationIndicator:

$ref: '#/components/schemas/CommunicationIndicator'

communicationDurationTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSec'

periodicTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSec'

scheduledCommunicationTime:

$ref: '#/components/schemas/ScheduledCommunicationTime'

scheduledCommunicationType:

$ref: '#/components/schemas/ScheduledCommunicationType'

stationaryIndication:

$ref: '#/components/schemas/StationaryIndication'

batteryInds:

type: array

items:

$ref: '#/components/schemas/BatteryIndication'

minItems: 1

trafficProfile:

$ref: '#/components/schemas/TrafficProfile'

expectedUmts:

type: array

items:

$ref: '#/components/schemas/UmtLocationArea5G'

minItems: 1

description: >

Identifies the UE's expected geographical movement. The attribute is only applicable

in 5G.

expectedUmtDays:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DayOfWeek'

expectedUmtDaysAdd:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DayOfWeek'

minItems: 1

maxItems: 5

description: Identifies the additional day(s) of the week.

appExpUeBehvs:

type: array

items:

$ref: '#/components/schemas/AppExpUeBehaviour'

minItems: 1

description: Contains the Application Specific Expected UE Behaviour parameters.

confidenceLevel:

type: string

pattern: '^[0]\.[0-9]{2}|[1.00]$'

accuracyLevel:

type: string

pattern: '^[0]\.[0-9]{2}|[1.00]$'

required:

- setId

ScheduledCommunicationTime:

description: Represents an offered scheduled communication time.

type: object

properties:

daysOfWeek:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DayOfWeek'

minItems: 1

maxItems: 6

description: >

Identifies the day(s) of the week. If absent, it indicates every day of the week.

timeOfDayStart:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeOfDay'

timeOfDayEnd:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeOfDay'

CpReport:

description: >

Represents a CP report indicating the CP set identifier(s) which CP parameter(s) are not

added or modified successfully and the corresponding failure cause(s).

type: object

properties:

setIds:

type: array

items:

type: string

minItems: 1

description: >

Identifies the CP set identifier(s) which CP parameter(s) are not added or modified

successfully

failureCode:

$ref: '#/components/schemas/CpFailureCode'

required:

- failureCode

UmtLocationArea5G:

description: Represents the user location area describing the UE moving trajectory.

allOf:

- $ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

- type: object

properties:

umtTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeOfDay'

umtDuration:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSec'

AppExpUeBehaviour:

description: Contains the Application Specificf Expected UE Behaviour parameters.

type: object

properties:

appId:

type: string

description: Indicates the Application Identifier.

expPduSesInacTm:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

flowDescriptions:

type: array

items:

type: string

minItems: 1

description: >

Represents a 3-tuple with protocol, server ip and server port for UL/DL application

traffic. The content of the string has the same encoding as the IPFilterRule AVP

value as defined in IETF RFC 6733.

confidenceLevel:

type: string

pattern: '^[0]\.[0-9]{2}|[1.00]$'

accuracyLevel:

type: string

pattern: '^[0]\.[0-9]{2}|[1.00]$'

failureCode:

$ref: '#/components/schemas/CpFailureCode'

validityTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

oneOf:

- required: [appId]

- required: [flowDescriptions]

CommunicationIndicator:

anyOf:

- type: string

enum:

- PERIODICALLY

- ON\_DEMAND

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the type of the communication.

Possible values are:

- PERIODICALLY: Identifies the UE communicates periodically

- ON\_DEMAND: Identifies the UE communicates on demand

StationaryIndication:

anyOf:

- type: string

enum:

- STATIONARY

- MOBILE

- 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 stationarity of the UE.

Possible values are:

- STATIONARY: Identifies the UE is stationary

- MOBILE: Identifies the UE is mobile

CpFailureCode:

anyOf:

- type: string

enum:

- MALFUNCTION

- SET\_ID\_DUPLICATED

- OTHER\_REASON

- CONFIDENCE\_LEVEL\_NOT\_SUFFICIENT

- ACCURACY\_LEVEL\_NOT\_SUFFICIENT

- 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 failure reason of the CP parameter provisioning.

Possible values are

- MALFUNCTION: This value indicates that something functions wrongly in CP parameter

provisioning or the CP parameter provisioning does not function at all.

- SET\_ID\_DUPLICATED: The received CP set identifier(s) are already provisioned.

- OTHER\_REASON: Other reason unspecified.

- CONFIDENCE\_LEVEL\_NOT\_SUFFICIENT: The received confidence level for the expected UE

parameter is not sufficient.

- ACCURACY\_LEVEL\_NOT\_SUFFICIENT: The received accuracy level for the expected UE parameter

is not sufficient.

BatteryIndication:

anyOf:

- type: string

enum:

- BATTERY\_RECHARGE

- BATTERY\_REPLACE

- BATTERY\_NO\_RECHARGE

- BATTERY\_NO\_REPLACE

- NO\_BATTERY

- 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 power consumption.

Possible values are:

- BATTERY\_RECHARGE: UE powered with rechargeable battery.

- BATTERY\_REPLACE: UE powered with replaceable battery.

- BATTERY\_NO\_RECHARGE: UE powered with no rechargeable battery.

- BATTERY\_NO\_REPLACE: UE powered with no replaceable battery.

- NO\_BATTERY: UE not battery powered.

TrafficProfile:

anyOf:

- type: string

enum:

- SINGLE\_TRANS\_UL

- SINGLE\_TRANS\_DL

- DUAL\_TRANS\_UL\_FIRST

- DUAL\_TRANS\_DL\_FIRST

- MULTI\_TRANS

- 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 data transmission.

Possible values are:

- SINGLE\_TRANS\_UL: Uplink single packet transmission.

- SINGLE\_TRANS\_DL: Downlink single packet transmission.

- DUAL\_TRANS\_UL\_FIRST: Dual packet transmission, firstly uplink packet transmission with

subsequent downlink packet transmission.

- DUAL\_TRANS\_DL\_FIRST: Dual packet transmission, firstly downlink packet transmission with

subsequent uplink packet transmission.

- MULTI\_TRANS: Multiple packet transmission.

ScheduledCommunicationType:

anyOf:

- type: string

enum:

- DOWNLINK

- UPLINK

- BIDIRECTIONAL

- 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 scheduled communication.

Possible values are:

- DOWNLINK: Downlink only.

- UPLINK: Uplink only.

- BIDIRECTIONAL: Bi-directional.

# A.11 PfdManagement API

openapi: 3.0.0

info:

title: 3gpp-pfd-management

version: 1.3.0-alpha.3

description: |

API for PFD management.

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externalDocs:

description: 3GPP TS 29.122 V18.4.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-pfd-management/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/transactions:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

get:

summary: Read all or queried PFDs for a given SCS/AS.

operationId: FetchAllPFDManagementTransactions

tags:

- PFD Management Transactions

parameters:

- name: external-app-ids

in: query

description: The external application identifier(s) of the requested PFD data.

required: false

schema:

type: array

items:

type: string

minItems: 1

responses:

'200':

description: OK. All or queried transactions related to the request URI are returned.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/PfdManagement'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Create PFDs for a given SCS/AS and one or more external Application Identifier(s).

operationId: CreatePFDManagementTransaction

tags:

- PFD Management Transactions

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/PfdManagement'

description: Create a new transaction for PFD management.

responses:

'201':

description: >

Created. The transaction was created successfully. The SCEF shall return the created

transaction in the response content. PfdReport may be included to provide detailed

failure information for some applications.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdManagement'

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':

description: >

The PFDs for all applications were not created successfully. PfdReport is included with

detailed information.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/PfdReport'

minItems: 1

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

callbacks:

notificationDestination:

'{request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/PfdReport'

minItems: 1

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'

/{scsAsId}/transactions/{transactionId}:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

- name: transactionId

in: path

description: Transaction ID

required: true

schema:

type: string

get:

summary: Read all PFDs for a given SCS/AS and a transaction for one or more external Application Identifier(s).

operationId: FetchIndPFDManagementTransaction

tags:

- Individual PFD Management Transaction

responses:

'200':

description: OK. The transaction information related to the request URI is returned.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdManagement'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

put:

summary: Update PFDs for a given SCS/AS and a transaction for one or more external Application Identifier(s).

operationId: UpdateIndPFDManagementTransaction

tags:

- Individual PFD Management Transaction

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/PfdManagement'

description: Change information in PFD management transaction.

responses:

'200':

description: >

OK. The transaction was modified successfully. The SCEF shall return an updated

transaction in the response content.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdManagement'

'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':

description: >

The PFDs for all applications were not updated successfully. PfdReport is included with

detailed information.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/PfdReport'

minItems: 1

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

patch:

summary: Modify an existing PFD Management Transaction resource.

operationId: ModifyIndPFDManagementTransaction

tags:

- Individual PFD Management Transaction

requestBody:

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/PfdManagementPatch'

responses:

'200':

description: >

OK. The PFD Management Transaction was modified successfully. The SCEF shall return an

updated representation of the resource in the response body.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdManagement'

'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':

description: >

The PFDs for all applications were not modified successfully. A set of PFD Report(s) is

included with detailed information.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/PfdReport'

minItems: 1

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Delete PFDs for a given SCS/AS and a transaction for one or more external Application Identifier(s).

operationId: DeleteIndPFDManagementTransaction

tags:

- Individual PFD Management Transaction

responses:

'204':

description: >

No Content. The transaction was deleted successfully. The content shall be empty.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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'

/{scsAsId}/transactions/{transactionId}/applications/{appId}:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

- name: transactionId

in: path

description: Transaction ID

required: true

schema:

type: string

- name: appId

in: path

description: Identifier of the application

required: true

schema:

type: string

get:

summary: Read PFDs at individual application level.

operationId: FetchIndApplicationPFDManagement

tags:

- Individual Application PFD Management

responses:

'200':

description: OK. The application information related to the request URI is returned.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdData'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

put:

summary: Update PFDs at individual application level.

operationId: UpdateIndApplicationPFDManagement

tags:

- Individual Application PFD Management

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/PfdData'

description: Change information in application.

responses:

'200':

description: >

OK. The application resource was modified successfully. The SCEF shall return an updated

application resource in the response content.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdData'

'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':

description: The PFDs for the application were not updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdReport'

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'409':

description: The PFDs for the application were not updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdReport'

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

description: The PFDs for the application were not updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdReport'

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

patch:

summary: Update PFDs at individual application level.

operationId: ModifyIndApplicationPFDManagement

tags:

- Individual Application PFD Management

requestBody:

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/PfdData'

description: Change information in PFD management transaction.

responses:

'200':

description: >

OK. The transaction was modified successfully. The SCEF shall return an updated

transaction in the response content.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdData'

'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':

description: The PFDs for the application were not updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdReport'

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'409':

description: The PFDs for the application were not updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdReport'

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

description: The PFDs for the application were not updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/PfdReport'

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Delete PFDs at individual application level.

operationId: DeleteIndApplicationPFDManagement

tags:

- Individual Application PFD Management

responses:

'204':

description: >

No Content. The application was deleted successfully. The content shall be empty.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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:

PfdManagement:

description: Represents a PFD management resource for a PFD management request.

type: object

properties:

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

pfdDatas:

type: object

additionalProperties:

$ref: '#/components/schemas/PfdData'

minProperties: 1

description: >

Each element uniquely identifies the PFDs for an external application identifier.

Each element is identified in the map via an external application identifier as key.

The response shall include successfully provisioned PFD data of application(s).

pfdReports:

type: object

additionalProperties:

$ref: '#/components/schemas/PfdReport'

minProperties: 1

description: >

Supplied by the SCEF and contains the external application identifiers for which PFD(s)

are not added or modified successfully. The failure reason is also included.

Each element provides the related information for one or more external application

identifier(s) and is identified in the map via the failure identifier as key.

readOnly: true

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

requestTestNotification:

type: boolean

description: >

Set to true by the SCS/AS to request the SCEF to send a test notification as defined

in clause 5.2.5.3. Set to false or omitted otherwise.

websockNotifConfig:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

required:

- pfdDatas

PfdData:

description: >

Represents a PFD request to add, update or remove PFD(s) for one external application

identifier.

type: object

properties:

externalAppId:

type: string

description: Each element uniquely external application identifier

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

pfds:

type: object

additionalProperties:

$ref: '#/components/schemas/Pfd'

description: >

Contains the PFDs of the external application identifier. Each PFD is identified in

the map via a key containing the PFD identifier.

allowedDelay:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSecRm'

cachingTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSecRo'

required:

- externalAppId

- pfds

Pfd:

description: Represents a PFD for an external Application Identifier.

type: object

properties:

pfdId:

type: string

description: Identifies a PDF of an application identifier.

flowDescriptions:

type: array

items:

type: string

minItems: 1

description: >

Represents a 3-tuple with protocol, server ip and server port for UL/DL application

traffic. The content of the string has the same encoding as the IPFilterRule AVP

value as defined in IETF RFC 6733.

urls:

type: array

items:

type: string

minItems: 1

description: >

Indicates a URL or a regular expression which is used to match the significant parts

of the URL.

domainNames:

type: array

items:

type: string

minItems: 1

description: Indicates an FQDN or a regular expression as a domain name matching criteria.

dnProtocol:

$ref: '#/components/schemas/DomainNameProtocol'

required:

- pfdId

PfdReport:

description: >

Represents a PFD report indicating the external application identifier(s) which PFD(s)

are not added or modified successfully and the corresponding failure cause(s).

type: object

properties:

externalAppIds:

type: array

items:

type: string

minItems: 1

description: >

Identifies the external application identifier(s) which PFD(s) are not added or

modified successfully

failureCode:

$ref: '#/components/schemas/FailureCode'

cachingTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSec'

locationArea:

$ref: '#/components/schemas/UserPlaneLocationArea'

required:

- externalAppIds

- failureCode

UserPlaneLocationArea:

description: >

Represents location area(s) of the user plane functions which are unable to enforce the

provisioned PFD(s) successfully.

type: object

properties:

locationArea:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea'

locationArea5G:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

dnais:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnai'

minItems: 0

description: Identifies a list of DNAI which the user plane functions support.

PfdManagementPatch:

description: >

Represents the parameters to request the modification of a PFD management transaction

resource.

type: object

properties:

pfdDatas:

type: object

additionalProperties:

$ref: '#/components/schemas/PfdData'

minProperties: 1

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

FailureCode:

anyOf:

- type: string

enum:

- MALFUNCTION

- RESOURCE\_LIMITATION

- SHORT\_DELAY

- APP\_ID\_DUPLICATED

- PARTIAL\_FAILURE

- OTHER\_REASON

- 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 failure reason of the PFD management.

Possible values are:

- MALFUNCTION: This value indicates that something functions wrongly in PFD provisioning

or the PFD provisioning does not function at all.

- RESOURCE\_LIMITATION: This value indicates there is resource limitation for PFD storage.

- SHORT\_DELAY: This value indicates that the allowed delay is too short and PFD(s)

are not stored.

- APP\_ID\_DUPLICATED: The received external application identifier(s) are already

provisioned.

- PARTIAL\_FAILURE: The PFD(s) are not provisioned to all PCEFs/TDFs/SMFs.

- OTHER\_REASON: Other reason unspecified.

DomainNameProtocol:

anyOf:

- type: string

enum:

- DNS\_QNAME

- TLS\_SNI

- TLS\_SAN

- TSL\_SCN

- 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 Domain Name Protocol.

Possible values are:

- DNS\_QNAME: Identifies the DNS protocol and the question name in DNS query.

- TLS\_SNI: Identifies the Server Name Indication in TLS ClientHello message.

- TLS\_SAN: Identifies the Subject Alternative Name in TLS ServerCertificate message.

- TSL\_SCN: Identifies the Subject Common Name in TLS ServerCertificate message.

# A.12 ECRControl API

openapi: 3.0.0

info:

title: 3gpp-ecr-control

version: 1.2.0

description: |

API for enhanced converage restriction control.

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externalDocs:

description: 3GPP TS 29.122 V17.6.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-ecr-control/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/query:

post:

summary: Query the status of enhanced converage restriction for a UE.

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ECRControl'

responses:

'200':

description: The requested information was returned successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/ECRData'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

/configure:

post:

summary: Configure the enhanced converage restriction for a UE.

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ECRControl'

responses:

'200':

description: The Enhanced Coverage Restriction setting was configured successfully..

content:

application/json:

schema:

$ref: '#/components/schemas/ECRData'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'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:

ECRControl:

description: Represents the parameters to request Enhanced Coverage Restriction control.

type: object

properties:

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

mtcProviderId:

type: string

description: Identifies the MTC Service Provider and/or MTC Application.

scsAsId:

type: string

description: Identifier of the SCS/AS.

externalId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalId'

msisdn:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Msisdn'

ecrDataWbs:

type: array

items:

$ref: '#/components/schemas/PlmnEcRestrictionDataWb'

minItems: 0

restrictedPlmnIds:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/PlmnId'

minItems: 0

description: Indicates a complete list (and possibly empty) of serving PLMNs where Enhanced Coverage shall be restricted. This attribute shall not be present for the query custom operation.

allowedPlmnIds:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/PlmnId'

minItems: 0

description: Indicates a complete list (and possibly empty) of serving PLMNs where Enhanced Coverage shall be allowed. This attribute shall not be present for the query custom operation.

required:

- supportedFeatures

oneOf:

- required: [externalId]

- required: [msisdn]

not:

required: [restrictedPlmnIds, allowedPlmnIds]

ECRData:

description: Represents the current visited PLMN (if any) and the current settings of enhanced coverage restriction.

type: object

properties:

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

visitedPlmnId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/PlmnId'

ecrDataWbs:

type: array

items:

$ref: '#/components/schemas/PlmnEcRestrictionDataWb'

minItems: 0

restrictedPlmnIds:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/PlmnId'

minItems: 0

description: Indicates a complete list (and possibly empty) of serving PLMNs where Enhanced Coverage shall be restricted.

allowedPlmnIds:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/PlmnId'

minItems: 0

description: Indicates a complete list (and possibly empty) of serving PLMNs where Enhanced Coverage shall be allowed.

required:

- supportedFeatures

not:

required: [restrictedPlmnIds, allowedPlmnIds]

PlmnEcRestrictionDataWb:

description: Indicates whether enhanced coverage mode is restricted or not for a PLMN ID.

type: object

properties:

plmnId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/PlmnId'

plmnEcrDataWb:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/EcRestrictionDataWb'

required:

- plmnId

# A.13 NpConfiguration API

openapi: 3.0.0

info:

title: 3gpp-network-parameter-configuration

version: 1.2.0

description: |

API for network parameter configuration.

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externalDocs:

description: 3GPP TS 29.122 V17.6.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-network-parameter-configuration/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause of 3GPP TS 29.122.

paths:

/{scsAsId}/configurations:

get:

summary: Read all of the active configurations for the SCS/AS.

operationId: FetchAllNPConfigurations

tags:

- Np Configurations

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

responses:

'200':

description: OK (Successful get all of the active NpConfigurations for the SCS/AS)

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/NpConfiguration'

minItems: 0

description: Network Parameter configurations

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Creates a new configuration resource for network parameter configuration.

operationId: CreateNPConfiguration

tags:

- Np Configurations

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

requestBody:

description: new configuration creation

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/NpConfiguration'

callbacks:

notificationDestination:

'{request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ConfigurationNotification'

responses:

'204':

description: No Content (successful notification)

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

responses:

'201':

description: Created (Successful creation of configuration)

content:

application/json:

schema:

$ref: '#/components/schemas/NpConfiguration'

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'

/{scsAsId}/configurations/{configurationId}:

get:

summary: Read an active configuration for the SCS/AS and the configuration Id.

operationId: FetchIndNPConfiguration

tags:

- Individual Np Configuration

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: configurationId

in: path

description: Identifier of the configuration resource

required: true

schema:

type: string

responses:

'200':

description: OK (Successful get the active configuration)

content:

application/json:

schema:

$ref: '#/components/schemas/NpConfiguration'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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: Updates/replaces an existing configuration resource.

operationId: UpdateIndNPConfiguration

tags:

- Individual Np Configuration

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: configurationId

in: path

description: Identifier of the configuration resource

required: true

schema:

type: string

requestBody:

description: Parameters to update/replace the existing configuration

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/NpConfiguration'

responses:

'200':

description: OK (Successful update of the existing configuration)

content:

application/json:

schema:

$ref: '#/components/schemas/NpConfiguration'

'204':

description: No Content (Successful update of the configuration)

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'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: Updates/replaces an existing configuration resource.

operationId: ModifyIndNPConfiguration

tags:

- Individual Np Configuration

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: configurationId

in: path

description: Identifier of the configuration resource

required: true

schema:

type: string

requestBody:

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/NpConfigurationPatch'

responses:

'200':

description: OK. The configuration was modified successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/NpConfiguration'

'204':

description: No Content. The configuration was modified successfully.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Deletes an already existing configuration.

operationId: DeleteIndNPConfiguration

tags:

- Individual Np Configuration

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: configurationId

in: path

description: Identifier of the configuration resource

required: true

schema:

type: string

responses:

'204':

description: No Content (Successful deletion of the existing configuration)

'200':

description: OK. (Successful deletion of the existing configuration)

content:

application/json:

schema:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ConfigResult'

minItems: 1

description: The configuration was terminated successfully, the configuration failure information for group members shall be included if 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'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'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:

NpConfiguration:

description: Represents a network parameters configuration.

type: object

properties:

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

mtcProviderId:

type: string

description: Identifies the MTC Service Provider and/or MTC Application.

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

externalId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalId'

msisdn:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Msisdn'

externalGroupId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalGroupId'

maximumLatency:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSec'

maximumResponseTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSec'

suggestedNumberOfDlPackets:

type: integer

minimum: 0

description: This parameter may be included to identify the number of packets that the serving gateway shall buffer in case that the UE is not reachable.

groupReportingGuardTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSec'

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

requestTestNotification:

type: boolean

description: Set to true by the SCS/AS to request the SCEF to send a test notification as defined in clause 5.2.5.3. Set to false or omitted otherwise.

websockNotifConfig:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

validityTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

snssai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

ueIpAddr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/IpAddr'

ueMacAddr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

oneOf:

- required: [externalId]

- required: [msisdn]

- required: [externalGroupId]

NpConfigurationPatch:

description: Represents parameters used to request the modification of a network parameters configuration resource.

type: object

properties:

maximumLatency:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSecRm'

maximumResponseTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSecRm'

suggestedNumberOfDlPackets:

type: integer

minimum: 0

description: This parameter may be included to identify the number of packets that the serving gateway shall buffer in case that the UE is not reachable.

nullable: true

groupReportGuardTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSecRm'

validityTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTimeRm'

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

ConfigurationNotification:

description: Represents a configuration result notification.

type: object

properties:

configuration:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

configResults:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ConfigResult'

minItems: 1

description: The grouping configuration result notification provided by the SCEF.

appliedParam:

$ref: 'TS29122\_MonitoringEvent.yaml#/components/schemas/AppliedParameterConfiguration'

required:

- configuration

# A.14 AsSessionWithQoS API

openapi: 3.0.0

info:

title: 3gpp-as-session-with-qos

version: 1.3.0-alpha.4

description: |

API for setting us an AS session with required QoS.

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externalDocs:

description: 3GPP TS 29.122 V18.4.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-as-session-with-qos/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/subscriptions:

get:

summary: Read all or queried active subscriptions for the SCS/AS.

operationId: FetchAllASSessionWithQoSSubscriptions

tags:

- AS Session with Required QoS Subscriptions

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: ip-addrs

in: query

description: The IP address(es) of the requested UE(s).

required: false

content:

application/json:

schema:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/IpAddr'

minItems: 1

- name: ip-domain

in: query

description: >

The IPv4 address domain identifier. The attribute may only be provided if IPv4 address

is included in the ip-addrs query parameter.

required: false

schema:

type: string

- name: mac-addrs

in: query

description: The MAC address(es) of the requested UE(s).

required: false

schema:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

minItems: 1

responses:

'200':

description: OK.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/AsSessionWithQoSSubscription'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Creates a new subscription resource.

operationId: CreateASSessionWithQoSSubscription

tags:

- AS Session with Required QoS Subscriptions

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

requestBody:

description: Request to create a new subscription resource

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/AsSessionWithQoSSubscription'

callbacks:

notificationDestination:

'{request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/UserPlaneNotificationData'

responses:

'204':

description: No Content (successful notification)

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

responses:

'201':

description: Created (Successful creation of subscription)

content:

application/json:

schema:

$ref: '#/components/schemas/AsSessionWithQoSSubscription'

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':

description: Forbidden

content:

application/problem+json:

schema:

$ref: '#/components/schemas/ProblemDetailsAsSessionWithQos'

headers:

Retry-After:

description: >

Indicates the time the AF has to wait before making a new request. It can be a

non-negative integer (decimal number) indicating the number of seconds the AF

has to wait before making a new request or an HTTP-date after which the AF can

retry a new request.

schema:

type: string

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

/{scsAsId}/subscriptions/{subscriptionId}:

get:

summary: Read an active subscriptions for the SCS/AS and the subscription Id.

operationId: FetchIndASSessionWithQoSSubscription

tags:

- Individual AS Session with Required QoS Subscription

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

responses:

'200':

description: OK (Successful get the active subscription)

content:

application/json:

schema:

$ref: '#/components/schemas/AsSessionWithQoSSubscription'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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: Updates/replaces an existing subscription resource.

operationId: UpdateIndASSessionWithQoSSubscription

tags:

- Individual AS Session with Required QoS Subscription

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

requestBody:

description: Parameters to update/replace the existing subscription

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/AsSessionWithQoSSubscription'

responses:

'200':

description: OK (Successful update of the subscription)

content:

application/json:

schema:

$ref: '#/components/schemas/AsSessionWithQoSSubscription'

'204':

description: No Content (Successful update of the subscription)

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

description: Forbidden

content:

application/problem+json:

schema:

$ref: '#/components/schemas/ProblemDetailsAsSessionWithQos'

headers:

Retry-After:

description: >

Indicates the time the AF has to wait before making a new request. It can be a

non-negative integer (decimal number) indicating the number of seconds the AF

has to wait before making a new request or an HTTP-date after which the AF can

retry a new request.

schema:

type: string

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'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: Updates/replaces an existing subscription resource.

operationId: ModifyIndASSessionWithQoSSubscription

tags:

- Individual AS Session with Required QoS Subscription

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

requestBody:

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/AsSessionWithQoSSubscriptionPatch'

responses:

'200':

description: OK. The subscription was modified successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/AsSessionWithQoSSubscription'

'204':

description: No Content. The subscription was modified successfully.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

description: Forbidden

content:

application/problem+json:

schema:

$ref: '#/components/schemas/ProblemDetailsAsSessionWithQos'

headers:

Retry-After:

description: >

Indicates the time the AF has to wait before making a new request. It can be a

non-negative integer (decimal number) indicating the number of seconds the AF

has to wait before making a new request or an HTTP-date after which the AF can

retry a new request.

schema:

type: string

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Deletes an already existing subscription.

operationId: DeleteIndASSessionWithQoSSubscription

tags:

- Individual AS Session with Required QoS Subscription

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

responses:

'204':

description: No Content (Successful deletion of the existing subscription)

'200':

description: OK (Successful deletion of the existing subscription)

content:

application/json:

schema:

$ref: '#/components/schemas/UserPlaneNotificationData'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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:

AsSessionWithQoSSubscription:

description: Represents an individual AS session with required QoS subscription resource.

type: object

properties:

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

snssai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

exterAppId:

type: string

description: Identifies the external Application Identifier.

extGroupId:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ExternalGroupId'

gpsi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

flowInfo:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/FlowInfo'

minItems: 1

description: Describe the data flow which requires QoS.

ethFlowInfo:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'

minItems: 1

description: Identifies Ethernet packet flows.

enEthFlowInfo:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/EthFlowInfo'

minItems: 1

description: >

Identifies the Ethernet flows which require QoS. Each Ethernet flow consists of a flow

idenifer and the corresponding UL and/or DL flows.

listUeAddrs:

type: array

items:

$ref: '#/components/schemas/UeAddInfo'

minItems: 1

description: Identifies the list of UE address.

multiModalId:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/MultiModalId'

protoDesc:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/ProtoDesc'

qosReference:

type: string

description: Identifies a pre-defined QoS information

altQoSReferences:

type: array

items:

type: string

minItems: 1

description: >

Identifies an ordered list of pre-defined QoS information. The lower the index of the

array for a given entry, the higher the priority.

altQosReqs:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/AlternativeServiceRequirementsData'

minItems: 1

description: >

Identifies an ordered list of alternative service requirements that include individual

QoS parameter sets. The lower the index of the array for a given entry, the higher the

priority.

disUeNotif:

description: >

Indicates whether the QoS flow parameters signalling to the UE when the SMF is notified

by the NG-RAN of changes in the fulfilled QoS situation is disabled (true) or

not (false). Default value is false. The fulfilled situation is either the QoS profile

or an Alternative QoS Profile.

type: boolean

ueIpv4Addr:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv4Addr'

ipDomain:

type: string

ueIpv6Addr:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv6Addr'

macAddr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

usageThreshold:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/UsageThreshold'

sponsorInfo:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/SponsorInformation'

qosMonInfo:

$ref: '#/components/schemas/QosMonitoringInformation'

pdvMon:

$ref: '#/components/schemas/QosMonitoringInformation'

qosDuration:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

qosInactInt:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

directNotifInd:

type: boolean

description: >

Indicates whether the direct event notification is requested (true) or not (false).

Default value is false.

tscQosReq:

$ref: '#/components/schemas/TscQosRequirement'

l4sInfo:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/UplinkDownlinkSupport'

requestTestNotification:

type: boolean

description: >

Set to true by the SCS/AS to request the SCEF to send a test notification as defined

in clause 5.2.5.3. Set to false or omitted otherwise.

websockNotifConfig:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

events:

description: >

Represents the list of user plane event(s) to which the SCS/AS requests to subscribe to.

type: array

items:

$ref: '#/components/schemas/UserPlaneEvent'

minItems: 1

multiModDatFlows:

type: object

additionalProperties:

$ref: '#/components/schemas/AsSessionMediaComponent'

minProperties: 1

description: >

Contains media component data for a single-modal data flow(s).

The key of the map is the medCompN attribute.

pduSetQos:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSetQosPara'

rTLatencyInd:

type: boolean

description: >

Indicates the service data flow needs to meet the Round-Trip (RT) latency requirement of

the service, when it is included and set to "true".

The default value is "false" if omitted. periodInfo:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/PeriodicityInfo'

rttMon:

$ref: '#/components/schemas/QosMonitoringInformation'

qosMonDatRate:

$ref: '#/components/schemas/QosMonitoringInformation'

avrgWndw:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AverWindow'

servAuthInfo:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/ServAuthInfo'

qosMonConReq:

$ref: '#/components/schemas/QosMonitoringInformation'

listUeConsDtRt:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/IpAddr'

minItems: 1

description: >

Identifies the list of UE addresses subject for Consolidated Data Rate monitoring.

required:

- notificationDestination

AsSessionWithQoSSubscriptionPatch:

description: Represents parameters to modify an AS session with specific QoS subscription.

type: object

properties:

exterAppId:

type: string

description: Identifies the external Application Identifier.

flowInfo:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/FlowInfo'

minItems: 1

description: Describe the IP data flow which requires QoS.

ethFlowInfo:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'

minItems: 1

description: Identifies Ethernet packet flows.

enEthFlowInfo:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/EthFlowInfo'

minItems: 1

description: >

Identifies the Ethernet flows which require QoS. Each Ethernet flow consists of a flow

idenifer and the corresponding UL and/or DL flows.

listUeAddrs:

type: array

items:

$ref: '#/components/schemas/UeAddInfo'

minItems: 1

description: Identifies the list of UE address.

qosReference:

type: string

description: Pre-defined QoS reference

altQoSReferences:

type: array

items:

type: string

minItems: 1

description: >

Identifies an ordered list of pre-defined QoS information. The lower the index of the

array for a given entry, the higher the priority.

altQosReqs:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/AlternativeServiceRequirementsData'

minItems: 1

description: >

Identifies an ordered list of alternative service requirements that include individual

QoS parameter sets. The lower the index of the array for a given entry, the higher the

priority.

disUeNotif:

type: boolean

description: >

Indicates whether the QoS flow parameters signalling to the UE when the SMF is notified

by the NG-RAN of changes in the fulfilled QoS situation is disabled (true) or

not (false). The fulfilled situation is either the QoS profile or an Alternative QoS

Profile.

usageThreshold:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/UsageThresholdRm'

qosMonInfo:

$ref: '#/components/schemas/QosMonitoringInformationRm'

pdvMon:

$ref: '#/components/schemas/QosMonitoringInformationRm'

directNotifInd:

type: boolean

description: >

Indicates whether the direct event notification is requested (true) or not (false).

notificationDestination:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

tscQosReq:

$ref: '#/components/schemas/TscQosRequirementRm'

l4sInfo:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/UplinkDownlinkSupport'

events:

description: >

Represents the updated list of user plane event(s) to which the SCS/AS requests to

subscribe to.

type: array

items:

$ref: '#/components/schemas/UserPlaneEvent'

minItems: 1

multiModDatFlows:

type: object

additionalProperties:

$ref: '#/components/schemas/AsSessionMediaComponentRm'

minProperties: 1

description: >

Contains media component data for a single-modal data flow(s).

The key of the map is the medCompN attribute.

pduSetQos:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSetQosParaRm'

rTLatencyInd:

type: boolean

description: >

Indicates the service data flow needs to meet the Round-Trip (RT) latency requirement of

the service, when it is included and set to "true".

The default value is "false" if omitted.

protoDesc:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/ProtoDesc'

periodInfo:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/PeriodicityInfo'

qosDuration:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSecRm'

qosInactInt:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSecRm'

rttMon:

$ref: '#/components/schemas/QosMonitoringInformationRm'

qosMonDatRate:

$ref: '#/components/schemas/QosMonitoringInformationRm'

avrgWndw:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AverWindowRm'

qosMonConReq:

$ref: '#/components/schemas/QosMonitoringInformationRm'

listUeConsDtRt:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/IpAddr'

minItems: 1

description: >

Identifies the list of UE addresses subject for Consolidated Data Rate monitoring.

QosMonitoringInformation:

description: Represents QoS monitoring information.

type: object

properties:

reqQosMonParams:

type: array

items:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/RequestedQosMonitoringParameter'

minItems: 1

repFreqs:

type: array

items:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/ReportingFrequency'

minItems: 1

repThreshDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

repThreshUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

repThreshRp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

conThreshDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

conThreshUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

waitTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

repPeriod:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

repThreshDatRateDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

repThreshDatRateUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

consDataRateThrDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

consDataRateThrUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

required:

- reqQosMonParams

- repFreqs

QosMonitoringInformationRm:

description: >

Represents the same as the QosMonitoringInformation data type but with

the nullable:true property.

type: object

properties:

reqQosMonParams:

type: array

items:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/RequestedQosMonitoringParameter'

minItems: 1

repFreqs:

type: array

items:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/ReportingFrequency'

minItems: 1

repThreshDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UintegerRm'

repThreshUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UintegerRm'

repThreshRp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UintegerRm'

conThreshDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UintegerRm'

conThreshUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UintegerRm'

waitTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSecRm'

repPeriod:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSecRm'

repThreshDatRateDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

repThreshDatRateUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

consDataRateThrDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

consDataRateThrUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

QosMonitoringReport:

description: Represents a QoS monitoring report.

type: object

properties:

ulDelays:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

minItems: 1

dlDelays:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

minItems: 1

rtDelays:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

minItems: 1

pdmf:

type: boolean

description: Represents the packet delay measurement failure indicator.

ulDataRate:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

dlDataRate:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

ulAggrDataRate:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

dlAggrDataRate:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

ulConInfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

dlConInfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

cimf:

type: boolean

description: >

Represents the congestion information measurement failure indicator. When set to "true",

it indicates that a congestion information failure has occurred. Default value is false

if omitted.

UserPlaneNotificationData:

description: Represents the parameters to be conveyed in a user plane event(s) notification.

type: object

properties:

transaction:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

eventReports:

type: array

items:

$ref: '#/components/schemas/UserPlaneEventReport'

minItems: 1

description: Contains the reported event and applicable information

required:

- transaction

- eventReports

UserPlaneEventReport:

description: Represents an event report for user plane.

type: object

properties:

event:

$ref: '#/components/schemas/UserPlaneEvent'

accumulatedUsage:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/AccumulatedUsage'

flowIds:

type: array

items:

type: integer

minItems: 1

description: >

Identifies the affected flows that were sent during event subscription. It might be

omitted when the reported event applies to all the flows sent during the subscription.

multiModFlows:

type: array

items:

$ref: '#/components/schemas/MultiModalFlows'

minItems: 1

description: >

Identifies the the flow filters for the single-modal data flows thatwere sent

during event subscription.

It may be omitted when the reported event applies to all the

single-modal data flows sent during the subscription.

appliedQosRef:

type: string

description: >

The currently applied QoS reference. Applicable for event QOS\_NOT\_GUARANTEED or

SUCCESSFUL\_RESOURCES\_ALLOCATION.

altQosNotSuppInd:

type: boolean

description: >

When present and set to true it indicates that the Alternative QoS profiles are not

supported by the access network. Applicable for event QOS\_NOT\_GUARANTEED.

plmnId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnIdNid'

qosMonReports:

type: array

items:

$ref: '#/components/schemas/QosMonitoringReport'

minItems: 1

description: Contains the QoS Monitoring Reporting information

pdvMonReports:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/PdvMonitoringReport'

minItems: 1

description: Contains the PDV Monitoring Reporting information

ratType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

batOffsetInfo:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/BatOffsetInfo'

rttMonReports:

type: array

items:

$ref: '#/components/schemas/QosMonitoringReport'

minItems: 1

description: Contains the round trip delay over two SDFs reporting information

qosMonDatRateReps:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/QosMonitoringReport'

minItems: 1

description: >

Contains QoS Monitoring for data rate information. It shall be present when the notified

event is "QOS\_MONITORING" and data rate measurements are available.

aggrDataRateRpts:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/QosMonitoringReport'

minItems: 1

description: >

Contains QoS Monitoring for aggregated data rate information. It shall be present when

the notified event is "QOS\_MONITORING" and data rate measurements are available.

qosMonConInfoReps:

type: array

items:

$ref: '#/components/schemas/QosMonitoringReport'

minItems: 1

description: >

Contains QoS Monitoring for congestion information. It shall be present when the

notified event is "QOS\_MONITORING" and congestion measurements are available.

required:

- event

TscQosRequirement:

description: Represents QoS requirements for time sensitive communication.

type: object

properties:

reqGbrDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

reqGbrUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

reqMbrDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

reqMbrUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

maxTscBurstSize:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ExtMaxDataBurstVol'

req5Gsdelay:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketDelBudget'

reqPer:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketErrRate'

priority:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscPriorityLevel'

tscaiTimeDom:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

tscaiInputDl:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscaiInputContainer'

tscaiInputUl:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscaiInputContainer'

capBatAdaptation:

type: boolean

description: >

Indicates the capability for AF to adjust the burst sending time, when it is supported

and set to "true". The default value is "false" if omitted.

TscQosRequirementRm:

description: >

Represents the same as the TscQosRequirement data type but with the nullable:true property.

type: object

properties:

reqGbrDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

reqGbrUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

reqMbrDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

reqMbrUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

maxTscBurstSize:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ExtMaxDataBurstVolRm'

req5Gsdelay:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketDelBudgetRm'

reqPer:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketErrRateRm'

priority:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscPriorityLevelRm'

tscaiTimeDom:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UintegerRm'

tscaiInputDl:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscaiInputContainer'

tscaiInputUl:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscaiInputContainer'

capBatAdaptation:

type: boolean

description: >

Indicates the capability for AF to adjust the burst sending time, when it is supported

and set to "true". The default value is "false" if omitted.

nullable: true

AdditionInfoAsSessionWithQos:

description: Describes additional error information specific for this API.

type: object

properties:

acceptableServInfo:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/AcceptableServiceInfo'

ProblemDetailsAsSessionWithQos:

description: Extends ProblemDetails to also include the acceptable service info.

allOf:

- $ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

- $ref: '#/components/schemas/AdditionInfoAsSessionWithQos'

AsSessionMediaComponent:

description: >

Representmedia component data for a single-modal data flow of a multi-modal service.

type: object

required:

- medCompN

allOf:

- not:

required: [altSerReqs,altSerReqsData]

- not:

required: [qosReference,altSerReqsData]

properties:

flowInfos:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/FlowInfo'

minItems: 1

nullable: true

description: >

Contains the IP data flow(s) description for a single-modal data flow.

qosReference:

type: string

disUeNotif:

type: boolean

altSerReqs:

type: array

items:

type: string

minItems: 1

altSerReqsData:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/AlternativeServiceRequirementsData'

minItems: 1

description: >

Contains alternative service requirements that include individual QoS parameter sets.

marBwDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

marBwUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

medCompN:

type: integer

medType:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/MediaType'

mirBwDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

mirBwUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

tsnQos:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TsnQosContainer'

tscaiInputDl:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscaiInputContainer'

tscaiInputUl:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscaiInputContainer'

tscaiTimeDom:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

rTLatencyReq:

type: boolean

description: Round-Trip latency requirement of the service data flow.

pduSetQos:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSetQosPara'

evSubsc:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/EventsSubscReqData'

AsSessionMediaComponentRm:

description: >

Represents the AsSessionMediaComponent data type with nullable information.

type: object

required:

- medCompN

not:

required: [altSerReqs,altSerReqsData]

properties:

flowInfos:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/FlowInfo'

minItems: 1

nullable: true

description: >

Contains the IP data flow(s) description for a single-modal data flow.

qosReference:

type: string

nullable: true

altSerReqs:

type: array

items:

type: string

minItems: 1

nullable: true

altSerReqsData:

type: array

items:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/AlternativeServiceRequirementsData'

minItems: 1

description: >

Contains removable alternative service requirements that include individual QoS

parameter sets.

nullable: true

disUeNotif:

type: boolean

nullable: true

marBwDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

marBwUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

medCompN:

type: integer

medType:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/MediaType'

mirBwDl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

mirBwUl:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRateRm'

tsnQos:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TsnQosContainerRm'

tscaiInputDl:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscaiInputContainer'

tscaiInputUl:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscaiInputContainer'

rTLatencyReq:

type: boolean

description: Round-Trip latency requirement of the service data flow.

pduSetQos:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSetQosPara'

evSubsc:

$ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/EventsSubscReqDataRm'

nullable: true

MultiModalFlows:

description: Represents a flow information within a single-modal data flow.

type: object

properties:

medCompN:

type: integer

description: >

It contains the ordinal number of the single-modal data flow. Identifies the

single-modal data flow.

flowIds:

type: array

items:

type: integer

minItems: 1

description: >

Identifies the affected flow(s) within the single-modal data flow

(identified by the medCompN attribute).

It may be omitted when all flows are affected.

required:

- medCompN

UeAddInfo:

description: Represent the UE address information.

properties:

ueIpAddr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/IpAddr'

portNumber:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Port'

UserPlaneEvent:

anyOf:

- type: string

enum:

- SESSION\_TERMINATION

- LOSS\_OF\_BEARER

- RECOVERY\_OF\_BEARER

- RELEASE\_OF\_BEARER

- USAGE\_REPORT

- FAILED\_RESOURCES\_ALLOCATION

- QOS\_GUARANTEED

- QOS\_NOT\_GUARANTEED

- QOS\_MONITORING

- SUCCESSFUL\_RESOURCES\_ALLOCATION

- ACCESS\_TYPE\_CHANGE

- PLMN\_CHG

- L4S\_NOT\_AVAILABLE

- L4S\_AVAILABLE

- BAT\_OFFSET\_INFO

- RT\_DELAY\_TWO\_QOS\_FLOWS

- PACK\_DELAY\_VAR

- 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 user plane event.

Possible values are:

- SESSION\_TERMINATION: Indicates that Rx session is terminated.

- LOSS\_OF\_BEARER : Indicates a loss of a bearer.

- RECOVERY\_OF\_BEARER: Indicates a recovery of a bearer.

- RELEASE\_OF\_BEARER: Indicates a release of a bearer.

- USAGE\_REPORT: Indicates the usage report event.

- FAILED\_RESOURCES\_ALLOCATION: Indicates the resource allocation is failed.

- QOS\_GUARANTEED: The QoS targets of one or more SDFs are guaranteed again.

- QOS\_NOT\_GUARANTEED: The QoS targets of one or more SDFs are not being guaranteed.

- QOS\_MONITORING: Indicates a QoS monitoring event.

- SUCCESSFUL\_RESOURCES\_ALLOCATION: Indicates the resource allocation is successful.

- ACCESS\_TYPE\_CHANGE: Indicates an Access type change.

- PLMN\_CHG: Indicates a PLMN change.

- L4S\_NOT\_AVAILABLE: The ECN marking for L4S of one or more SDFs is not available.

- L4S\_AVAILABLE: The ECN marking for L4S of one or more SDFs is available again.

- BAT\_OFFSET\_INFO: Indicates the network provided BAT offset and the optionally adjusted periodicity.

- RT\_DELAY\_TWO\_QOS\_FLOWS: Indicates round-trip delay on UL and DL flows over two QoS flows.

- PACK\_DELAY\_VAR: Indicates Packet Delay Variation is enabled for the SDF.

# A.15 MsisdnLessMoSms API

openapi: 3.0.0

info:

title: 3gpp-msisdn-less-mo-sms

version: 1.2.0

description: |

API for MSISDN-less Mobile Originated SMS.

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externalDocs:

description: 3GPP TS 29.122 V17.6.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/:

post:

summary: Deliver a received MSIDN-less MO SMS from the SCEF to the SCS/AS.

operationId: DeliverMSISDNlessMOSMSNotification

tags:

- MSISDN-less MO SMS Notification

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/MsisdnLessMoSmsNotification'

responses:

'200':

description: Success

content:

application/json:

schema:

$ref: '#/components/schemas/MsisdnLessMoSmsNotificationReply'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'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:

MsisdnLessMoSmsNotification:

description: Represents a MSISDN-less MO SMS notification.

type: object

properties:

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

sms:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Bytes'

externalId:

type: string

description: External identifier has the form username@realm.

applicationPort:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Port'

required:

- supportedFeatures

- sms

- externalId

- applicationPort

MsisdnLessMoSmsNotificationReply:

description: Represents a reply to a MSISDN-less MO SMS notification.

type: object

properties:

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- supportedFeatures

# A.16 RacsParameterProvisioning API

openapi: 3.0.0

info:

title: 3gpp-racs-parameter-provisioning

version: 1.2.0-alpha.2

description: |

API for provisioning UE radio capability parameters.

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externalDocs:

description: 3GPP TS 29.122 V18.4.0 T8 reference point for Northbound APIs

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-racs-pp/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{scsAsId}/provisionings:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

get:

summary: Read all RACS parameter provisionings for a given AF.

operationId: FetchAllRACSParameterProvisionings

tags:

- RACS Parameter Provisionings

responses:

'200':

description: OK. The provisioning information related to the request URI is returned.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/RacsProvisioningData'

minItems: 0

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Create a new RACS parameter provisioning.

operationId: CreateRACSParameterProvisioning

tags:

- RACS Parameter Provisionings

requestBody:

description: create new provisionings for a given SCS/AS.

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/RacsProvisioningData'

responses:

'201':

description: Created. The provisioning was created successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/RacsProvisioningData'

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':

description: The RACS data for all RACS IDs were not provisioned successfully.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/RacsFailureReport'

minItems: 1

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

/{scsAsId}/provisionings/{provisioningId}:

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS as defined in clause 5.2.4 of 3GPP TS 29.122.

required: true

schema:

type: string

- name: provisioningId

in: path

description: Provisioning ID

required: true

schema:

type: string

get:

summary: Read an existing RACS parameter provisioning.

operationId: FetchIndRACSParameterProvisioning

tags:

- Individual RACS Parameter Provisioning

responses:

'200':

description: OK. The provisioning information related to the request URI is returned.

content:

application/json:

schema:

$ref: '#/components/schemas/RacsProvisioningData'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

patch:

summary: Modify some properties in an existing RACS parameter provisioning.

operationId: ModifyIndRACSParameterProvisioning

tags:

- Individual RACS Parameter Provisioning

requestBody:

description: update an existing parameter provisioning.

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/RacsProvisioningDataPatch'

responses:

'200':

description: OK. The provisioning data was updated successfully. The SCEF shall return an updated provisioning information in the response.

content:

application/json:

schema:

$ref: '#/components/schemas/RacsProvisioningData'

'204':

description: >

The provisioning data was updated successfully, and no content is to be sent in

the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

description: The RACS data for all RACS IDs were not provisioned successfully.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/RacsFailureReport'

minItems: 1

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

put:

summary: Modify all properties in an existing RACS parameter provisioning.

operationId: UpdateIndRACSParameterProvisioning

tags:

- Individual RACS Parameter Provisioning

requestBody:

description: update an existing parameter provisioning.

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/RacsProvisioningData'

responses:

'200':

description: >

OK. The provisioning data was updated successfully. The SCEF shall return an updated

provisioning information in the response.

content:

application/json:

schema:

$ref: '#/components/schemas/RacsProvisioningData'

'204':

description: >

The provisioning data was updated successfully, and no content is to be sent in

the response message body.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

description: The RACS data for all RACS IDs were not provisioned successfully.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/RacsFailureReport'

minItems: 1

application/problem+json:

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/ProblemDetails'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Delete a RACS parameter provisioning.

operationId: DeleteIndRACSParameterProvisioning

tags:

- Individual RACS Parameter Provisioning

responses:

'204':

description: >

No Content. The provisioning was terminated successfully. The content shall

be empty.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'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:

RacsProvisioningData:

description: Represents a UE's radio capability data.

type: object

properties:

self:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Link'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

racsConfigs:

type: object

additionalProperties:

$ref: '#/components/schemas/RacsConfiguration'

minProperties: 1

description: >

Identifies the configuration related to manufacturer specific UE radio capability.

Each element uniquely identifies an RACS configuration for an RACS ID and is identified

in the map via the RACS ID as key. The response shall include successfully provisioned

RACS data.

racsReports:

type: object

additionalProperties:

$ref: '#/components/schemas/RacsFailureReport'

minProperties: 1

description: >

Supplied by the SCEF. Contains the RACS IDs for which the RACS data are not provisioned

successfully. Any string value can be used as a key of the map.

readOnly: true

required:

- racsConfigs

RacsFailureReport:

description: Represents a radio capability data provisioning failure report.

type: object

properties:

racsIds:

type: array

items:

type: string

minItems: 1

description: >

Identifies the RACS ID(s) for which the RACS data are not provisioned successfully.

failureCode:

$ref: '#/components/schemas/RacsFailureCode'

required:

- racsIds

- failureCode

RacsConfiguration:

description: Represents a single UE radio capability configuration data.

type: object

properties:

racsId:

type: string

description: >

The UE radio capability ID provided by the SCS/AS to identify the UE radio capability

data. See 3GPP TS 23.003 for the encoding.

racsParamEps:

type: string

description: The UE radio capability data in EPS.

racsParam5Gs:

type: string

description: The UE radio capability data in 5GS.

imeiTacs:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TypeAllocationCode'

minItems: 1

description: Related UE model's IMEI-TAC values.

anyOf:

- required: [racsParamEps]

- required: [racsParam5Gs]

required:

- racsId

- imeiTacs

RacsProvisioningDataPatch:

description: >

Represents parameters to request the modification of a UE's radio capability data.

type: object

properties:

racsConfigs:

type: object

additionalProperties:

$ref: '#/components/schemas/RacsConfigurationRm'

minProperties: 1

description: >

Identifies the configuration related to manufactuer specific UE radio capability.

Each element uniquely identifies an RACS configuration for an RACS ID and is identified

in the map via the RACS ID as key.

RacsConfigurationRm:

description: >

Represents the same as the RacsConfiguration data type but with the nullable:true property.

type: object

properties:

racsParamEps:

type: string

description: The UE radio capability data in EPS.

nullable: true

racsParam5Gs:

type: string

description: The UE radio capability data in 5GS.

nullable: true

imeiTacs:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TypeAllocationCode'

minItems: 1

description: Related UE model's IMEI-TAC values.

nullable: true

RacsFailureCode:

anyOf:

- type: string

enum:

- MALFUNCTION

- RESOURCE\_LIMITATION

- RACS\_ID\_DUPLICATED

- OTHER\_REASON

- 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 failure result of UE radio capability provisioning.

Possible values are:

- MALFUNCTION: This value indicates that something functions wrongly in RACS provisioning or

the RACS provisioning does not function at all.

- RESOURCE\_LIMITATION: This value indicates there is resource limitation for RACS data

storage.

- RACS\_ID\_DUPLICATED: The received RACS identifier(s) are already provisioned.

- OTHER\_REASON: Other reason unspecified.

Annex B (informative):  
TS Skeleton Template

A TS Skeleton Template to be used as a starting point of drafting a 3GPP NBI (i.e. northbound and/or application layer interface) Stage 3 specification is available at the following location:

https://www.3gpp.org/ftp/information/All\_Templates/29.xxx-NBI-Stage3-Template.zip

Annex C (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2017-04 | CT3#89 |  |  |  |  | TS skeleton of T8 reference point stage 3. Inclusion of C3-172217, C3-172242, C3-172249 and editorial change from Rapporteur. | 0.0.0 |
| 2017-05 | CT3#90 |  |  |  |  | Inclusion of C3-173256, C3-173257, C3-173306, C3-173318, C3-173323, C3-173329 and editorial change from Rapporteur. | 0.1.0 |
| 2017-09 | CT3#91 |  |  |  |  | Inclusion of C3-174368, C3-174279, C3-174079, C3-174352, C3-174328, C3-174329, C3-174374, C3-174375, C3-174243, C3-174333, C3-174334, C3-174376, C3-174281, C3-174377, C3-174356, C3-174280, C3-174358, C3-174359, C3-174379, C3-174337, C3-174361, C3-174294, C3-174362, C3-174385, C3-174299 and editorial change from Rapporteur. | 0.2.0 |
| 2017-10 | CT3#92 |  |  |  |  | Inclusion of C3-175068, C3-175365, C3-175370, C3-175301, C3-175227, C3-175228, C3-175359, C3-175230, C3-175231, C3-175337, C3-175247, C3-175290, C3-175360 and editorial changes from Rapporteur. | 0.3.0 |
| 2017-12 | CT3#93 |  |  |  |  | Inclusion of C3-176329, C3-176218, C3-176356, C3-176375, C3-176357, C3-176334, C3-176378, C3-176067, C3-176335, C3-176073, C3-176337, C3-176380, C3-176390, C3-176362, C3-176339, C3-176340, C3-176233, C3-176089, C3-176267, C3-176383, C3-176365, C3-176366, C3-176272, C3-176273, C3-176274, C3-176391, C3-176368, C3-176369, C3-176385, C3-176279 and editorial changes from Rapporteur. | 0.4.0 |
| 2018-01 | CT3#94 |  |  |  |  | Inclusion of C3-180349, C3-180329, C3-180222, C3-180078, C3-180285, C3-180081, C3-180330, C3-180331, C3-180084, C3-180332, C3-180333, C3-180290, C3-180291, C3-180089, C3-180234, C3-180334, C3-180294, C3-180237, C3-180295, C3-180296, C3-180297, C3-180337, C3-180357, C3-180136, C3-180298 and editorial changes from Rapporteur. | 0.5.0 |
| 2018-02 | CT3#95 |  |  |  |  | Inclusion of C3-181271, C3-181324, C3-181340, C3-181273, C3-181333, C3-181334, C3-181276, C3-181325 and editorial changes from Rapporteur. | 0.6.0 |
| 2018-03 | CT#79 | CP-181053 |  |  |  | TS sent to plenary for information | 1.0.0 |
| 2018-04 | CT3#96 |  |  |  |  | Inclusion of C3-182464, C3-182017, C3-182444, C3-182019, C3-182486, C3-182487, C3-182344, C3-182074, C3-182373, C3-182446, C3-182291, C3-182292, C3-182488, C3-182508, C3-182345, C3-182094, C3-182295, C3-182346, C3-182096, C3-182347, C3-182348, C3-182026, C3-182349, C3-182098, C3-182350, C3-182099, C3-182100, C3-182209, C3-182210, C3-182101, C3-182102, C3-182455, C3-182506, C3-182353, C3-182491, C3-182355, C3-182447, C3-182507, C3-182359, C3-182106, C3-182107, C3-182108, C3-182492, C3-182109, C3-182110, C3-182480, C3-182362, C3-182448, C3-182449, C3-182450, C3-182425, C3-182365, C3-182112, C3-182113, C3-182035, C3-182367, C3-182115, C3-182368, C3-182493, C3-182494, C3-182509, C3-182372 and editorial changes from Rapporteur. | 1.1.0 |
| 2018-05 | CT3#97 |  |  |  |  | Inclusion of C3-183028, C3-183029, C3-183030, C3-183474, C3-183051, C3-183475, C3-183476, C3-183054, C3-183055, C3-183056, C3-183478, C3-183479, C3-183336, C3-183337, C3-183832, C3-183340, C3-183609, C3-183611, C3-183612, C3-183833, C3-183614, C3-183834, C3-183883, C3-183616, C3-183343, C3-183088, C3-183617, C3-183618, C3-183741, C3-183625, C3-183626, C3-183122, C3-183123, C3-183124, C3-183635, C3-183792, C3-183634, C3-183619, C3-183786, C3-183082, C3-183083, C3-183084, C3-183622, C3-183835, C3-183624, C3-183627, C3-183075, C3-183737, C3-183836, C3-183419, C3-183630, C3-183066, C3-183347, C3-183861, C3-183788, C3-183862, C3-183789, C3-183637, C3-183837, C3-183863, C3-183639, C3-183864, C3-183067, C3-183068, C3-183069, C3-183641, C3-183059, C3-183071, C3-183606, C3-183779 and editorial changes from Rapporteur. | 1.2.0 |
| 2018-06 | CT#80 | CP-181038 |  |  |  | TS sent to plenary for approval | 2.0.0 |
| 2018-06 | CT#80 | CP-181038 |  |  |  | TS approved by plenary | 15.0.0 |
| 2018-09 | CT#81 | CP-182022 | 0001 | 2 | F | MonitoringEvent API OpenAPI schema | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0002 | 2 | F | ChargeableParty API OpenAPI schema | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0003 | 2 | F | GMDviaMBMSbyMB2 API OpenAPI schema | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0004 | 2 | F | GMDviaMBMSbyxMB API OpenAPI schema | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0005 | 2 | F | ReportingNetworkStatus API OpenAPI schema | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0006 | 2 | F | ECRControl API OpenAPI schema | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0007 | 2 | F | NpConfiguration API OpenAPI schema | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0008 | 2 | F | AsSessionWithQoS API OpenAPI schema | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0009 |  | F | Update the Error Handling | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0010 | 2 | F | CpProvisioning OpenAPI schema | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0011 | 2 | F | Remove the monitoring configuration for a group | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0012 | 1 | F | Resource description in Procedure subclauses | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0013 | 1 | F | Monitoring event API Update | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0014 | 2 | F | BDT API Update | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0015 |  | F | Network Parameter Configuration API Update | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0016 | 1 | F | Complete the common openAPI definition | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0017 | 2 | F | Complete the openAPI definition for BDT API | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0018 |  | F | NIDD API cleanup | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0019 | 2 | F | Complete the openAPI definition for NIDD API | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0020 | 1 | F | One-time monitoring | 15.1.0 |
| 2018-09 | CT#81 | CP-182178 | 0021 | 3 | F | PATCH data type in ChargeableParty API | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0022 | 1 | F | Procedure correction of PFD management error handling | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0023 | 2 | F | Complete the openAPI definition for PFD API | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0024 | 1 | F | Essential Corrections on TS 29.122 | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0025 | 2 | F | Allignment of error codes with TS 29.500 | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0026 | 2 | F | OpenAPI updates for Device Triggering | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0027 | 1 | F | OpenAPI updates for MSISDN-less Mobile Originated SMS | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0028 | 2 | F | Monitoring event report | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0030 |  | F | Add cause in ProblemDetails data type | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0031 | 1 | F | Remove format keyword for 3GPP defined data type | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0032 |  | F | Correct supported features | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0033 |  | F | Correct ConfigResult data type for Monitoring API | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0034 |  | F | Correct reachability type in monitoring API | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0035 |  | F | Add HSS interaction for NIDD configuration | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0036 |  | F | Correct NiddConfigurationPatch data type | 15.1.0 |
| 2018-09 | CT#81 | CP-182179 | 0037 | 2 | F | Removable attribute definition for NIDD configuration | 15.1.0 |
| 2018-09 | CT#81 | CP-182180 | 0038 | 2 | F | Correct MT NIDD procedure | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0039 | 1 | F | Correct group NIDD procedure | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0040 |  | F | Device Trigger cleanup | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0041 |  | F | Removable attribute definition for PFD management | 15.1.0 |
| 2018-09 | CT#81 | CP-182181 | 0042 | 2 | F | Correct PFD error code | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0043 |  | F | Removable attribute definition for NP configuration | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0044 |  | F | Correct ConfigResult data type for NP Provisioning API | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0045 |  | F | Removable attribute definition for AS required QoS | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0047 |  | F | Version numbering update | 15.1.0 |
| 2018-09 | CT#81 | CP-182022 | 0048 | 1 | F | Removal of external docs field | 15.1.0 |
| 2018-09 | CT#81 | CP-182203 | 0049 |  | F | paths property in A.2 | 15.1.0 |
| 2018-12 | CT#82 | CP-183116 | 0050 |  | F | File naming for Common data type | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0051 |  | F | UE corrections | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0052 | 2 | F | ExternalDocs field | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0053 | 7 | F | Enhancement of LocationArea | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0054 |  | F | Data type for Individual TMGI Allocation PATCH operation | 15.2.0 |
| 2018-12 | CT#82 | CP-183127 | 0055 | 2 | F | Correction on Accuracy level | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0056 | 2 | F | Correction on type ConfigResult | 15.2.0 |
| 2018-12 | CT#82 | CP-183128 | 0057 | 5 | F | Monitoring Event Report | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0059 |  | F | Correct server definition | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0060 |  | F | Correct data type for roamingStatus | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0061 |  | F | Correct external identifier and msisdn | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0062 |  | F | Correct common data definition | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0063 | 3 | F | Additional data type clarification in openAPI | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0064 |  | F | Correct Chargeable Party | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0065 | 2 | F | Correct GMD via MB2 | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0066 | 3 | F | Correct GMD via xMB | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0067 | 5 | F | Correct MT NIDD | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0068 |  | F | Correct monitoring API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0069 |  | F | Correct CP provisioning | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0070 |  | F | Correct Device trigger | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0071 |  | F | Correct PFD management | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0072 |  | F | Correct report network status | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0073 |  | F | Correct NP provisioning | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0074 |  | F | Correct MO SMS | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0075 |  | F | Correct AS session with QoS | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0076 | 3 | F | Error handling | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0077 | 1 | F | Content type | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0078 | 2 | F | Supporting Ethernet UE in Chargeable Party and AF session with QoS | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0079 | 2 | F | Security adaptation for T8 APIs with CAPIF | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0080 | 1 | F | Remove empty array or map for applicable attributes | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0081 | 3 | F | Presence conditions in yaml file | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0082 |  | F | Remove format keyword for TimeOfDay data type | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0083 | 2 | F | Additional external group ID for number of UE in an area | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0084 |  | F | Correct eDRX cycle length | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0086 |  | F | Correct PLMN ID in monitoring API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0088 |  | F | Missing ECRData in ECR configuration response | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0089 |  | F | Correct GMD via MBMS | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0090 |  | F | Missing UE ID in GMD acknowledgement | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0091 | 1 | F | RDS indication in MT NIDD acknowledgement | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0092 | 1 | F | Correct pfdDatas cardinality in PFD management | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0093 | 1 | F | Correct NP configuration yaml definition | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0094 | 6 | F | Different results in CP parameter sets provisioning | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0095 |  | F | Correct server URI in Device Trigger | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0096 |  | F | Implementation of Binary data | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0097 |  | F | Missed GET for resource GMD via MBMS by xMB | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0098 | 1 | F | Notification URI Consistency\_ChargableParty | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0099 | 1 | F | Notification URI for GMDviaMBMSbyMB2 API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0100 | 1 | F | Notification URI for GMDviaMBMSbyxMB API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0101 |  | F | Resource usage and Notification URI for NIDD API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0102 | 2 | F | Security field | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0103 | 1 | F | Status code support for AsSessionWithQoS API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0104 | 1 | F | Status code support for ChargeableParty API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0105 | 2 | F | Status code support for CpProvisioning API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0106 | 1 | F | Status code support for DeviceTriggering API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0107 | 1 | F | Status code support for ECRControl API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0108 | 1 | F | Status code support for GMDviaMBMSbyMB2 API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0109 | 2 | F | Status code support for GMDviaMBMSbyxMB API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0110 | 3 | F | Status code support for MonitoringEvent API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0111 | 1 | F | Status code support for MsisdnLessMoSms API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0112 | 2 | F | Status code support for NIDD API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0113 | 1 | F | Status code support for NpConfiguration API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0114 | 1 | F | Status code support for PfdManagement API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0115 | 1 | F | Status code support for ReportingNetworkStatus API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0116 | 1 | F | Status code support for ResourceManagementOfBdt API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0117 | 1 | F | Location header | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0118 | 2 | F | API Version Update | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0119 | 1 | F | Link of the created resources for AsSessionWithQoS API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0120 | 1 | F | Link of the created resources for ChargeableParty API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0121 | 1 | F | Link of the created resources for CpProvisioning API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0122 | 1 | F | Link of the created resourcesfor DeviceTriggering API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0123 | 1 | F | Link of the created resources for GMDviaMBMSbyMB2 API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0124 | 1 | F | Link of the created resources for GMDviaMBMSbyxMB API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0125 | 1 | F | Link of the created resources for MonitoringEvent API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0126 | 1 | F | Link of the created resources for NIDD API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0127 | 1 | F | Link of the created resources for NpConfiguration API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0128 | 1 | F | Link of the created resources for PfdManagement API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0129 | 1 | F | Link of the created resources for ReportingNetworkStatus API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0130 | 1 | F | Link of the created resources for ResourceManagementOfBdt API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0132 |  | F | API version for MonitoringEvent API | 15.2.0 |
| 2018-12 | CT#82 | CP-183116 | 0133 |  | F | Successful code corrections for group message delivery APIs | 15.2.0 |
| 2018-12 | CT#82 | CP-183117 | 0087 | 2 | B | PDN connectivity status monitoring | 16.0.0 |
| 2019-03 | CT#83 | CP-190109 | 0138 | 4 | F | PFD extension | 16.1.0 |
| 2019-03 | CT#83 | CP-190125 | 0140 |  | F | Remove SHORT\_DELAY\_STORED | 16.1.0 |
| 2019-03 | CT#83 | CP-190125 | 0142 | 3 | F | Renew TMGI expiration | 16.1.0 |
| 2019-03 | CT#83 | CP-190125 | 0144 | 2 | F | Corrections related to mandatory features and and MonitoringEvent API errors | 16.1.0 |
| 2019-03 | CT#83 | CP-190125 | 0146 | 1 | F | Correction on MacAddr48 data type reference in the OpenAPI file | 16.1.0 |
| 2019-03 | CT#83 | CP-190159 | 0148 | 2 | F | API Version Update | 16.1.0 |
| 2019-03 | CT#83 | CP-190129 | 0149 | 2 | F | Moving xMB stage 2 to TS 26.348 | 16.1.0 |
| 2019-06 | CT#84 | CP-191073 | 0151 | 1 | A | Correction on 5G location area | 16.2.0 |
| 2019-06 | CT#84 | CP-191092 | 0153 | 1 | A | Failure case when feature required by the monitoring type unsupported | 16.2.0 |
| 2019-06 | CT#84 | CP-191073 | 0155 | 1 | A | 5G feature for Number of UEs in an area notification | 16.2.0 |
| 2019-06 | CT#84 | CP-191210 | 0156 | 4 | B | Notification of Downlink data delivery status and availability after DDN failure notification for multiple Afs | 16.2.0 |
| 2019-06 | CT#84 | CP-191090 | 0157 | 1 | B | Add External Group Id | 16.2.0 |
| 2019-06 | CT#84 | CP-191092 | 0160 | 1 | A | Add openAPI definition for 200 OK in MonitoringEvent API | 16.2.0 |
| 2019-06 | CT#84 | CP-191100 | 0163 |  | B | Feature applicability for PDN connectivity status | 16.2.0 |
| 2019-06 | CT#84 | CP-191099 | 0165 | 1 | A | Support of MTC Provider Id | 16.2.0 |
| 2019-06 | CT#84 | CP-191070 | 0166 | 1 | B | Network parameter provisioning support | 16.2.0 |
| 2019-06 | CT#84 | CP-191092 | 0168 |  | A | Add openAPI definition for PUT in BDT API | 16.2.0 |
| 2019-06 | CT#84 | CP-191103 | 0171 | 1 | B | PFD management notification | 16.2.0 |
| 2019-06 | CT#84 | CP-191100 | 0173 | 1 | F | Clarify number of UE in an area | 16.2.0 |
| 2019-06 | CT#84 | CP-191070 | 0174 |  | F | Update reference to TS 24.250 | 16.2.0 |
| 2019-06 | CT#84 | CP-191105 | 0175 | 2 | B | BDT Warning Notification Support | 16.2.0 |
| 2019-06 | CT#84 | CP-191092 | 0177 | 1 | A | Precedence and storage of T8 OpenAPI files | 16.2.0 |
| 2019-06 | CT#84 | CP-191092 | 0179 | 2 | A | Copyright Note in YAML file | 16.2.0 |
| 2019-06 | CT#84 | CP-191101 | 0181 | 2 | F | API version Update | 16.2.0 |
| 2019-09 | CT#85 | CP-192139 | 0183 | 1 | A | Correct presence condition in PFD definition | 16.3.0 |
| 2019-09 | CT#85 | CP-192158 | 0184 | 2 | B | Enhancement of Monitoring and Network Parameter Configuration | 16.3.0 |
| 2019-09 | CT#85 | CP-192156 | 0185 | 1 | B | Support a set of MAC addresses in traffic filter | 16.3.0 |
| 2019-09 | CT#85 | CP-192165 | 0187 | 2 | B | Support parameter provisioning in RACS | 16.3.0 |
| 2019-09 | CT#85 | CP-192200 | 0188 | 3 | B | Accurate UE moving trajectory definition | 16.3.0 |
| 2019-09 | CT#85 | CP-192157 | 0189 | 1 | B | Removal of a BDT warning notification request | 16.3.0 |
| 2019-09 | CT#85 | CP-192158 | 0190 | 1 | F | Correction on MSISDN | 16.3.0 |
| 2019-09 | CT#85 | CP-192158 | 0191 | 1 | F | Battery Indication and Traffic Profile for CpProvisioning API | 16.3.0 |
| 2019-09 | CT#85 | CP-192158 | 0192 | 2 | F | Northbound API registration and discovery | 16.3.0 |
| 2019-09 | CT#85 | CP-192158 | 0193 | 1 | F | Corrections on monitoring type | 16.3.0 |
| 2019-09 | CT#85 | CP-192158 | 0194 | 1 | F | Notification of resource allocation failure | 16.3.0 |
| 2019-09 | CT#85 | CP-192197 | 0196 | 3 | B | PFD management partial failure | 16.3.0 |
| 2019-09 | CT#85 | CP-192163 | 0199 |  | F | Correction on MSISDN | 16.3.0 |
| 2019-09 | CT#85 | CP-192173 | 0200 |  | F | OpenAPI version update for TS 29.122 Rel-16 | 16.3.0 |
| 2019-12 | CT#86 | CP-193216 | 0158 | 9 | B | Update to NIDD APIs for RDS Dynamic Port Management | 16.4.0 |
| 2019-12 | CT#86 | CP-193179 | 0202 | 1 | B | Nnef\_APISupportCapability Service | 16.4.0 |
| 2019-12 | CT#86 | CP-193179 | 0203 | 1 | B | Scheduled communication type | 16.4.0 |
| 2019-12 | CT#86 | CP-193198 | 0204 |  | F | Correct UMT location area | 16.4.0 |
| 2019-12 | CT#86 | CP-193199 | 0205 | 2 | B | RDS port mismatch in NIDD | 16.4.0 |
| 2019-12 | CT#86 | CP-193199 | 0206 |  | F | Reference update: RFC 8259 | 16.4.0 |
| 2019-12 | CT#86 | CP-193206 | 0208 | 4 | A | Correct SCEF aggregation | 16.4.0 |
| 2019-12 | CT#86 | CP-193209 | 0209 | 3 | B | Complete RACS details | 16.4.0 |
| 2019-12 | CT#86 | CP-193199 | 0210 | 1 | B | BatteryIndication data type | 16.4.0 |
| 2019-12 | CT#86 | CP-193220 | 0212 | 3 | B | PFD partial failure notification | 16.4.0 |
| 2019-12 | CT#86 | CP-193206 | 0215 | 1 | A | Correct application port | 16.4.0 |
| 2019-12 | CT#86 | CP-193179 | 0216 | 1 | B | Support API capability change based on API filter | 16.4.0 |
| 2019-12 | CT#86 | CP-193198 | 0217 | 1 | F | openAPI correction for ExNotification | 16.4.0 |
| 2019-12 | CT#86 | CP-193212 | 0218 | 1 | F | Update of API version and TS version in OpenAPI file | 16.4.0 |
| 2020-03 | CT#87e | CP-200198 | 0220 | 1 | B | Update of the DDD status event and availability of DDN failure event | 16.5.0 |
| 2020-03 | CT#87e | CP-200202 | 0222 | 1 | B | QoS Monitoring Report | 16.5.0 |
| 2020-03 | CT#87e | CP-200198 | 0223 |  | F | Clarify empty array for API capability change | 16.5.0 |
| 2020-03 | CT#87e | CP-200144 | 0224 | 1 | B | Support PDU session status | 16.5.0 |
| 2020-03 | CT#87e | CP-200208 | 0225 | 1 | B | Support BDT policy candidates in notification | 16.5.0 |
| 2020-03 | CT#87e | CP-200212 | 0226 | 1 | B | Add alternative QoS requirements | 16.5.0 |
| 2020-03 | CT#87e | CP-200219 | 0227 | 1 | B | Adding data type for the BDT Reference ID with "nullable: true" property | 16.5.0 |
| 2020-03 | CT#87e | CP-200209 | 0231 |  | F | Enumeration PdnEstablishmentOptionsRm and "nullable" keyword | 16.5.0 |
| 2020-03 | CT#87e | CP-200216 | 0232 |  | F | Update of OpenAPI version and TS version in externalDocs field | 16.5.0 |
| 2020-06 | CT#88e | CP-201194 | 0228 | 7 | B | Supporting the Location Services via NEF | 16.6.0 |
| 2020-06 | CT#88e | CP-201243 | 0233 | 1 | F | Addition of IMEI/TAC values for RACS operations | 16.6.0 |
| 2020-06 | CT#88e | CP-201243 | 0234 | 3 | F | Corrections to UE radio capability configuration data | 16.6.0 |
| 2020-06 | CT#88e | CP-201243 | 0235 | 1 | F | Missing bullet in introduction | 16.6.0 |
| 2020-06 | CT#88e | CP-201241 | 0237 | 1 | A | Event of Usage Threshold | 16.6.0 |
| 2020-06 | CT#88e | CP-201235 | 0239 | 3 | F | Periodic reporting by Nnef | 16.6.0 |
| 2020-06 | CT#88e | CP-201210 | 0241 | 1 | F | Correction to the DDD status event | 16.6.0 |
| 2020-06 | CT#88e | CP-201241 | 0243 |  | A | Correct GMDviaMBMSbyxMB openAPI error | 16.6.0 |
| 2020-06 | CT#88e | CP-201292 | 0245 | 2 | A | Correct NIDD API | 16.6.0 |
| 2020-06 | CT#88e | CP-201213 | 0246 |  | F | Correct data type used in QoS monitoring | 16.6.0 |
| 2020-06 | CT#88e | CP-201235 | 0247 |  | F | Storage of YAML files | 16.6.0 |
| 2020-06 | CT#88e | CP-201276 | 0248 | 2 | F | Traffic descriptor for xBDT | 16.6.0 |
| 2020-06 | CT#88e | CP-201256 | 0249 | 1 | F | URI of the SCEF northbound APIs | 16.6.0 |
| 2020-06 | CT#88e | CP-201213 | 0250 | 1 | F | Correction to QoS monitoring | 16.6.0 |
| 2020-06 | CT#88e | CP-201243 | 0252 |  | F | Avoid using the same data type for PUT and PATCH | 16.6.0 |
| 2020-06 | CT#88e | CP-201250 | 0253 | 1 | B | Complete and fix RDS Port Management | 16.6.0 |
| 2020-06 | CT#88e | CP-201246 | 0254 | 1 | F | Move 5G specific procedure to TS 29.522 | 16.6.0 |
| 2020-06 | CT#88e | CP-201210 | 0255 | 1 | B | Support of Enhanced Coverage Mode control | 16.6.0 |
| 2020-06 | CT#88e | CP-201234 | 0256 |  | F | Removal of open issue on external Group Id for ResourceManagementOfBdt API | 16.6.0 |
| 2020-06 | CT#88e | CP-201235 | 0257 | 1 | F | Optionality of ProblemDetails | 16.6.0 |
| 2020-06 | CT#88e | CP-201241 | 0259 | 1 | A | Correction on PfdManagement for PfdManagement API | 16.6.0 |
| 2020-06 | CT#88e | CP-201241 | 0261 | 1 | A | Corrections on APP\_ID\_DUPLICATED error for PfdManagement API | 16.6.0 |
| 2020-06 | CT#88e | CP-201241 | 0263 | 1 | A | Corrections on SET\_ID\_DUPLICATED error for CpProvisioning API | 16.6.0 |
| 2020-06 | CT#88e | CP-201235 | 0264 |  | F | required field in OpenAPI file | 16.6.0 |
| 2020-06 | CT#88e | CP-201235 | 0265 | 1 | F | Supported headers, Resource Data type and Operation Name | 16.6.0 |
| 2020-06 | CT#88e | CP-201255 | 0267 |  | F | Update of OpenAPI version and TS version in externalDocs field | 16.6.0 |
| 2020-09 | CT#89e | CP-202070 | 0271 |  | A | Failure response for AsSessionWithQoS API | 16.7.0 |
| 2020-09 | CT#89e | CP-202070 | 0273 |  | A | Same IPv4 address for different PDU sessions | 16.7.0 |
| 2020-09 | CT#89e | CP-202077 | 0274 | 1 | F | Remove 5G procedures to TS 29.522 | 16.7.0 |
| 2020-09 | CT#89e | CP-202072 | 0275 | 1 | F | Unique RACS Id | 16.7.0 |
| 2020-09 | CT#89e | CP-202072 | 0276 |  | F | Failure response | 16.7.0 |
| 2020-09 | CT#89e | CP-202048 | 0277 | 1 | F | Initial report for multiple PDN connections | 16.7.0 |
| 2020-09 | CT#89e | CP-202070 | 0281 |  | A | Use correct code for deleting individual ChargeableParty transaction | 16.7.0 |
| 2020-09 | CT#89e | CP-202021 | 0283 | 2 | A | Removal of an established AS session | 16.7.0 |
| 2020-09 | CT#89e | CP-202072 | 0284 |  | F | Usage of PUT and PATCH | 16.7.0 |
| 2020-09 | CT#89e | CP-202070 | 0286 |  | A | Corrections to mtcProviderId | 16.7.0 |
| 2020-09 | CT#89e | CP-202086 | 0287 | 1 | F | Updates NpConfiguration with mtcProviderId | 16.7.0 |
| 2020-09 | CT#89e | CP-202084 | 0289 |  | F | Update of OpenAPI version and TS version in externalDocs field | 16.7.0 |
| 2020-12 | CT#90e | CP-203139 | 0291 | 1 | F | TS 29.122 Essential Corrections and alignments | 16.8.0 |
| 2020-12 | CT#90e | CP-203079 | 0294 | 2 | F | Essential Corrections to eLCS related monitoring events | 16.8.0 |
| 2020-12 | CT#90e | CP-203132 | 0295 | 1 | F | Correction to Alternative QoS Parameter | 16.8.0 |
| 2020-12 | CT#90e | CP-203139 | 0296 |  | F | Storage of YAML files in 3GPP Forge | 16.8.0 |
| 2020-12 | CT#90e | CP-203108 | 0299 | 1 | F | Corrections to MonitoringEventReport | 16.8.0 |
| 2020-12 | CT#90e | CP-203111 | 0300 | 1 | F | Incorrect definition of QosMonitoringInformation | 16.8.0 |
| 2020-12 | CT#90e | CP-203139 | 0301 | 1 | F | Callback URI correction | 16.8.0 |
| 2020-12 | CT#90e | CP-203133 | 0305 |  | A | Successful response code for Event Notification | 16.8.0 |
| 2020-12 | CT#90e | CP-203133 | 0307 | 1 | A | Failure response for SCEF northbound APIs | 16.8.0 |
| 2020-12 | CT#90e | CP-203109 | 0308 |  | F | Correction on Location Service via NEF | 16.8.0 |
| 2020-12 | CT#90e | CP-203131 | 0310 | 1 | F | Protocol or application errors | 16.8.0 |
| 2020-12 | CT#90e | CP-203133 | 0312 | 1 | A | Solve IP address overlapping for Chargeable Party | 16.8.0 |
| 2020-12 | CT#90e | CP-203100 | 0314 | 2 | A | Correction to NIDD configuration cancellation procedure | 16.8.0 |
| 2020-12 | CT#90e | CP-203133 | 0316 | 1 | A | Correction to device triggering recall procedure | 16.8.0 |
| 2020-12 | CT#90e | CP-203152 | 0322 |  | F | Update of OpenAPI version and TS version in externalDocs field | 16.8.0 |
| 2020-12 | CT#90e | CP-203140 | 0290 |  | F | DateTime Enhancement | 17.0.0 |
| 2020-12 | CT#90e | CP-203137 | 0293 | 1 | B | Adding Support for Indicating Serialization Format in RDS | 17.0.0 |
| 2020-12 | CT#90e | CP-203153 | 0323 |  | F | Update of OpenAPI version and TS version in externalDocs field | 17.0.0 |
| 2020-12 | CT#90e | CP-203149 | 0324 |  | F | Faliure authorization result of BDT reference Id for ChargeableParty API request | 17.0.0 |
| 2021-03 | CT#91e | CP-210224 | 0325 |  | F | Clarification of eLCS feature applicability only to 5G | 17.1.0 |
| 2021-03 | CT#91e | CP-210210 | 0327 |  | A | Correct applied QoS reference for QoS not guaranteed | 17.1.0 |
| 2021-03 | CT#91e | CP-210210 | 0331 | 2 | A | Disable UE notifications at changes related to Alternative QoS Profiles | 17.1.0 |
| 2021-03 | CT#91e | CP-210207 | 0333 | 2 | A | Last known location report | 17.1.0 |
| 2021-03 | CT#91e | CP-210207 | 0335 |  | A | Default value of accuary | 17.1.0 |
| 2021-03 | CT#91e | CP-210207 | 0337 | 3 | A | Support Redirection for MonitoringEvent API | 17.1.0 |
| 2021-03 | CT#91e | CP-210219 | 0338 | 1 | F | OpenAPI "description" fields in data type definitions | 17.1.0 |
| 2021-03 | CT#91e | CP-210218 | 0339 |  | F | Update of "description" field for map data types | 17.1.0 |
| 2021-03 | CT#91e | CP-210218 | 0340 |  | F | OpenAPI reference | 17.1.0 |
| 2021-03 | CT#91e | CP-210189 | 0344 |  | A | Correction to AF ID in ECRControl API | 17.1.0 |
| 2021-03 | CT#91e | CP-210189 | 0346 |  | A | Correction to mtcProviderId in ECRControl API | 17.1.0 |
| 2021-03 | CT#91e | CP-210221 | 0352 | 1 | F | Removal of invalid tabulations is some attributes description in the MonitoringEvent API OpenAPI file | 17.1.0 |
| 2021-03 | CT#91e | CP-210234 | 0353 | 1 | D | Text style correction | 17.1.0 |
| 2021-03 | CT#91e | CP-210231 | 0355 | 1 | B | Supported features within ProblemDetails | 17.1.0 |
| 2021-03 | CT#91e | CP-210221 | 0356 | 1 | B | Supported features within ProblemDetails | 17.1.0 |
| 2021-03 | CT#91e | CP-210234 | 0359 | 1 | F | Notification URI Correction for AsSessionWithQoS API | 17.1.0 |
| 2021-03 | CT#91e | CP-210207 | 0361 | 1 | A | Support Redirection for NIDD API | 17.1.0 |
| 2021-03 | CT#91e | CP-210207 | 0363 | 1 | A | Support Redirection for ChargeableParty API | 17.1.0 |
| 2021-03 | CT#91e | CP-210207 | 0365 | 1 | A | Support Redirection for CpProvisioning API | 17.1.0 |
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| 2021-03 | CT#91e | CP-210208 | 0371 | 1 | A | Support Redirection for ECRControl API | 17.1.0 |
| 2021-03 | CT#91e | CP-210208 | 0373 | 1 | A | Support Redirection for MsisdnLessMoSms API | 17.1.0 |
| 2021-03 | CT#91e | CP-210208 | 0375 | 1 | A | Support Redirection for NpConfiguration API | 17.1.0 |
| 2021-03 | CT#91e | CP-210208 | 0377 | 1 | A | Support Redirection for PfdManagement API | 17.1.0 |
| 2021-03 | CT#91e | CP-210208 | 0379 | 1 | A | Support Redirection for RacsParameterProvisioning API | 17.1.0 |
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| 2021-03 | CT#91e | CP-210209 | 0383 | 1 | A | Usage threshold update | 17.1.0 |
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| 2021-06 | CT#92e | CP-211271 | 0341 | 3 | B | Updates to AF Application Identifier in ChargeableParty API | 17.2.0 |
| 2021-06 | CT#92e | CP-211271 | 0342 | 3 | B | Updates to AF Application Identifier in AsSessionWithQoS API | 17.2.0 |
| 2021-06 | CT#92e | CP-211282 | 0347 | 5 | B | Update DNN and S-NSSAI in ChargeableParty API | 17.2.0 |
| 2021-06 | CT#92e | CP-211282 | 0348 | 5 | B | Update DNN and S-NSSAI in AsSessionWithQoS API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0390 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the CommonData API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0392 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the ResourceManagementOfBdt API | 17.2.0 |
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| 2021-06 | CT#92e | CP-211238 | 0395 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the DeviceTriggering API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0396 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the GMDViaMBMS APIs | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0397 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the ReportingNetworkStatus API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0398 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the CpProvisioning API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0399 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the PfdManagement API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0400 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the ECRControl API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0401 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the NpConfiguration API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0402 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the AsSessionWithQoS API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0403 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the MsisdnLessMoSms API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0404 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files of the RacsParameterProvisioning API | 17.2.0 |
| 2021-06 | CT#92e | CP-211238 | 0405 | 1 | F | Removal of invalid unbreakable spaces is some attributes description in the GMDViaMBMS and ReportingNetworkStatus APIs | 17.2.0 |
| 2021-06 | CT#92e | CP-211241 | 0406 |  | F | Support redirection for pure 4G SCEF northbound APIs | 17.2.0 |
| 2021-06 | CT#92e | CP-211241 | 0407 | 1 | F | MonitoringEvent API: TAB and missing "description" fields | 17.2.0 |
| 2021-06 | CT#92e | CP-211178 | 0408 | 3 | B | Support Time Sensitive Communication | 17.2.0 |
| 2021-06 | CT#92e | CP-211232 | 0410 | 1 | A | Clarification on Manufacturer Assigned URC | 17.2.0 |
| 2021-06 | CT#92e | CP-211199 | 0412 | 1 | A | Correction to LDR geographic area | 17.2.0 |
| 2021-06 | CT#92e | CP-211227 | 0415 |  | A | Resource corrections for SCEF Northbound APIs | 17.2.0 |
| 2021-06 | CT#92e | CP-211228 | 0418 | 1 | A | TWAN level accuracy applicability | 17.2.0 |
| 2021-06 | CT#92e | CP-211119 | 0422 | 1 | F | New Network slice status reporting events for the MonitoringEvent API | 17.2.0 |
| 2021-06 | CT#92e | CP-211241 | 0426 | 1 | F | Respecting 3GPP Forge executing rules | 17.2.0 |
| 2021-06 | CT#92e | CP-211240 | 0427 | 1 | B | Support of 204 No content response code for PFDs update(NBI17) | 17.2.0 |
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| 2021-06 | CT#92e | CP-211185 | 0433 |  | F | 204 No Content during modification procedure on ChargeableParty API | 17.2.0 |
| 2021-06 | CT#92e | CP-211240 | 0434 | 1 | F | Update of notification destination for ResourceManagementOfBdt API | 17.2.0 |
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| 2021-06 | CT#92e | CP-211240 | 0436 |  | F | Update of notification destination for AsSessionWithQoS API | 17.2.0 |
| 2021-06 | CT#92e | CP-211248 | 0437 |  | B | eCAPIF support | 17.2.0 |
| 2021-06 | CT#92e | CP-211269 | 0438 | 1 | B | Update procedures to support HSS initiated GEM partial cancellation | 17.2.0 |
| 2021-06 | CT#92e | CP-211269 | 0439 | 1 | B | Updates to support notification of GEM partial cancellation | 17.2.0 |
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| 2021-06 | CT#92e | CP-211240 | 0441 | 1 | F | Updates 204 No Content in RacsParameterProvisioning API | 17.2.0 |
| 2021-06 | CT#92e | CP-211241 | 0444 | 1 | B | Updates notification destination via PATCH operation in NIDD API | 17.2.0 |
| 2021-06 | CT#92e | CP-211228 | 0447 | 1 | A | Format of location information | 17.2.0 |
| 2021-06 | CT#92e | CP-211227 | 0450 |  | A | Corrections on PATCH operation for ChargeableParty API | 17.2.0 |
| 2021-06 | CT#92e | CP-211227 | 0453 |  | A | Essential corrections to 204 in PATCH in NIDD API | 17.2.0 |
| 2021-06 | CT#92e | CP-211265 | 0454 |  | A | Update of OpenAPI version and TS version in externalDocs field | 17.2.0 |
| 2021-09 | CT#93e | CP-212215 | 0455 | 1 | F | Resource URI corrections for PfdManagement and NpConfiguration APIs | 17.3.0 |
| 2021-09 | CT#93e | CP-212224 | 0456 | 1 | B | Clarification to type FlowInfo | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0457 |  | F | Correction to Resource URI of ResourceManagementOfBdt API | 17.3.0 |
| 2021-09 | CT#93e | CP-212210 | 0458 | 1 | B | UAV Presence Monitoring | 17.3.0 |
| 2021-09 | CT#93e | CP-212215 | 0459 | 1 | B | Resource allocation status for Chargeable Party | 17.3.0 |
| 2021-09 | CT#93e | CP-212224 | 0460 |  | F | Fix AppId feature description | 17.3.0 |
| 2021-09 | CT#93e | CP-212215 | 0463 | 1 | F | Supporting 204 No Content during configuration procedure on DeviceTriggering API | 17.3.0 |
| 2021-09 | CT#93e | CP-212215 | 0464 | 1 | F | Supporting 204 No Content during configuration procedure on ReportingNetworkStatus API | 17.3.0 |
| 2021-09 | CT#93e | CP-212186 | 0466 | 1 | A | Accuracy attribute correction | 17.3.0 |
| 2021-09 | CT#93e | CP-212213 | 0469 |  | A | Correction on Configuration data | 17.3.0 |
| 2021-09 | CT#93e | CP-212204 | 0471 |  | A | Correction on User Plane Notification data | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0472 |  | F | Corrections on resource root structure and resource URI on MonitoringEvent API | 17.3.0 |
| 2021-09 | CT#93e | CP-212215 | 0473 | 1 | F | Rel-17 Resource URI corrections on AsSessionWithQoS API | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0474 |  | F | Resource URI corrections on ChargeableParty API | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0475 |  | F | Resource URI correction on DeviceTriggering API | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0476 |  | F | Resource URI correction on ReportingNetworkStatus API | 17.3.0 |
| 2021-09 | CT#93e | CP-212215 | 0477 | 1 | F | Add list of data types table to the CommonData API | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0478 |  | F | Correction of some remaining invalid characters in OpenAPI specification files | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0479 |  | F | Miscellaneous corrections | 17.3.0 |
| 2021-09 | CT#93e | CP-212215 | 0480 | 1 | F | Resource URI correction in the GMD via MBMS APIs | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0481 |  | F | Correction to MAC address in MonitoringEvent API | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0482 |  | F | Updates 204 No Content in GMDviaMBMSbyMB2 API | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0483 |  | F | Updates 204 No Content in GMDviaMBMSbyxMB API | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0484 |  | F | Updates notification destination via PATCH operation in GMDviaMBMSbyMB2 API | 17.3.0 |
| 2021-09 | CT#93e | CP-212214 | 0485 |  | F | Updates notification destination via PATCH operation in GMDviaMBMSbyxMB API | 17.3.0 |
| 2021-09 | CT#93e | CP-212215 | 0486 | 1 | F | Correct resource URI in NIDD API | 17.3.0 |
| 2021-09 | CT#93e | CP-212215 | 0487 | 1 | F | Correct resource URI in RacsParameterProvisioning API | 17.3.0 |
| 2021-09 | CT#93e | CP-212224 | 0488 |  | B | Update DNN and S-NSSAI in MonitoringEvent API | 17.3.0 |
| 2021-09 | CT#93e | CP-212226 | 0489 | 1 | B | Update procedures to support SCSAS initiated GEM partial cancellation | 17.3.0 |
| 2021-09 | CT#93e | CP-212237 | 0490 | 1 | B | Updates to support GEM partial cancellation | 17.3.0 |
| 2021-09 | CT#93e | CP-212187 | 0491 | 1 | B | Support for Multiple QoS Class in deferred location request | 17.3.0 |
| 2021-09 | CT#93e | CP-212215 | 0492 | 2 | B | Supporting Load and Overload Control for northbound APIs | 17.3.0 |
| 2021-09 | CT#93e | CP-212211 | 0494 |  | B | Update of TscQosRequirement and TscQosRequirementRm | 17.3.0 |
| 2021-09 | CT#93e | CP-212223 | 0495 |  | F | Update of OpenAPI version and TS version in externalDocs field | 17.3.0 |
| 2021-12 | CT#94e | CP-213233 | 0496 | 2 | B | Enhance MonitoringEvent API to support UAV list | 17.4.0 |
| 2021-12 | CT#94e | CP-213247 | 0497 | 1 | F | Correcting "JSON Patch" encoding of changes | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0498 | 1 | B | Updates GET Query in AsSessionWithQoS API | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0499 | 1 | B | Updates GET Query in ChargeableParty API | 17.4.0 |
| 2021-12 | CT#94e | CP-213234 | 0500 | 1 | B | Adding alternative QoS related parameters to AsSessionWithQoS | 17.4.0 |
| 2021-12 | CT#94e | CP-213260 | 0502 | 2 | B | Update the data type definition for MonitoringEvent API | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0503 | 1 | F | Removal of errors from MonitoringEvent OpenAPI file | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0504 |  | F | ResourceManagementOfBdt: adding summary, operationId and tags fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0505 |  | F | ChargeableParty: adding operationId fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0506 | 1 | F | NIDD: adding summary, operationId and tags fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0507 | 1 | F | DeviceTriggering: adding operationId fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0508 |  | F | GMDviaMBMSbyMB2: adding operationId fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0509 |  | F | GMDviaMBMSbyxMB: adding operationId fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0510 |  | F | ReportingNetworkStatus: adding operationId and tags fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0511 | 1 | F | CpProvisioning: adding summary, operationId and tags fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0512 |  | F | PfdManagement: adding summary, operationId and tags fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0513 |  | F | NpConfiguration: adding operationId fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0514 |  | F | AsSessionWithQoS: adding operationId fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0515 | 1 | F | MsisdnLessMoSms: adding summary, operationId and tags fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0516 |  | F | RacsParameterProvisioning: adding summary, operationId and tags fields | 17.4.0 |
| 2021-12 | CT#94e | CP-213247 | 0517 | 1 | B | Update error handling procedures for GEM partial cancellation | 17.4.0 |
| 2021-12 | CT#94e | CP-213212 | 0518 | 1 | F | Resolve editor note for Multiple QoS Class | 17.4.0 |
| 2021-12 | CT#94e | CP-213230 | 0519 |  | F | Resolving the subscription to NSAC events related ENs | 17.4.0 |
| 2021-12 | CT#94e | CP-213230 | 0520 | 1 | F | Resolving the reporting type related ENs for NSAC event subscriptions | 17.4.0 |
| 2021-12 | CT#94e | CP-213268 | 0521 | 2 | B | Supporting explicit subscription to user plane events for the AsSessionWithQoS API | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0522 | 1 | B | Updating the support of explicit subscription to bearer events for the ChargeableParty API | 17.4.0 |
| 2021-12 | CT#94e | CP-213235 | 0523 | 1 | F | Supporting 204 No Content during configuration procedure on ResourceManagementOfBdt API | 17.4.0 |
| 2021-12 | CT#94e | CP-213236 | 0524 |  | F | Correction to Resource URI of CpProvisioning API | 17.4.0 |
| 2021-12 | CT#94e | CP-213236 | 0525 | 1 | B | Support of 204 No Content during modification procedure on CpProvisioning API | 17.4.0 |
| 2021-12 | CT#94e | CP-213220 | 0526 |  | B | Alignment with SA3 supported TLS profiles | 17.4.0 |
| 2021-12 | CT#94e | CP-213223 | 0527 |  | B | Clarification of direct notification | 17.4.0 |
| 2021-12 | CT#94e | CP-213230 | 0528 | 1 | B | Supporting network slice status retrieval | 17.4.0 |
| 2021-12 | CT#94e | CP-213236 | 0532 | 1 | B | Updates GET Query in MonitoringEvent API | 17.4.0 |
| 2021-12 | CT#94e | CP-213236 | 0533 | 1 | F | Adding a list of APIs table | 17.4.0 |
| 2021-12 | CT#94e | CP-213267 | 0534 | 2 | B | Supporting multiple events per subscription on MonitoringEvent API | 17.4.0 |
| 2021-12 | CT#94e | CP-213236 | 0536 | 1 | F | Adding the MonitoringEvent API specific data types tables | 17.4.0 |
| 2021-12 | CT#94e | CP-213236 | 0537 | 1 | F | Adding the DeviceTriggering API specific data types tables | 17.4.0 |
| 2021-12 | CT#94e | CP-213236 | 0538 | 1 | F | Adding the ReportingNetworkStatus API specific data types tables | 17.4.0 |
| 2021-12 | CT#94e | CP-213236 | 0539 | 1 | F | Adding the ECRControl API specific data types tables | 17.4.0 |
| 2021-12 | CT#94e | CP-213236 | 0540 | 1 | F | Adding the NpConfiguration API specific data types tables | 17.4.0 |
| 2021-12 | CT#94e | CP-213246 | 0541 | 1 | F | Update of OpenAPI version and TS version in externalDocs field | 17.4.0 |
| 2022-03 | CT#95e | CP-220203 | 0542 |  | F | Correction of mbmsLocArea attribute for GMDViaMBMS APIs | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0543 |  | F | Adding the ChargeableParty API specific data types table | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0544 |  | F | Adding the PfdManagement API specific data types table | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0545 | 1 | F | Adding the ResourceManagementOfBdt API specific data types table | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0546 | 1 | F | Updating the AsSessionWithQoS API data types table | 17.5.0 |
| 2022-03 | CT#95e | CP-220204 | 0547 | 2 | B | Add the support for PATCH method for the update of a NIDD DL Data transfer resource | 17.5.0 |
| 2022-03 | CT#95e | CP-220204 | 0548 | 3 | B | Add the support of PATCH for the update of a Device Triggering Transaction resource | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0549 | 1 | F | Adding the NIDD API specific data types table | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0550 |  | F | Adding the GMDViaMBMS APIs specific data types tables | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0551 |  | F | Adding the CpProvisioning API specific data types table | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0552 |  | F | Adding the MsisdnLessMoSms API specific data types table | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0553 |  | F | Adding the RacsParameterProvisioning API specific data types table | 17.5.0 |
| 2022-03 | CT#95e | CP-220181 | 0554 | 1 | B | Add the support of the civic address type of accuracy | 17.5.0 |
| 2022-03 | CT#95e | CP-220187 | 0555 | 1 | B | Defining the reporting format for NSAC | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0556 | 1 | B | Description of JSON body with "JSON Patch" encoding of changes | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0557 |  | F | Updates to GET query supporting in collection level | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0558 |  | B | Updates GET query in PfdManagement API | 17.5.0 |
| 2022-03 | CT#95e | CP-220183 | 0559 | 1 | B | Adding alternative QoS related parameter sets to AsSessionWithQoS | 17.5.0 |
| 2022-03 | CT#95e | CP-220203 | 0560 |  | F | Correction of the encoding of complex query parameters | 17.5.0 |
| 2022-03 | CT#95e | CP-220199 | 0561 | 1 | B | Support GEM partial addition | 17.5.0 |
| 2022-03 | CT#95e | CP-220185 | 0562 |  | F | Feature support handling for Edge Computing | 17.5.0 |
| 2022-03 | CT#95e | CP-220187 | 0564 | 1 | F | One-time reporting | 17.5.0 |
| 2022-03 | CT#95e | CP-220169 | 0567 |  | A | Incorrect resource name and attribute name | 17.5.0 |
| 2022-03 | CT#95e | CP-220181 | 0568 | 1 | B | Support AF specific UE ID retrieval in MonitoringEvent API | 17.5.0 |
| 2022-03 | CT#95e | CP-220181 | 0569 | 1 | B | Support AF specific UE ID retrieval in CpProvisioning API | 17.5.0 |
| 2022-03 | CT#95e | CP-220181 | 0570 | 1 | B | Support AF specific UE ID retrieval in NpConfiguration API | 17.5.0 |
| 2022-03 | CT#95e | CP-220204 | 0571 | 1 | B | Support PATCH for the update of a PFD Management Transaction resource | 17.5.0 |
| 2022-03 | CT#95e | CP-220204 | 0572 | 1 | B | Support PATCH for the update of Network Status Reporting Subscription resource | 17.5.0 |
| 2022-03 | CT#95e | CP-220194 | 0573 |  | F | Update of info and externalDocs fields | 17.5.0 |
| 2022-06 | CT#96 | CP-221145 | 0575 | 1 | B | Mutual exclusivity of QoS reference and individual QoS parameters | 17.6.0 |
| 2022-06 | CT#96 | CP-221139 | 0576 | 1 | F | Corrections to the AF provided inputs for NSAC | 17.6.0 |
| 2022-06 | CT#96 | CP-221147 | 0577 | 1 | F | Aligning the naming conventions for resource URI components and enumerations with 5GC APIs | 17.6.0 |
| 2022-06 | CT#96 | CP-221147 | 0578 | 1 | F | Resolving the naming convention issues | 17.6.0 |
| 2022-06 | CT#96 | CP-221144 | 0580 | 1 | F | Support of QoS notification control for requested alternative QoS parameters | 17.6.0 |
| 2022-06 | CT#96 | CP-221159 | 0581 |  | F | Adding Link data type with "nullable: true" property | 17.6.0 |
| 2022-06 | CT#96 | CP-221159 | 0583 |  | B | Missing application errors in the Monitoring API | 17.6.0 |
| 2022-06 | CT#96 | CP-221159 | 0584 |  | F | Correction to TscQosRequirement and TscQosRequirementRm | 17.6.0 |
| 2022-06 | CT#96 | CP-221159 | 0585 |  | B | Supporting user consent revocation for EDGEAPP on the Nnef\_EventExposure API | 17.6.0 |
| 2022-06 | CT#96 | CP-221159 | 0588 |  | A | Correcting the DateTime data type name | 17.6.0 |
| 2022-06 | CT#96 | CP-221159 | 0589 |  | F | Removing the MonitoringEventSubscriptionPatch data type | 17.6.0 |
| 2022-06 | CT#96 | CP-221159 | 0590 |  | F | Defining the default logical relationship between query parameters | 17.6.0 |
| 2022-06 | CT#96 | CP-221159 | 0591 |  | F | Update of info and externalDocs fields | 17.6.0 |
| 2022-09 | CT#97e | CP-222097 | 0592 | 1 | F | Updates error handling for AF specific UE Id retrieval in MonitoringEvent API | 17.7.0 |
| 2022-09 | CT#97e | CP-222097 | 0593 | 1 | F | Updates error handling for AF specific UE Id retrieval in CpProvisioning API | 17.7.0 |
| 2022-09 | CT#97e | CP-222097 | 0594 | 1 | F | Updates error handling for AF specific UE Id retrieval in NpConfiguration API | 17.7.0 |
| 2022-09 | CT#97e | CP-222118 | 0595 | 1 | F | The events subscribed by the NEF | 17.7.0 |
| 2022-09 | CT#97e | CP-222113 | 0596 | - | F | Fixing TSC related reused data types in AsSessionWithQoS | 17.7.0 |
| 2022-09 | CT#97e | CP-222118 | 0597 | 1 | F | Application errors handling for the NpConfiguration API | 17.7.0 |
| 2022-09 | CT#97e | CP-222117 | 0598 | - | F | Application errors handling for the RacsParameterProvisioning API | 17.7.0 |
| 2022-09 | CT#97e | CP-222117 | 0599 | 1 | F | Usage of the "tags" field and URI structure | 17.7.0 |
| 2022-09 | CT#97e | CP-222117 | 0600 | - | F | Application errors handling for the NIDD API | 17.7.0 |
| 2022-09 | CT#97e | CP-222117 | 0601 | 1 | F | Application errors handling for the ReportingNetworkStatus API | 17.7.0 |
| 2022-09 | CT#97e | CP-222117 | 0602 | - | F | Application errors handling for the ECRControl API | 17.7.0 |
| 2022-09 | CT#97e | CP-222117 | 0603 | 1 | F | "Error handling" clause: alignment with other NBI and 5GS APIs | 17.7.0 |
| 2022-09 | CT#97e | CP-222125 | 0605 | 1 | F | Correction of User Plane Event Report | 17.7.0 |
| 2022-09 | CT#97e | CP-222125 | 0607 | 1 | F | Reporting condition for QoS Monitoring Information | 17.7.0 |
| 2022-09 | CT#97e | CP-222090 | 0609 | 1 | A | Corrections on location reporting | 17.7.0 |
| 2022-09 | CT#97e | CP-222117 | 0612 | 1 | F | Boolean types in partial modification | 17.7.0 |
| 2022-09 | CT#97e | CP-222117 | 0613 | 1 | F | Updates on PATCH in MonitoringEvent API | 17.7.0 |
| 2022-09 | CT#97e | CP-222118 | 0614 | 1 | F | Missing description field for enumeration data type in MonitoringEvent API | 17.7.0 |
| 2022-09 | CT#97e | CP-222097 | 0615 | - | F | Correcting the name of the application errors related to user consent revocation support | 17.7.0 |
| 2022-09 | CT#97e | CP-222117 | 0616 | - | F | Application errors handling for the MontoringEvent API | 17.7.0 |
| 2022-09 | CT#97e | CP-222121 | 0620 | - | F | Update of info and externalDocs fields | 17.7.0 |
| 2022-12 | CT#98e | CP-223184 | 0623 | 1 | F | Corrections on PLMN\_CHG event | 17.8.0 |
| 2022-12 | CT#98e | CP-223184 | 0624 | 1 | F | Corrections on ACCESS\_TYPE\_CHANGE event | 17.8.0 |
| 2022-12 | CT#98e | CP-223188 | 0626 | - | F | Update of info and externalDocs fields | 17.8.0 |
| 2022-12 | CT#98e | CP-223185 | 0622 | 1 | F | ResultReason enumeration definition in the OpenAPI file | 18.0.0 |
| 2022-12 | CT#98e | CP-223189 | 0625 | - | F | Update of info and externalDocs fields | 18.0.0 |
| 2023-03 | CT#99 | CP-230179 | 0628 | 1 | B | Adding PER to AF Session with QoS API | 18.1.0 |
| 2023-03 | CT#99 | CP-230172 | 0629 | 1 | B | Unavailability Period feature for Monitoring Event API | 18.1.0 |
| 2023-03 | CT#99 | CP-230157 | 0632 | 1 | B | Correction of expectedUmtDays attribute | 18.1.0 |
| 2023-03 | CT#99 | CP-230156 | 0634 | 1 | B | Update Flow Description Information with ToSTC in ChargeableParty API | 18.1.0 |
| 2023-03 | CT#99 | CP-230156 | 0636 | 1 | B | Update Flow Description Information with ToSTC in AsSessionWithQoS API | 18.1.0 |
| 2023-03 | CT#99 | CP-230157 | 0640 | 2 | B | Updates on location reporting | 18.1.0 |
| 2023-03 | CT#99 | CP-230281 | 0641 | 2 | B | Updates to immediate reporting in MonitoringEvent API | 18.1.0 |
| 2023-03 | CT#99 | CP-230156 | 0642 | 1 | F | Correction of the description fields in enumerations | 18.1.0 |
| 2023-03 | CT#99 | CP-230156 | 0643 | - | F | Description fields in enumerations | 18.1.0 |
| 2023-03 | CT#99 | CP-230173 | 0650 | 1 | A | Correction on handling of Packet Delay Failure report Threshold | 18.1.0 |
| 2023-03 | CT#99 | CP-230174 | 0651 | - | F | Generalization of QoS monitoring control description | 18.1.0 |
| 2023-03 | CT#99 | CP-230182 | 0652 | 1 | B | Support of Nnef\_AFsessionWithQoS\_Create service update for Multi-Modal service XR and Media Services | 18.1.0 |
| 2023-03 | CT#99 | CP-230157 | 0653 | 1 | B | Vendor specific extensions | 18.1.0 |
| 2023-03 | CT#99 | CP-230155 | 0655 | 1 | A | Corrections in MonitoringEvent API | 18.1.0 |
| 2023-03 | CT#99 | CP-230277 | 0656 | 1 | B | Specification of application errors for QoS requests | 18.1.0 |
| 2023-03 | CT#99 | CP-230175 | 0657 | 1 | B | Indication of Alternative Service Requirements not supported | 18.1.0 |
| 2023-03 | CT#99 | CP-230179 | 0658 | 1 | B | Support of BAT window and capability for BAT adaptation | 18.1.0 |
| 2023-03 | CT#99 | CP-230153 | 0659 | - | B | Support of Group Member List Change event | 18.1.0 |
| 2023-03 | CT#99 | CP-230157 | 0660 | 1 | F | Clarification on bearer related events in AsSessionWithQoS API | 18.1.0 |
| 2023-03 | CT#99 | CP-230305 | 0662 | 2 | A | Correction of the procedure when the NEF reject the AF update request | 18.1.0 |
| 2023-03 | CT#99 | CP-230161 | 0664 | - | F | Update of info and externalDocs fields | 18.1.0 |
| 2023-06 | CT#100 | CP-231169 | 0639 | 2 | A | Correction on TLS\_SCN in PFD data | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0665 | 1 | F | Corrections on applicability of ToS Traffic Class | 18.2.0 |
| 2023-06 | CT#100 | CP-231130 | 0666 | 2 | B | AsSessionWithQoS enhancements to support multi-modal services | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0669 | 1 | B | Vendor specific extensions – resolve EN | 18.2.0 |
| 2023-06 | CT#100 | CP-231130 | 0671 | 2 | B | Support of ECN marking for L4S | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0672 | 1 | F | Defining a TS skeleton for TSs documenting NBI APIs | 18.2.0 |
| 2023-06 | CT#100 | CP-231143 | 0675 | 1 | F | Support of BAT offset and adjusted periodicity | 18.2.0 |
| 2023-06 | CT#100 | CP-231300 | 0677 | 1 | B | Support of PDU Set QoS Parameters | 18.2.0 |
| 2023-06 | CT#100 | CP-231129 | 0678 | 3 | B | Support of Uplink Downlink transmission coordination to meet RT latency requirement | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0680 | 1 | B | Updates in NpConfiguration API | 18.2.0 |
| 2023-06 | CT#100 | CP-231186 | 0681 |  | F | Clarification on Loss\_of\_connectivity\_notification\_5G | 18.2.0 |
| 2023-06 | CT#100 | CP-231126 | 0682 | 1 | B | Enhanced data management for the Monitoring API | 18.2.0 |
| 2023-06 | CT#100 | CP-231164 | 0686 | 1 | A | Corrections in the Notification mechanism description | 18.2.0 |
| 2023-06 | CT#100 | CP-231153 | 0688 | 1 | A | MonitoringEvent resources update for an Error case | 18.2.0 |
| 2023-06 | CT#100 | CP-231262 | 0689 | 1 | B | Adding Monitoring event for application traffic detection. | 18.2.0 |
| 2023-06 | CT#100 | CP-231130 | 0690 | 1 | B | Protocol description parameter support in AS Session with QoS | 18.2.0 |
| 2023-06 | CT#100 | CP-231147 | 0694 |  | A | Removal of unspecified QoS monitoring control options | 18.2.0 |
| 2023-06 | CT#100 | CP-231129 | 0696 |  | B | Support of periodicity measurement and reporting for power saving | 18.2.0 |
| 2023-06 | CT#100 | CP-231128 | 0697 |  | B | Support Application-Specific Expected UE Behaviour parameters | 18.2.0 |
| 2023-06 | CT#100 | CP-231311 | 0699 | 1 | A | Corrections to boolean type in MonitoringEventSubscription | 18.2.0 |
| 2023-06 | CT#100 | CP-231140 | 0700 | 1 | F | Corrections to immediate reporting in MonitoringEvent API | 18.2.0 |
| 2023-06 | CT#100 | CP-231140 | 0701 | 1 | F | Corrections to Location Type and immediate reporting in MonitoringEvent API | 18.2.0 |
| 2023-06 | CT#100 | CP-231313 | 0702 | 1 | B | Updates to BDT on ASP Id | 18.2.0 |
| 2023-06 | CT#100 | CP-231167 | 0705 |  | A | Reporting format for one-time reporting | 18.2.0 |
| 2023-06 | CT#100 | CP-231130 | 0707 | 1 | B | Support of Packet Delay Variation monitoring and reporting | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0711 |  | F | Corrections to the resource update related provisions for the MonitoringEvent API | 18.2.0 |
| 2023-06 | CT#100 | CP-231139 | 0712 |  | B | Editor Note removal for userLocation attribute | 18.2.0 |
| 2023-06 | CT#100 | CP-231141 | 0715 |  | F | Update of info and externalDocs fields | 18.2.0 |
| 2023-09 | CT#101 | CP-232091 | 0721 | 1 | F | Wrong applicability of AsSessionWithQoS error | 18.3.0 |
| 2023-09 | CT#101 | CP-232086 | 0722 | 1 | F | Applicability of new AfSessionWithQoS errors | 18.3.0 |
| 2023-09 | CT#101 | CP-232124 | 0723 | 1 | B | Update application detection event exposure | 18.3.0 |
| 2023-09 | CT#101 | CP-232087 | 0724 | 1 | B | AF QoS Timing info addition | 18.3.0 |
| 2023-09 | CT#101 | CP-232172 | 0725 | 2 | B | AIMLsys service data model update for ASsessionWithQoS | 18.3.0 |
| 2023-09 | CT#101 | CP-232158 | 0727 | 1 | F | Editor note removal for Multimodal id | 18.3.0 |
| 2023-09 | CT#101 | CP-232090 | 0729 |  | B | AF request QoS for target UE in AsSessionWithQoS API | 18.3.0 |
| 2023-09 | CT#101 | CP-232109 | 0731 | 1 | B | Reject Location request when area does not overlap with configured "event report allowed area" | 18.3.0 |
| 2023-09 | CT#101 | CP-232113 | 0732 | 1 | B | Network slice admission control notification update for UE with atleast one PDU session/PDN connection | 18.3.0 |
| 2023-09 | CT#101 | CP-232086 | 0735 |  | F | Correction in Feature numbering | 18.3.0 |
| 2023-09 | CT#101 | CP-232086 | 0736 |  | F | remove useless BdtReferenceIdRm | 18.3.0 |
| 2023-09 | CT#101 | CP-232091 | 0738 |  | F | Corrections on the roaming status report | 18.3.0 |
| 2023-09 | CT#101 | CP-232084 | 0739 | 1 | B | Subscription to Round-Trip delay over two service data flows | 18.3.0 |
| 2023-09 | CT#101 | CP-232158 | 0740 | 1 | B | Subscription to data rate monitoring | 18.3.0 |
| 2023-09 | CT#101 | CP-232158 | 0741 | 1 | B | Support of the congestion information measurement and reporting | 18.3.0 |
| 2023-09 | CT#101 | CP-232158 | 0742 | 1 | B | Support of the Packet Delay Variation monitoring | 18.3.0 |
| 2023-09 | CT#101 | CP-232087 | 0745 | 1 | B | Confidence and accuracy levels for UE behaviour parameters | 18.3.0 |
| 2023-09 | CT#101 | CP-232103 | 0746 | 2 | B | Location exposure for Ranging\_SL | 18.3.0 |
| 2023-09 | CT#101 | CP-232087 | 0747 | 1 | B | Resolve EN for Application-Specific Expected UE Behaviour parameters | 18.3.0 |
| 2023-09 | CT#101 | CP-232085 | 0748 |  | F | Update of info and externalDocs fields | 18.3.0 |
| 2023-12 | CT#102 | CP-233231 | 0691 | 4 | B | Supporting query parameters extensibility | 18.4.0 |
| 2023-12 | CT#102 | CP-233263 | 0718 | 1 | A | Resolving the remaining LOLC related ENs | 18.4.0 |
| 2023-12 | CT#102 | CP-233262 | 0719 | 2 | B | Support of user plane positioning | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 0734 | 3 | F | Corrections to MonitoringEventReport | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 0749 |  | F | Correct the attribute names and add abbreviation | 18.4.0 |
| 2023-12 | CT#102 | CP-233233 | 0750 | 1 | B | Introduction of new features for PDU set handle and RT latency | 18.4.0 |
| 2023-12 | CT#102 | CP-233233 | 0752 |  | B | Update Data Rate monitoring | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 0753 |  | F | Corrections to the monitoringType and addnMonTypes attributes | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 0754 | 1 | F | Corrections to the User Consent Revocation Notification definition | 18.4.0 |
| 2023-12 | CT#102 | CP-233234 | 0755 | 3 | B | Support of subscription to flow level events | 18.4.0 |
| 2023-12 | CT#102 | CP-233233 | 0756 | 1 | F | Support of the new feature name EnQoSMon | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 0757 | 2 | F | Updating the obsoleted IETF HTTP RFCs | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 0760 | 1 | F | associate attributes with corresponding NOTE | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 0761 |  | B | ProblemDetails RFC 7807 obsoleted by RFC 9457 | 18.4.0 |
| 2023-12 | CT#102 | CP-233268 | 0762 | 1 | B | Update Location exposure for Ranging\_SL | 18.4.0 |
| 2023-12 | CT#102 | CP-233257 | 0763 | 1 | F | Corrections in MonitoringEventReport | 18.4.0 |
| 2023-12 | CT#102 | CP-233233 | 0764 |  | B | Protocol description - End of burst indication update | 18.4.0 |
| 2023-12 | CT#102 | CP-233208 | 0765 | 2 | B | Feature granularity and definition for MultiModal & PowerSaving | 18.4.0 |
| 2023-12 | CT#102 | CP-233245 | 0766 | 1 | F | Correction on formulating conditions based on feature support | 18.4.0 |
| 2023-12 | CT#102 | CP-233233 | 0771 |  | B | Definition of L4S feature | 18.4.0 |
| 2023-12 | CT#102 | CP-233236 | 0772 | 3 | B | Updates to AppExpUeBehaviour Data Type in CpProvisioning API | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 0774 |  | F | Update the feature description for Application-Specific Expected UE Behaviour | 18.4.0 |
| 2023-12 | CT#102 | CP-233257 | 0775 | 1 | B | Update application detection event exposure | 18.4.0 |
| 2023-12 | CT#102 | CP-233262 | 0776 | 1 | B | Support of cumulative event report | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 0777 |  | F | Remove the redundant features | 18.4.0 |
| 2023-12 | CT#102 | CP-233235 | 0778 | 1 | B | Support of Consolidated Data Rate for Multi-member AF session | 18.4.0 |
| 2023-12 | CT#102 | CP-233209 | 0780 | 2 | B | Port handling with AsSessionWithQoS | 18.4.0 |
| 2023-12 | CT#102 | CP-233236 | 0781 | 1 | B | Multiple AF Expected UE behaviour | 18.4.0 |
| 2023-12 | CT#102 | CP-233225 | 0782 |  | F | Removal of EN related to data management | 18.4.0 |
| 2023-12 | CT#102 | CP-233257 | 0783 | 1 | F | Wrong attribute name | 18.4.0 |
| 2023-12 | CT#102 | CP-233231 | 0784 |  | F | Corrections on monitoring event | 18.4.0 |
| 2023-12 | CT#102 | CP-233234 | 0785 |  | F | Remove the multiModalId in the update message and update the terminology | 18.4.0 |
| 2023-12 | CT#102 | CP-233237 | 0787 |  | F | Update of info and externalDocs fields | 18.4.0 |