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| Technical Specification | |
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# Foreword

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

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

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

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

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

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

**shall** indicates a mandatory requirement to do something

**shall not** indicates an interdiction (prohibition) to do something

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

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

**should** indicates a recommendation to do something

**should not** indicates a recommendation not to do something

**may** indicates permission to do something

**need not** indicates permission not to do something

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

**can** indicates that something is possible

**cannot** indicates that something is impossible

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

**will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

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

**might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

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

In addition:

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

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

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

# 1 Scope

The present document specifies the stage 3 protocol and data model for the Nudm Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the UDM.

The 5G System stage 2 architecture and procedures are specified in 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [4] and 3GPP TS 29.501 [5].

# 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 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

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

[6] 3GPP TS 33.501: "Security Architecture and Procedures for 5G System".

[7] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".

[8] 3GPP TS 23.003: "Numbering, addressing and identification".

[9] 3GPP TS 29.504: "5G System; Unified Data Repository Services; Stage 3".

[10] 3GPP TS 29.505: "5G System; Usage of the Unified Data Repository Services for Subscription Data; Stage 3".

[11] 3GPP TS 32.255: "Charging management; 5G data connectivity domain charging".

[12] 3GPP TS 32.298: "Charging management; Charging Data Record (CDR) parameter description".

[13] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

[14] OpenAPI Initiative, "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>

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

[16] IETF RFC 7807: "Problem Details for HTTP APIs".

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

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

[19] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".

[20] 3GPP TS 23.122: "Non-Access-Stratum (NAS) functions related to Mobile Station in idle mode".

[21] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[22] 3GPP TS 29.338: "Diameter based protocols to support Short Message Service (SMS) capable Mobile Management Entities (MMEs)"

[23] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[24] 3GPP TS 29.509: "Authentication Server Services; Stage 3".

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

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

[27] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[28] ETSI TS 102 225: "Smart Cards; Secured packet structure for UICC based applications".

[29] IETF RFC 7542: "The Network Access Identifier".

[30] 3GPP TR 21.900: "Technical Specification Group working methods".

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

[32] 3GPP TS 23.632: "User Data Interworking, Coexistence and Migration"

[33] 3GPP TS 29.519: "Policy Data, Application Data and Structured Data for Exposure; Stage 3".

[34] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[35] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[36] 3GPP TS 29.518: "Access and Mobility Management Services".

[37] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS); Stage 2".

[38] 3GPP TS 23.273: "5G System (5GS) Location Services (LCS); Stage 2".

[39] 3GPP TS 29.515: "5G System; Gateway Mobile Location Services; Stage 3".

[40] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

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

[42] BBF TR-069: "CPE WAN Management Protocol".

[43] BBF TR-369: "User Services Platform (USP)".

[44] 3GPP TS 29.524: "5G System; Cause codes mapping between 5GC interfaces; Stage 3".

[45] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

[46] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

[47] 3GPP TS 22.071: "Location Services (LCS); Service description; Stage 1".

[48] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".

[49] 3GPP TS 24.302: "Access to the 3GPP Evolved Packet Core (EPC) via non-3GPP access networks".

[50] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".

[51] 3GPP TS 23.287: "Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services".

[52] 3GPP TS 29.328: "IP Multimedia (IM) Subsystem Sh interface; Signalling flows and message contents".

[53] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[54] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[55] 3GPP TS 29.563: "5G System; Home Subscriber Server (HSS) services for interworking with Unified Data Management (UDM); Stage 3"

# 3 Definitions and abbreviations

## 3.1 Definitions

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

## 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].

5GC 5G Core Network

ACS Auto-Configuration Server

AMF Access and Mobility Management Function

AUSF Authentication Server Function

NIDD Non-IP Data Delivery

DNN Data Network Name

FQDN Fully Qualified Domain Name

FN-RG Fixed Network RG

GMLC Gateway Mobile Location Centre

GPSI Generic Public Subscription Identifier

GUAMI Globally Unique AMF Identifier

HGMLC Home GMLC

JSON Javascript Object Notation

LCS LoCation Services

LPI LCS Privacy Indicator

MICO Mobile Initiated Connection Only

N5GC Non-5G-Capable

NAI Network Access Identifier

NAS Non-Access Stratum

NEF Network Exposure Function

NRF Network Repository Function

NSSAI Network Slice Selection Assistance Information

NWDAF Network Data Analytics Function

PEI Permanent Equipment Identifier

QFI QoS Flow Identifier

5G-RG 5G Residential Gateway

RG Residential Gateway

SBI Service Based Interface

SMF Session Management Function

SMSF Short Message Service Function

SUCI Subscription Concealed Identifier

SUPI Subscription Permanent Identifier

UDM Unified Data Management

UDR Unified Data Repository

W-AGF Wireline Access Gateway Function

# 4 Overview

## 4.1 Introduction

Within the 5GC, the UDM offers services to the AMF, SMF, SMSF, NEF, GMLC, NWDAF and AUSF via the Nudm service based interface (see 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.288 [35]).

Figure 4.1-1 provides the reference model (in service based interface representation and in reference point representation), with focus on the UDM.



Figure 4.1-1: Reference model – UDM

The functionalities supported by the UDM are listed in clause 6.2.7 of 3GPP TS 23.501 [2].

# 5 Services offered by the UDM

## 5.1 Introduction

The UDM offeres the following services via the Nudm interface:

- Nudm\_SubscriberDataManagement Service

- Nudm\_UEContextManagement Service

- Nudm\_UEAuthentication Service

- Nudm\_EventExposure Service

- Nudm\_ParameterProvision Service

- Nudm\_NIDDAuthorization

- Nudm\_MT

Table 5.1-1 summarizes the corresponding APIs defined for this specification.

Table 5.1-1: API Descriptions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Service Name | Clause | Description | OpenAPI Specification File | apiName | **Annex** |
| Nudm\_SubscriberDataManagement | 6.1 | UDM Subscriber Data Management Service | TS29503\_Nudm\_SDM.yaml | nudm-sdm | A.2 |
| Nudm\_UEContextManagement | 6.2 | UDM Context Management Service | TS29503\_Nudm\_UECM.yaml | nudm-uecm | A.3 |
| Nudm\_UEAuthentication | 6.3 | UDM UE Authentication Service | TS29503\_Nudm\_UEAU.yaml | nudm-ueau | A.4 |
| Nudm\_EventExposure | 6.4 | UDM Event Exposure Service | TS29503\_Nudm\_EE.yaml | nudm-ee | A.5 |
| Nudm\_ParameterProvision | 6.5 | UDM Parameter Provision Service | TS29503\_Nudm\_PP.yaml | nudm-pp | A.6 |
| Nudm\_NIDDAuthorization | 6.6 | UDM NIDD Authorization Service | TS29503\_Nudm\_NIDDAU.yaml | nudm-niddau | A.7 |
| Nudm\_MT | 6.7 | UDM MT Service | TS29503\_Nudm\_MT.yaml | nudm-mt | A.8 |

All scenarios shown in the following clauses assume that the UDM is stateful and stores information in local memory. However, the UDM may be stateless and stores information externally in the UDR. If so, the stateless UDM makes use of Nudr services as specified in 3GPP TS 29.504 [9] and 3GPP TS 29.505 [10] to retrieve required data from the UDR and store them locally before processing an incoming request. Processing the incoming request may then include updating data in the UDR or subscribing to data change notifications at the UDR by consuming the appropriate Nudr services. After processing the incoming request, the UDM may delete the locally stored data. When data stored in UDR is then shared among the different UDM instances of the same group, as identified by UDM Group ID (see 3GPP TS 23.501 [2], clause 6.2.6), bulk subscriptions, as described in clause 4.15.3.2.4 of 3GPP TS 23.502 [3], are not applicable, i.e. an NF consumer (e.g. NEF) only subscribes towards one of the UDM instances within the group. See Annex B.

## 5.2 Nudm\_SubscriberDataManagement Service

### 5.2.1 Service Description

See 3GPP TS 23.501 [2] table 7.2.5-1.

### 5.2.2 Service Operations

#### 5.2.2.1 Introduction

For the Nudm\_SubscriberDataManagement service the following service operations are defined:

- Get

- Subscribe

- ModifySubscription

- Unsubscribe

- Notification

- Info

The Nudm\_SubscriberDataManagement Service is used by Consumer NFs (AMF, SMF, SMSF, GMLC) to retrieve the UE's individual subscription data relevant to the consumer NF from the UDM by means of the Get service operation. If the consumer NF supports the feature "sharedData" (see clause 6.1.8), the retrieved individual subscription data for the UE may contain shared data identifier identifying additional parts of subscription data shared by several UEs. If so, the Nudm\_SubscriberDataManagement Service is also used by Consumer NFs to retrieve shared subscription data from the UDM by means of the Get service operation.

It is also used by Consumer NFs to subscribe to notifications of data change by means of the Subscribe service operation. If the consumer NF supports the feature "sharedData" (see clause 6.1.8), the consumer NF may also subscribe to notifications of shared data change by means of the Subscribe service operation.

It is also used to modify an existing subscription by means of the ModifySubscription service operation. If the consumer NF supports the feature "sharedData" (see clause 6.1.8), the consumer NF may also modify an existing subscription to notifications of shared data change by means of the ModifySubscription service operation.

It is also used to unsubscribe from notifications of data changes by means of the Unsubscribe service operation. If the feature "sharedData" (see clause 6.1.8) is supported, it may also be used to unsubscribe from notifications of shared data changes by means of the Unsubscribe service operation.

It is also used by the Consumer NFs (AMF, SMF, SMSF) that have previously subscribed, to get notified by means of the Notification service operation when UDM decides to modify the subscribed data. If the feature "sharedData" (see clause 6.1.8) is supported by the consumer NF and the consumer NF has previously subscribed to notifications of shared data change, it is also used by the consumer NF to get notified by means of the Notification service operation when the UDM decides to modify the subscribed shared data.

It is also used by Consumer NFs to provide the information about the status of the subscription data management procedures.

#### 5.2.2.2 Get

##### 5.2.2.2.1 General

The following procedures using the Get service operation are supported:

- Slice Selection Subscription Data Retrieval

- Access and Mobility Subscription Data Retrieval

- SMF Selection Subscription Data Retrieval

- Session Management Subscription Data Retrieval

- SMS Subscription Data Retrieval

- SMS Management Subscription Data Retrieval

- UE Context in SMF Data Retrieval

- UE Context in SMSF Data Retrieval

- Retrieval Of Multiple Data Sets

- Identifier Translation

- Shared Subscription Data Retrieval

- Trace Data Retrieval

- LCS Privacy Data Retrieval

- LCS Mobile Originated Data Retrieval

- Enhanced Coverage Restriction Data Retrieval

- V2X Subscription Data Retrieval

- LCS Broadcast Assistance Subscription Data Retrieval

- UE Context in AMF Data Retrieval

- Individual Shared Subscription Data Retrieval

When the feature SharedData (see clause 6.1.8) is supported and the retrieved UE-individual data (i.e. data other than Shared Subscription Data) contain SharedDataIds, the NF service consumer shall also retrieve the shared data identified by the received shared data Ids unless the identified shared data are already available at the NF service consumer. The order of sequence of sharedDataIds within UE-individual data is significant: Individual data take precedence over shared data; shared data "SharedDataX" identified by a sharedDataId X takes precedence over shared data "SharedDataY" identified by a sharedDataId Y if X appears before Y within the list of SharedDataIds in the UE-individual data.

##### 5.2.2.2.2 Slice Selection Subscription Data Retrieval

Figure 5.2.2.2.2-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the UE's NSSAI (see also clause 5.15.5.2.1 of 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3] figure 4.2.2.2.3-1 step 3). In this example scenario the NSSAI is retrieved by the AMF, see clause 6.1.3.2.1 for other scenarios that can retrieve the NSSAI. The request contains the UE's identity (/{supi}), the type of the requested information (/nssai) and query parameters (supported-features, plmn-id).



Figure 5.2.2.2.2-1: Requesting a UE's NSSAI

1. The NF service consumer (e.g. AMF) sends a GET request to the resource representing the UE's subscribed NSSAI, with query parameters indicating the supported-features and/or plmn-id.

2a. On success, the UDM responds with "200 OK" with the message body containing the UE's NSSAI as relevant for the requesting NF service consumer.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.3 Access and Mobility Subscription Data Retrieval

Figure 5.2.2.2.3-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the UE's Access and Mobility Subscription data (see also 3GPP TS 23.502 [3] figure 4.2.2.2.2-1 step 14). The request contains the UE's identity (/{supi}), the type of the requested information (/am-data) and query parameters (supported-features, plmn-id).



Figure 5.2.2.2.3-1: Requesting a UE's Access and Mobility Subscription Data

1. The NF service consumer (e.g. AMF) sends a GET request to the resource representing the UE's Access and Mobility Subscription Data, with query parameters indicating the supported-features and/or plmn-id.

2a. On Success, the UDM responds with "200 OK" with the message body containing the UE's Access and Mobility Subscription Data as relevant for the requesting NF service consumer.

NOTE 1: If the UDM initiated a request to obtain SoR information from the SOR-AF, the UDM starts an operator configurable timer up to which the UDM shall wait for a response from the SOR-AF for retrieving the SoR information. The UDM responds back to the NF service consumer for Access and Mobility Subscription Data Retrieval service operation before the timer expires. If the SOR-AF has not provided a response with the SoR information before the timer expires, the UDM shall behave as specified in clause C.2 of 3GPP°TS°23.122 [20] (step 3d).2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

NOTE 2: Upon reception of any Nudm\_EventExposure operation or Nudm\_PP operation, or when the validity of an event subscription or provisioned parameter with its associated maximum latency, maximum response time or DL Buffering Suggested Packet Count value expires, UDM may need to adjust the values of active time and/or periodic registration timer and/or DL Buffering Suggested Packet Count. The UDM shall notify AMF and/or SMF if the values are updated (see clause 4.15.3.2.3b and 4.15.6.3a of 3GPP TS 23.502 [3]).

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

##### 5.2.2.2.4 SMF Selection Subscription Data Retrieval

Figure 5.2.2.2.4-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the UE's SMF Selection Subscription data (see also 3GPP TS 23.502 [3] figure 4.2.2.2.2-1 step 14). The request contains the UE's identity (/{supi}), the type of the requested information (/smf-select-data) and query parameters (supported-features, plmn-id).



Figure 5.2.2.2.4-1: Requesting a UE's SMF Selection Subscription Data

1. The NF service consumer (e.g. AMF) sends a GET request to the resource representing the UE's SMF Selection Subscription Data, with query parameters indicating the supported-features and/or plmn-id.

2a. On success, the UDM responds with "200 OK" with the message body containing the UE's SMF Selection Subscription Data as relevant for the requesting NF service consumer.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.5 Session Management Subscription Data Retrieval

Figure 5.2.2.2.5-1 shows a scenario where the NF service consumer (e.g. SMF) sends a request to the UDM to receive the UE's session management subscription data (see also 3GPP TS 23.502 [3] figure 4.3.2.2.1-1 step 4a-4b). The request contains the UE's identity (/{supi}), the type of the requested information (/sm-data), and query parameters (single-nssai, dnn, supported-features, plmn-id).



Figure 5.2.2.2.5-1: Requesting a UE's Session Management Subscription Data

1. The NF service consumer (e.g. SMF) sends a GET request to the resource representing the UE's session management subscription data, with query parameters indicating the selected network slice and/or the DNN and/or supported-features and/or plmn-id.

2a. On success, the UDM responds with "200 OK", the message body containing the UE's session management subscription data (an array of SessionManagementSubscriptionData objects, one array element per S-NSSAI) as relevant for the requesting NF service consumer.

2b. If there is no valid subscription data for the UE, or if the UE subscription data exists, but the requested session management subscription is not available (e.g. query parameter contains network slice and/or DNN that does not belong to the UE subscription), HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.6 SMS Subscription Data Retrieval

Figure 5.2.2.2.6-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the UE's SMS Subscription Data (see also 3GPP TS 23.502 [3], clause 4.13.3.1). The request contains the UE's identity (/{supi}) and the type of the requested information (/sms-data).



Figure 5.2.2.2.6-1: Requesting UE's SMS Subscription Data

1. The NF Service Consumer (e.g. AMF) sends a GET request to the resource representing the UE's SMS Subscription Data.

2. The UDM responds with "200 OK" with the message body containing the UE's SMS Subscription Data.

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

##### 5.2.2.2.7 SMS Management Subscription Data Retrieval

Figure 5.2.2.2.7-1 shows a scenario where the NF service consumer (e.g. SMSF) sends a request to the UDM to receive the UE's SMS Management Subscription Data (see also 3GPP TS 23.502 [3], clause 4.13.3.1). The request contains the UE's identity (/{supi}) and the type of the requested information (/sms-mng-data).



Figure 5.2.2.2.7-1: Requesting UE's SMS Management Subscription Data

1. The NF Service Consumer (e.g. SMSF) sends a GET request to the resource representing the UE's SMS Management Subscription Data.

2. The UDM responds with "200 OK" with the message body containing the UE's SMS Management Subscription Data.

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

##### 5.2.2.2.8 UE Context In SMF Data Retrieval

Figure 5.2.2.2.8-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the UE's Context In SMF data (see also 3GPP TS 23.502 [3] figure 4.2.2.2.2-1 step 14). The request contains the UE's identity (/{supi}), the type of the requested information (/ue-context-in-smf-data) and query parameters (supported-features).



Figure 5.2.2.2.8-1: Requesting a UE's Context in SMF Data

1. The NF service consumer (e.g. AMF) shall send a GET request to the resource representing the UE's Context In SMF Data, with query parameters indicating the supported-features.

2a. On Success, the UDM shall respond with "200 OK" with the message body containing the UE's Context In SMF Data as relevant for the requesting NF service consumer.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.9 Retrieval Of Multiple Data Sets

Figure 5.2.2.2.9-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive multiple data sets. In this example scenario the UE's Access and Mobility Subscription data and the the UE's SMF Selection Subscription data are retrieved with a single request; see clause 6.1.3.11.3.1 for other data sets that can be retrieved with a single request. The request contains the UE's identity (/{supi}) and query parameters identifying the requested data sets (in this example: ?dataset-names=AM, SMF\_SEL).



Figure 5.2.2.2.9-1: Retrieval of Multiple Data Sets

1. The NF Service Consumer (e.g. AMF) sends a GET request to the resource representing the supi. Query parameters indicate the requested data sets.

2. The UDM responds with "200 OK" with the message body containing the requested and available data sets. When not all requested data sets are available at the UDM (e.g. no Trace Data), only the requested and available data sets are returned in a "200 OK" response.

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

##### 5.2.2.2.10 Identifier Translation

Figure 5.2.2.2.10-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to receive the SUPI/GPSI that corresponds to the provided GPSI/SUPI (see also 3GPP TS 23.502 [3], clause 4.13.2.2 and clause 4.13.7.2). The request contains the UE's identity (/{ueId}) which shall be a SUPI or GPSI and the type of the requested information (/id-translation-result).

NOTE: This service operation can be used by a Rel-15 GMLC during 5GS-MT-LR procedure to get the SUPI of a UE from GPSI, as an authorized NF service consumer of Nudm\_SubscriberDataManagement service.



Figure 5.2.2.2.10-1: Identifier Translation

1. The NF Service Consumer (e.g. NEF) shall send a GET request to the resource representing the IdTranslationResult, with query parameters indicating the supported-features and/or app-port-id.

2. The UDM shall respond with "200 OK" with the message body containing the UE's SUPI.

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

##### 5.2.2.2.11 Shared Subscription Data Retrieval

Figure 5.2.2.2.11-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the shared subscription data. The request contains the type of the requested information (/shared-data) and query parameters (supportedFeatures, shared-data-id).



Figure 5.2.2.2.11-1: Requesting shared data

1. The NF service consumer (e.g. AMF) sends a GET request to the resource representing the SharedData, with query parameters indicating the supportedFeatures and shared-data-id.

2a. On success, the UDM responds with "200 OK" with the message body containing the SharedData.

2b. If there is no valid shared data for one or more of the shared-data-ids, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.12 UE Context In SMSF Data Retrieval

Figure 5.2.2.2.12-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the UE's Context In SMSF data. The request contains the UE's identity (/{supi}), the type of the requested information (/ue-context-in-smsf-data) and query parameters (supported-features).



Figure 5.2.2.2.12-1: Requesting a UE's Context in SMSF Data

1. The NF service consumer (e.g. AMF) shall send a GET request to the resource representing the UE's Context In SMSF Data, with query parameters indicating the supported-features.

2a. On Success, the UDM shall respond with "200 OK" with the message body containing the UE's Context In SMSF Data as relevant for the requesting NF service consumer.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.13 Trace data Retrieval

Figure 5.2.2.2.13-1 shows a scenario where the NF service consumer (e.g. AMF, SMF) sends a request to the UDM to receive the UE's trace data. The request contains the UE's identity (/{supi}), the type of the requested information (/trace-data) and query parameters.



Figure 5.2.2.2.13-1: Requesting a UE's trace Data

1. The NF service consumer (e.g. AMF, SMF) shall send a GET request to the resource representing the UE's trace Data, with query parameters.

2a. On Success, the UDM shall respond with "200 OK" with the message body containing the UE's trace data response as relevant for the requesting NF service consumer.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.14 Group Identifier Translation

Figure 5.2.2.2.14-1 shows a scenario where the NF service consumer sends a request to the UDM to receive the Internal Group Identifier that corresponds to the provided External Group Identifier and / or the list of the UE identifiers (e.g. SUPIs, GPSIs) that belong to the provided External Group Identifier.



Figure 5.2.2.2.14-1: External Group Identifier Translation

1. The NF Service Consumer (e.g. NEF, GMLC) shall send a GET request to the resource representing the group identifiers handled by UDM; the External Group Identifier is passed in a query parameter of the request URI, and an indication is also passed if the list of UE identifiers that belong to the provided External Group Identifier are required.

2. The UDM shall respond with "200 OK" with the message body containing the Internal Group Identifier and / or the list of UE identifiers that belong to the provided External Group Identifier.

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

Figure 5.2.2.2.14-2 shows another scenario where the NF service consumer sends a request to the to receive the External Group Identifier that corresponds to the provided Internal Group Identifier and optionally, the list of the UE identifiers (e.g. SUPIs , GPSIs) pertaining to such group.



Figure 5.2.2.2.14-2: Internal Group Identifier Translation

1. The NF Service Consumer (e.g. NEF, GMLC) shall send a GET request to the resource representing the Internal Group Identifiers handled by UDM; the Internal Group Identifier is passed in a query parameter of the request URI, and an indication is also passed if the list of UE identifiers that belong to the provided Internal Group Identifier are required.

2. The UDM shall respond with "200 OK" with the message body containing the corresponding External Group Identifier and / or the list of UE identifiers that belong to the provided External Group Identifier.

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

##### 5.2.2.2.15 LCS Privacy Data Retrieval

Figure 5.2.2.2.15-1 shows a scenario where the NF service consumer (e.g. HGMLC, NEF) sends a request to the UDM to receive the UE's LCS Privacy Subscription data (see 3GPP TS 23.273 [38] figure 6.1.2-1 step 2, figure 6.3.1-1 step 2, figure 6.5.1-1 step 7 and figure 6.8.1 step 3). The request contains the UE's identity (/{ueId}), the type of the requested information (/lcs-privacy-data) and query parameters (supported-features).



Figure 5.2.2.2.15-1: Requesting a UE's LCS Privacy Data

1. The NF service consumer (e.g. HGMLC, NEF) sends a GET request to the resource representing the UE's Lcs Privacy Subscription Data, with query parameters indicating the supported-features.

2a. On Success, the UDM responds with "200 OK" with the message body containing the UE's Lcs Privacy Subscription Data as relevant for the requesting NF service consumer.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.16 LCS Mobile Originated Data Retrieval

Figure 5.2.2.2.16-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the UE's LCS Mobile Originated Subscription data (see 3GPP TS 23.502 [3] figure 4.2.2.2.2-1 step 14). The request contains the UE's identity (/{supi}), the type of the requested information (/lcs-mo-data) and query parameters (supported-features).



Figure 5.2.2.2.16-1: Requesting a UE's LCS Mobile Originated Data

1. The NF service consumer (e.g. AMF) sends a GET request to the resource representing the UE's LCS Mobile Originated Subscription Data, with query parameters indicating the supported-features.

2a. On Success, the UDM responds with "200 OK" with the message body containing the UE's LCS Mobile Originated Subscription Data as relevant for the requesting NF service consumer.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.17 Enhanced Coverage Restriction Data Retrieval

Figure 5.2.2.2.17-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to retrieve a UE's subscribed Enhanced Coverage Restriction data (see also 3GPP TS 23.502 [3] figure 4.27.1-1 step 3 and 7). The request contains the identifier of the UE (/{supi}), the type of the requested information (/am-data/ecr-data) and query parameters (supported-features).



Figure 5.2.2.2.17-1: NF service consumer retrieves Enhance Coverage Restriction Data

1. The NF service consumer (e.g. NEF) sends a GET request to the resource that represents a UE's subscribed Enhanced Coverage Restriction data, with query parameters indicating the supported-features.

2a. On success, the UDM responds with "200 OK", the message body containing the UE's subscribed Enhanced Coverage Restriction data as relevant for the requesting NF service consumer.

2b. If there is no valid subscribed Enhanced Coverage Restriction data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.18 V2X Subscription Data Retrieval

Figure 5.2.2.2.18-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to retrieve a UE's subscribed V2X data (see also 3GPP TS 23.287 [51] clause 6.5.2). The request contains the identifier of the UE (/{supi}), the type of the requested information (/v2x-data) and query parameters (supported-features).



Figure 5.2.2.2.18-1: NF service consumer retrieves V2X Subscription Data

1. The NF service consumer (e.g. AMF) sends a GET request to the resource that represents a UE's subscribed V2X data, with query parameters indicating the supported-features.

2a. On success, the UDM responds with "200 OK", the message body containing the UE's subscribed V2X data as relevant for the requesting NF service consumer.

2b. If there is no valid subscribed V2X data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.19 LCS Broadcast Assistance Subscription Data Retrieval

Figure 5.2.2.2.19-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the UE's LCS Broadcast Assistance Subscription data (see 3GPP TS 23.273 [38]). The request contains the UE's identity (/{supi}), the type of the requested information (/lcs-bca-data) and query parameters (supported-features, plmn-id).



Figure 5.2.2.2.19-1: Requesting a UE's LCS Broadcast Assistance Subscription Data

1. The NF service consumer (e.g. AMF) sends a GET request to the resource representing the UE's Lcs Location Assistance Subscription Data, with query parameters indicating the supported-features and/or plmn-id.

2a. On Success, the UDM responds with "200 OK" with the message body containing the UE's Lcs Location Assistance Subscription Data as relevant for the requesting NF service consumer.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.20 UE Context In AMF Data Retrieval

Figure 5.2.2.2.20-1 shows a scenario where the NF service consumer (e.g. HSS) sends a request to the UDM to receive the UE's Context In AMF data (see also 3GPP TS 23.632 [32] figure 5.3.4-1 step 2 and 3). The request contains the UE's identity (/{supi}), the type of the requested information (/ue-context-in-amf-data) and query parameters (supported-features).



Figure 5.2.2.2.20-1: Requesting a UE's Context in AMF Data

1. The NF service consumer (e.g. HSS) shall send a GET request to the resource representing the UE's Context In AMF Data, with query parameters indicating the supported-features.

2a. On Success, the UDM shall respond with "200 OK" with the message body containing the UE's Context In AMF Data as relevant for the requesting NF service consumer.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.2.21 Individual Shared Subscription Data Retrieval

Figure 5.2.2.2.21-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the individual shared subscription data indicated by the sharedDataId. The request contains the type of the requested information (/shared-data/{sharedDataId}).



Figure 5.2.2.2.21-1: Requesting shared data

1. The NF service consumer (e.g. AMF) sends a GET request to the resource representing the individual SharedData indicated by the sharedDataId.

2a. On success, the UDM responds with "200 OK" with the message body containing the individual SharedData.

2b. If there is no valid individual SharedData indicated by the sharedDataId, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

#### 5.2.2.3 Subscribe

##### 5.2.2.3.1 General

The following procedures using the Subscribe service operation are supported:

- Subscription to notification of data change (for UE individual data)

- Subscription to notification of shared data change

##### 5.2.2.3.2 Subscription to notifications of data change

Figure 5.2.2.3.2-1 shows a scenario where the NF service consumer sends a request to the UDM to subscribe to notifications of data change (see also 3GPP TS 23.502 [3] figure 4.2.2.2.2-1 step 14). The request contains a callback URI and the URI of the monitored resource.



Figure 5.2.2.3.2-1: NF service consumer subscribes to notifications

1. The NF service consumer sends a POST request to the parent resource (collection of subscriptions) (.../{ueId}/sdm-subscriptions), to create a subscription as present in message body. The payload body of the POST request shall contain a representation of the individual subscription resource to be created.  An NF consumer supporting the "LimitedSubscriptions" feature shall create only one unique subscription per UE (identified by the ueId in URI) without additional filter criteria, or with a specific filter criteria (e.g. dnn and/or singleNssai), and set the "uniqueSubscription" IE with the value "true" in request body.

2a. On success, the UDM responds with "201 Created" with the message body containing a representation of the created subscription. The Location HTTP header shall contain the URI of the created subscription.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

2c. If the UE subscription data exist, but the requested subscription to data change notification cannot be created (e.g. due to an invalid/unsupported data reference to be monitored, contained in the SdmSubscription parameter), HTTP status code "501 Not Implemented" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.3.3 Subscription to notifications of shared data change

Figure 5.2.2.3.3-1 shows a scenario where the NF service consumer sends a request to the UDM to subscribe to notifications of shared data change. The request contains a callback URI and the URI of the monitored resource.



Figure 5.2.2.3.3-1: NF service consumer subscribes to notifications of shared data change

1. The NF service consumer sends a POST request to the parent resource (collection of subscriptions) (.../shared-data-subscriptions), to create a subscription as present in message body. The payload body of the POST request shall contain a representation of the shared data individual subscription resource to be created. An NF consumer supporting the "LimitedSubscriptions" feature shall create only one unique shared data individual subscription and set the "uniqueSubscription" IE with the value "true" in request body.

2. On success, the UDM responds with "201 Created" with the message body containing a representation of the created subscription. The Location HTTP header shall contain the URI of the created subscription.

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

#### 5.2.2.4 Unsubscribe

##### 5.2.2.4.1 General

The following procedures using the Unsubscribe service operation are supported:

- Unsubscribe to notification of data change (for UE individual data)

- Unsubscribe to notifications of shared data change

##### 5.2.2.4.2 Unsubscribe to notifications of data change

Figure 5.2.2.4.2-1 shows a scenario where the NF service consumer sends a request to the UDM to unsubscribe from notifications of data changes (see also 3GPP TS 23.502 [3] figure 4.2.2.2.2-1 step 14). The request contains the URI previously received in the Location HTTP header of the response to the subscription.



Figure 5.2.2.4.2-1: NF service consumer unsubscribes to notifications

1. The NF service consumer sends a DELETE request to the resource identified by the URI previously received during subscription creation.

2a. On success, the UDM responds with "204 No Content".

2b. If there is no valid subscription available (e.g. due to an unknown subscriptionId value), HTTP status code "404 Not Found" should be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.4.3 Unsubscribe to notifications of shared data change

Figure 5.2.2.4.3-1 shows a scenario where the NF service consumer sends a request to the UDM to unsubscribe from notifications of shared data changes. The request contains the URI previously received in the Location HTTP header of the response to the subscription.



Figure 5.2.2.4.3-1: NF service consumer unsubscribes to notifications for shared data

1. The NF service consumer sends a DELETE request to the resource identified by the URI previously received during subscription creation.

2a. On success, the UDM responds with "204 No Content".

2b. If there is no valid subscription available (e.g. due to an unknown subscriptionId value), HTTP status code "404 Not Found" should be returned including additional error information in the response body (in the "ProblemDetails" element).

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

#### 5.2.2.5 Notification

##### 5.2.2.5.1 General

The following procedures using the Notification service operation are supported:

- Data change notification to NF, including the updates of UE's Subscriber Data indicated by the "subscription data Type" input and additional UE's UDM-related parameters.

- Delivery of UE Parameters Update Data to the UE via control plane procedure as defined in 3GPP TS 23.502 [3] clause 4.20.

##### 5.2.2.5.2 Data Change Notification To NF

Figure 5.2.2.5.2-1 shows a scenario where the UDM notifies the NF service consumer (that has subscribed to receive such notification) about subscription data change (see also 3GPP TS 23.502 [3] clause 4.5.1 or 3GPP TS 23.502 [3] clause 4.5.2) or shared data change. The delivery of UE Parameters Update Data to the UE via control plane procedure is also conveyed using this notification, as defined in 3GPP TS 23.502 [3] clause 4.20. The notification request shall be sent to the callbackReference URI as previously received in the SdmSubscription (see clause 6.1.6.2.3).



Figure 5.2.2.5.2-1: Subscription Data Change Notification

1. The UDM sends a POST request to the callbackReference as provided by the NF service consumer during the subscription.

2. The NF service consumer responds with "204 No Content".

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

NOTE 1: If the NF service consumer detects that the received Data Change Notification contains an origValue that does not match the currently stored value, it can re-sync by using the Nudm\_SDM\_Get service operation.

NOTE 2: When the notification is used for the delivery of UE Parameter Update Data to the UE, the trigger for UDM to start this procedure is out of the scope of this specification. This can be based, e.g., on O&M commands or provisioning orders. When a given UE parameter can be updated either in the USIM or in the ME side of the UE (e.g., Routing Indicator, see 3GPP TS 23.502 [3] clause 4.20.1) it is assumed that the trigger for the UE parameter update procedure includes an indication to the UDM of the target for the UE parameters update (i.e., USIM or ME). This indication is used by the UDM to decide which UE parameter update data set type to use and whether the UE parameter update requires secured packet protection via SP-AF.

#### 5.2.2.6 Info

##### 5.2.2.6.1 General

The following procedures using the Info service operation are supported:

- Providing acknowledgement from the UE to UDM about successful delivery of Steering of Roaming information via the AMF as defined in 3GPP TS 23.122 [20]

- Providing acknowledgement from the UE to UDM about successful delivery of updated Default Configured NSSAI or UICC data (Secured-Packet, containing e.g. Routing indicator) via the AMF as defined in 3GPP TS 23.502 [3].

- Providing acknowledgement from the UE to the UDM about successful delivery of the Network Slicing Subscription Change Indication.

- Providing acknowledgement from the UE to UDM about successful delivery of CAG configuration (see 3GPP TS 23.501 [2] clause 5.30.3.3).

- Providing indication from AMF to UDM about unsuccessful delivery of Steering of Roaming Information, updated Default Configured NSSAI or UICC data, Network Slicing Subscription Change Indication or Network Slicing Subscription Change Indication.

- Triggering update of Steering of Roaming information at the UE due to "initial registration" or "emergency registration" in a VPLMN.

##### 5.2.2.6.2 Providing acknowledgement of Steering of Roaming

Figure 5.2.2.6.2-1 shows a scenario where the NF service consumer (e.g. AMF) sends the UE acknowledgement to the UDM (see also 3GPP TS 23.122 [20] Annex C). The request contains the UE's identity (/{supi}), the type of the acknowledgement information (/am-data/sor-ack), and the SOR-MAC-Iue.



Figure 5.2.2.6.2-1: Providing acknowledgement of Steering of Roaming

1. The NF service consumer (e.g. AMF) sends a PUT request to the resource representing the UE's Access and Mobility Subscription Data, with the AcknowledgeInfo (SOR-MAC-Iue received from the UE, or UE not reachable indication).

2. The UDM responds with "204 No Content".

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

##### 5.2.2.6.3 Providing acknowledgement of UE parameters update

Figure 5.2.2.6.3-1 shows a scenario where the NF service consumer (e.g. AMF) sends the UE acknowledgement to the UDM (see also 3GPP TS 23.502 [3]). The request contains the UE's identity (/{supi}), the type of the acknowledgement information (/am-data/upu-ack), and the UPU-MAC-Iue.



Figure 5.2.2.6.3-1: Providing acknowledgement of UE parameters update

1. The NF service consumer (e.g. AMF) sends a PUT request to the resource representing the UE's Access and Mobility Subscription Data, with the AcknowledgeInfo(UPU-MAC-IUE received from the UE, or UE not reachable indication).

2. The UDM responds with "204 No Content".

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

##### 5.2.2.6.4 Providing acknowledgement of UE for Network Slicing Subscription Change

Figure 5.2.2.6.4-1 shows a scenario where the NF service consumer (e.g. AMF) sends the UE acknowledgement to the UDM (see also 3GPP TS 23.502 [3]). The request contains the UE's identity (/{supi}) and the type of the acknowledgement information (/am-data/subscribed-snssais-ack).



Figure 5.2.2.6.4-1: Providing acknowledgement of UE for Network Slicing Subscription Change

1. The NF service consumer (e.g. AMF) sends a PUT request to the resource representing the UE's Access and Mobility Subscription Data, with the AcknowledgeInfo.

2. The UDM responds with "204 No Content".

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

##### 5.2.2.6.5 Providing acknowledgement of UE for CAG configuration change

Figure 5.2.2.6.5-1 shows a scenario where the NF service consumer (e.g. AMF) sends the UE acknowledgement to the UDM (see also 3GPP TS 23.502 [3]). The request contains the UE's identity (/{supi}) and the type of the acknowledgement information (/am-data/cag-ack).



Figure 5.2.2.6.5-1: Providing acknowledgement of UE for CAG configuration change

1. The NF service consumer (e.g. AMF) sends a PUT request to the resource representing the UE's Access and Mobility Subscription Data, with the AcknowledgeInfo.

2. The UDM responds with "204 No Content".

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

##### 5.2.2.6.6 Triggering Update of Steering Of Roaming information

Figure 5.2.2.6.6-1 shows a scenario where the NF service consumer (e.g. AMF) sends the request to the UDM to trigger the update of Steering of Roaming information at the UE. The request contains the UE's identity (/{supi}), the type of request (/am-data/update-sor) and the VPLMN ID.



Figure 5.2.2.6.6-1: Triggering update of Steering Of Roaming information

1. The NF service consumer (e.g. AMF) sends a POST request to the resource representing the UE's Access and Mobility Subscription Data, with the request to update the Steering of Roaming information at the UE.

2. The UDM responds with "200 OK" containing the updated Sor Information.

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

#### 5.2.2.7 ModifySubscription

##### 5.2.2.7.1 General

The following procedures using the ModifySubscription service operation are supported:

- Modification of a Subscription to notification of data change (for UE individual data)

- Modification of a Subscription to notification of shared data change

The ModifySubscription service operation can be used for the following purpose:

- Extend the expiry time of SdmSubscription;

- Modify the resource URIs to be monitored, e.g. add/remove resource URIs to/from the monitored resource URI list.

##### 5.2.2.7.2 Modification of a subscription to notifications of data change

Figure 5.2.2.7.2-1 shows a scenario where the NF service consumer sends a request to the UDM to modify a subscription to notifications of data changes. The request contains the URI previously received in the Location HTTP header of the response to the subscription.



Figure 5.2.2.7.2-1: NF service consumer modifies a subscription to notifications

1. The NF service consumer sends a PATCH request to the resource identified by the URI previously received during subscription creation.

The NF service consumer may include "monitoredResourceUris" to replace the existing monitored resource URIs, e.g. to add/remove specific resource URIs from the monitored resource URI list.

2a. On success, the UDM responds with "200 OK".

2b. If there is no valid subscription available (e.g. due to an unknown subscriptionId value), HTTP status code "404 Not Found" should be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.2.2.7.3 Modification of a subscription to notifications of shared data change

Figure 5.2.2.7.3-1 shows a scenario where the NF service consumer sends a request to the UDM to modifya subscription to notifications of shared data changes. The request contains the URI previously received in the Location HTTP header of the response to the subscription.



Figure 5.2.2.7.3-1: NF service consumer modifies a subscription to notifications for shared data

1. The NF service consumer sends a PATCH request to the resource identified by the URI previously received during subscription creation.

The NF service consumer may include "monitoredResourceUris" to replace the existing monitored resource URIs, e.g. for the purposes to add/remove specific resource URIs from the monitored resource URI list.

2a. On success, the UDM responds with "200 OK".

2b. If there is no valid subscription available (e.g. due to an unknown subscriptionId value), HTTP status code "404 Not Found" should be returned including additional error information in the response body (in the "ProblemDetails" element).

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

## 5.3 Nudm\_UEContextManagement Service

### 5.3.1 Service Description

See 3GPP TS 23.501 [2] table 7.2.5-1, and 3GPP TS 23.632 [32].

### 5.3.2 Service Operations

#### 5.3.2.1 Introduction

For the Nudm\_UEContextManagement service the following service operations are defined:

- Registration

- DeregistrationNotification

- Deregistration

- Get

- Update

- P-CSCF-RestorationNotification

- P-CSCF-RestorationTrigger

- AMFDeregistration

- PEI-Update

The Nudm\_UEContextManagement Service is used by Consumer NFs (AMF, SMF, SMSF) to register at the UDM by means of the Registration service operation.

It is also used by the registered Consumer NFs (AMF) to get notified by means of the DeregistrationNotification service operation when UDM decides to deregister the registered consumer NF.

It is also used by the registered Consumer NFs (AMF, SMF, SMSF) to deregister from the UDM by means of the Deregistration service operation.

It is also used by consumer NFs (NEF, NWDAF, NSSAAF) to retrieve registration information from the UDM by means of the Get service operation.

It is also used by the registered Consumer NFs (AMF, SMF) to update registration information stored at the UDM by means of the Update service operation.

It is also used by the registered Consumer NFs (AMF, SMF) to get notified by means of the P-CSCF-RestorationNotification service operation when UDM detects the need for P-CSCF restoration.

It is also used by the consumer NF (HSS) to trigger P-CSCF restoration by means of the P-CSCF-RestorationTrigger service operation.

It is also used by the consumer NF (HSS) to trigger deregistration of the registered AMF for 3GPP access by means of the AMFDeregistration service operation

It is also used by the consumer NF (HSS) to update the PEI in the AMF 3GPP Access Registration context, by means of the PEI-Update service operation.

#### 5.3.2.2 Registration

##### 5.3.2.2.1 General

The Registration service operation is invoked by a NF that has been selected to provide service to the UE to store related UE Context Management information in UDM.

NF Consumers are AMF for access and mobility management service, SMF for session management services, SMSF providing SMS services and HSS for IP-SM-GW registration in SMSoIP scenarios.

As part of this registration procedure, the UDM authorizes or rejects the subscriber to use the service provided by the registered NF, based on subscription data (e.g. roaming restrictions).

The following procedures using the Registration service operation are supported:

- AMF registration for 3GPP access

- AMF registration for non-3GPP access

- SMF registration

- SMSF registration for 3GPP access

- SMSF registration for non-3GPP access

- IP-SM-GW registration

##### 5.3.2.2.2 AMF registration for 3GPP access

Figure 5.3.2.2.2-1 shows a scenario where the AMF sends a request to the UDM to update the AMF registration information for 3GPP access (see also 3GPP TS 23.502 [3] figure 4.2.2.2.2-1 step 14). The request contains the UE's identity (/{ueId}) which shall be a SUPI and the AMF Registration Information for 3GPP access.



Figure 5.3.2.2.2-1: AMF registering for 3GPP access

1. The AMF sends a PUT request to the resource representing the UE's AMF registration for 3GPP access to update or create AMF registration information.

If EPS interworking with N26 is supported, and the AMF has per DNN selected the PGW-C+SMF for EPS interworking, the AMF shall include the info of selected PGW-C+SMF to the UDM.

2a. On success, the UDM updates the Amf3GppAccessRegistration resource by replacing it with the received resource information, and responds with "200 OK" or "204 No Content".

UDM shall invoke the Deregistration Notification service operation towards the old AMF using the callback URI provided by the old AMF.

When AMF indicates there are no ongoing event subscriptions, but UDM has ongoing event exposure subscriptions stored (e.g. in UDR), UDM shall invoke one Namf\_EventExposure Subscribe Service operations (see clause 5.3.2.2 of 3GPP TS 29.518 [36]) on behalf of NEF per subscription stored.

2b. If the resource does not exist (there is no previous AMF information stored in UDM for that user), UDM stores the received AMF registration data for 3GPP access and responds with HTTP Status Code "201 created". A response body may be included to convey additional information to the NF consumer (e.g., features supported by UDM).

2c. If the operation cannot be authorized due to e.g UE does not have required subcription data, the AMF does not support CAG feature and the UE is allowed to access 5GS via CAG cell(s) only, access barring, roaming restrictions or core network restriction, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

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

##### 5.3.2.2.3 AMF registration for non 3GPP access

Figure 5.3.2.2.3-1 shows a scenario where the AMF sends a request to the UDM to update the AMF registration information for non 3GPP access (see also 3GPP TS 23.502 [3] figure 4.2.2.2.2-1 step 14). The request contains the UE's identity (/{ueId}) which shall be a SUPI and the AMF Registration Information for non 3GPP access.



Figure 5.3.2.2.3-1: AMF registering for non 3GPP access

1. The AMF sends a PUT request to the resource representing the UE's AMF registration for non 3GPP access to update or create AMF registration information.

2a. On success, the UDM updates the AmfNon3GppAccessRegistration resource by replacing it with the received resource information, and responds with "200 OK" or "204 No Content".

UDM shall invoke the Deregistration Notification service operation towards the old AMF using the callback URI provided by the old AMF.

When AMF indicates there are no ongoing event subscriptions, but UDM has ongoing event exposure subscriptions stored (e.g. in UDR), UDM shall invoke one Namf\_EventExposure Subscribe Service operations (see clause 5.3.2.2 of 3GPP TS 29.518 [36]) on behalf of NEF per subscription stored.

2b. If the resource does not exist (there is no previous AMF information stored in UDM for that user), UDM stores the received AMF registration data for non-3GPP access and responds with HTTP Status Code "201 created". A response body may be included to convey additional information to the NF consumer (e.g., features supported by UDM).

2c. If the operation cannot be authorized due to e.g UE does not have required subcription data, the AMF does not support CAG feature and the UE is allowed to access 5GS via CAG cell(s) only, access barring, roaming restrictions or core network restriction, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.3.2.2.4 SMF registration

Figure 5.3.2.2.4-1 shows a scenario where an SMF sends a request to the UDM to create a new registration (see also 3GPP TS 23.502 [3] figure 4.3.2.2.1-1 step 4). The request contains the UE's identity (/{ueId}) which shall be a SUPI and the SMF Registration Information.



Figure 5.3.2.2.4-1: SMF registration

1. The SMF sends a PUT request to the resource .../{ueId}/registrations/smf-registrations/{pduSessionId}, to create an SMF Registration as present in the message body.

If the SMF belongs to an SMF Set, the NF Set ID of the SMF Set shall be included in the request message.

2a. The UDM responds with "201 Created" with the message body containing a representation of the created SMF registration.

If the new SMF is not in an SMF set or is not in the same SMF Set as the old SMF, the UDM shall invoke the Deregistration Notification service operation towards the old SMF using the callback URI provided by the old SMF.

2b. If the operation cannot be authorized due to e.g UE does not have required subcription data, access barring or roaming restrictions, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

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

##### 5.3.2.2.5 SMSF Registration for 3GPP Access

Figure 5.3.2.2.5-1 shows a scenario where the SMSF sends a request to the UDM to create or update the SMSF registration information for 3GPP access (see also 3GPP TS 23.502 [3], clause 4.13.3.1). The request contains the UE's identity (/{ueId}) which shall be a SUPI and the SMSF Registration Information for SMS service.



Figure 5.3.2.2.5-1: SMSF registering for 3GPP Access

1. The SMSF sends a PUT request to the resource representing the UE's SMSF registration for 3GPP Access to update or create SMSF registration information.

If the SMSF belongs to an SMSF Set, the NF Set ID of the SMSF Set shall be included in the request message.

2a. If successful, the UDM responds with "200 OK", or "201 Created" with the message body containing the representation of the SmsfRegistration.

2b. If the operation cannot be authorized due to e.g UE does not have required subcription data, access barring or roaming restrictions, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

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

##### 5.3.2.2.6 SMSF Registration for Non 3GPP Access

Figure 5.3.2.2.6-1 shows a scenario where the SMSF sends a request to the UDM to create or update the SMSF registration information for non 3GPP access (see also 3GPP TS 23.502 [3], clause 4.13.3.1). The request contains the UE's identity (/{ueId}) which shall be a SUPI and the SMSF Registration Information for SMS service.



Figure 5.3.2.2.6-1: SMSF registering for Non 3GPP Access

1. The SMSF sends a PUT request to the resource representing the UE's SMSF registration for Non 3GPP Access to update or create SMSF registration information.

If the SMSF belongs to an SMSF Set, the NF Set ID of the SMSF Set shall be included in the request message.

2a. If successful, the UDM responds with "200 OK", or "201 Created" with the message body containing the representation of the SmsfRegistration.

2b. If the operation cannot be authorized due to e.g UE does not have required subcription data, access barring or roaming restrictions, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

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

##### 5.3.2.2.7 IP-SM-GW registration

Figure 5.3.2.2.7-1 shows a scenario where an HSS sends a request to the UDM to create a new registration of an IP-SM-GW (see also 3GPP TS 23.632 [32] figure 5.5.X.2.1-1 step 2). The request contains the UE's identity (/{ueId}) which shall be a SUPI and the IP-SM-GW registration information.



Figure 5.3.2.2.7-1: IP-SM-GW registration

1. The HSS sends a PUT request to the resource .../{ueId}/registrations/ip-sm-gw, to create an IP-SM-GW registration as present in the message body.

2a. If there was not a prior registration, the UDM responds with "201 Created" with the message body containing a representation of the created IP-SM-GW registration.

2b. If there was a prior registration, the UDM responds with "200 OK" with the message body containing a representation of the updated IP-SM-GW registration.

2c. If the operation cannot be authorized due to e.g UE does not have required subcription data, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

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

#### 5.3.2.3 DeregistrationNotification

##### 5.3.2.3.1 General

The following procedure using the DeregistrationNotification service operation is supported:

- UDM initiated NF Deregistration

##### 5.3.2.3.2 UDM initiated NF Deregistration

Figure 5.3.2.3.2-1 shows a scenario where the UDM notifies the registered NF about its deregistration (see also 3GPP TS 23.502 [3] figure 4.2.2.2.2-1 step 14 and 3GPP TS 23.502 [3] figure 4.26.4.1.1-1 step 14). The request contains the callback URI for deregistration notification as received by the UDM during registration, and Deregistration Data.

The UDM initiates the deregistration procedure when the UE is registered to the AMF which does not support CAG feature and the CAG subscription of the UE changes and it is allowed to access the 5GS via CAG cell(s) only.

The UDM also initiates deregistration notification when UE moves to different AMF within same AMF-Set.

Deregistration notification shall not be sent if the nfInstanceId of the AMF initiating registration is same as the old AMF already registered in UDM (e.g. when multiple PLMNs are hosted on same AMF and UE moves across PLMNs).



Figure 5.3.2.3.2-1: UDM initiated NF Deregistration

1. The UDM sends a POST request to the callbackReference as provided by the NF service consumer during the registration.

2. The NF service consumer responds with "204 No Content".

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

#### 5.3.2.4 Deregistration

##### 5.3.2.4.1 General

The following procedures using the Deregistration service operation are supported:

- AMF deregistration for 3GPP access

- AMF deregistration for non-3GPP access

- SMF deregistration

- SMSF deregistration for 3GPP access

- SMSF deregistration for non-3GPP access

- IP-SM-GW deregistration

##### 5.3.2.4.2 AMF deregistration for 3GPP access

Figure 5.3.2.4.2-1 shows a scenario where the AMF sends a request to the UDM to deregister (purge) from the UDM for 3GPP access (see also 3GPP TS 23.502 [3] figure 4.5.3.1-1 step 3). The request contains the UE's identity (/{ueId}) which shall be a SUPI and an instruction to set the purgeFlag within the Amf3GppAccessRegistration resource.



Figure 5.3.2.4.2-1: AMF deregistering for 3GPP access

1. The AMF sends a PATCH request to the resource representing the UE's AMF registration for 3GPP access.

2a. The UDM shall check whether the received GUAMI matches the stored GUAMI. If so, the UDM shall set the PurgeFlag. The UDM responds with "204 No Content".

2b. Otherwise the UDM responds with "403 Forbidden".

NOTE: Based on operator policy, when AMF receives 403 Forbidden, the AMF can avoid freezing the 5G-TMSI that the UE used, under consideration that the UE has been assigned another 5G-TMSI by another AMF.

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

##### 5.3.2.4.3 AMF deregistration for non-3GPP access

Figure 5.3.2.4.3-1 shows a scenario where the AMF sends a request to the UDM to deregister (purge) from the UDM for non-3GPP access (see also 3GPP TS 23.502 [3] figure 4.5.3.1-1 step 3). The request contains the UE's identity (/{ueId}) which shall be a SUPI and an instruction to set the purgeFlag within the AmfNon3GppAccessRegistration resource.



Figure 5.3.2.4.3-1: AMF deregistering for non-3GPP access

1. The AMF sends a PATCH request to the resource representing the UE's AMF registration for non-3GPP access.

2a. The UDM shall check whether the received GUAMI matches the stored GUAMI. If so, the UDM shall set the PurgeFlag. The UDM responds with "204 No Content".

2b. Otherwise the UDM responds with "403 Forbidden".

NOTE: Based on operator policy, when AMF receives 403 Forbidden, the AMF can avoid freezing the 5G-TMSI that the UE used, under consideration that the UE has been assigned another 5G-TMSI by another AMF.

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

##### 5.3.2.4.4 SMF deregistration

Figure 5.3.2.4.4-1 shows a scenario where the SMF sends a request to the UDM to deregister an individual SMF registration (see also 3GPP TS 23.502 [3] figure 4.3.2.2-1 step 20). The request contains the UE's identity (/{ueId}) which shall be a SUPI and the PDU Session ID (/{pduSessionId}.



Figure 5.3.2.4.4-1: SMF deregistration

1. The SMF sends a DELETE request to the resource representing the individual SMF registration that is to be deregistered.

2. The UDM responds with "204 No Content". If the SMF had requested the SDM Subscription to be created with the "implicitUnsubscribe" flag set, then UDM will terminate the SDM Subscription when the last PDU Session for that SUPI and SMF is deregistered.

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

##### 5.3.2.4.5 SMSF Deregistration for 3GPP Access

Figure 5.3.2.4.5-1 shows a scenario where the SMSF sends a request to the UDM to delete the SMSF registration information for 3GPP access (see also 3GPP TS 23.502 [3], clause 4.13.3.2). The request contains the UE's identity (/{ueId}) which shall be a SUPI.



Figure 5.3.2.4.5-1: SMSF Deregistering for 3GPP Access

1. The SMSF sends a DELETE request to the resource representing the UE's SMSF registration for 3GPP access.

2. If successful, the UDM responds with "204 No Content".

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

##### 5.3.2.4.6 SMSF Deregistration for Non 3GPP Access

Figure 5.3.2.4.6-1 shows a scenario where the SMSF sends a request to the UDM to delete the SMSF registration information for non 3GPP access (see also 3GPP TS 23.502 [3], clause 4.13.3.2). The request contains the UE's identity (/{ueId}) which shall be a SUPI.



Figure 5.3.2.4.6-1: SMSF Deregistering for Non 3GPP Access

1. The SMSF sends a DELETE request to the resource representing the UE's SMSF registration for non 3GPP access.

2. If successful, the UDM responds with "204 No Content".

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

##### 5.3.2.4.7 IP-SM-GW deregistration

Figure 5.3.2.4.7-1 shows a scenario where the HSS sends a request to the UDM to deregister the IP-SM-GW from the UDM (see also 3GPP TS 23.632 [32] figure 5.5.X.2-2 step 2). The request contains the UE's identity (/{ueId}) which shall be a SUPI.



Figure 5.3.2.4.7-1: IP-SM-GW deregistration

1. The HSS sends a DELETE request to the resource representing the UE's IP-SM-GW registration.

2. The UDM responds with "204 No Content".

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

#### 5.3.2.5 Get

##### 5.3.2.5.1 General

The following procedures using the Get service operation are supported:

- Amf3GppAccessRegistration Information Retrieval

- AmfNon3GppAccessRegistration Information Retrieval

- SmfRegistrations Information Retrieval

- SmsfRegistration Information Retrieval for 3GPP Access

- SmsfRegistration Information Retrieval for Non-3GPP Access

- Location Information Retrieval

- Retrieval Of Multiple UE Registration Data Sets

- IP-SM-GW Registration Information Retrieval

##### 5.3.2.5.2 Amf3GppAccessRegistration Information Retrieval

Figure 5.3.2.5.2-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to retrieve the UE's Amf3GppAccessRegistration Information. The request contains the UE's identity (/{ueId}) which shall be a GPSI or SUPI, the type of the requested information (/registrations/amf-3gpp-access) and query parameters (supported-features).



Figure 5.3.2.5.2-1: Requesting a UE's AMF Registration Information for 3GPP Access

1. The NF service consumer (e.g. NEF) sends a GET request to the resource representing the UE's AMF registration information for 3GPP access, with query parameters indicating the supported-features.

2. The UDM responds with "200 OK" with the message body containing the UE's Amf3GppAccessRegistration.

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

##### 5.3.2.5.3 AmfNon3GppAccessRegistration Information Retrieval

Figure 5.3.2.5.3-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to retrieve the UE's AmfNon3GppAccessRegistration Information. The request contains the UE's identity (/{ueId}) which shall be a GPSI or SUPI, the type of the requested information (/registrations/amf-non-3gpp-access) and query parameters (supported-features).



Figure 5.3.2.5.3-1: Requesting a UE's AMF Registration Information for non-3GPP Access

1. The NF service consumer (e.g. NEF) sends a GET request to the resource representing the UE's AMF registration information for non-3GPP access, with query parameters indicating the supported-features.

2. The UDM responds with "200 OK" with the message body containing the UE's AmfNon3GppAccessRegistration.

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

##### 5.3.2.5.4 Void

##### 5.3.2.5.5 SmsfRegistration Information Retrieval for 3GPP Access

Figure 5.3.2.5.5-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to retrieve the UE's SmsfRegistration Information. The request contains the UE's identity (/{ueId}) which shall be a GPSI, the type of the requested information (/registrations/smsf-3gpp-access) and query parameters (supported-features).



Figure 5.3.2.5.5-1: Requesting a UE's SMSF Registration Information for 3GPP Access

1. The NF service consumer (e.g. NEF) sends a GET request to the resource representing the UE's SMSF registration information for 3GPP access, with query parameters indicating the supported-features.

2a. The UDM responds with "200 OK" with the message body containing the UE's SmsfRegistration for 3GPP access.

2b. If the UE does not have required subscription data for SMS service or SMS service is barred, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

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

##### 5.3.2.5.6 SmsfRegistration Information Retrieval for Non-3GPP Access

Figure 5.3.2.5.6-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to retrieve the UE's SmsfRegistration Information for non-3GPPP access. The request contains the UE's identity (/{ueId}) which shall be a GPSI, the type of the requested information (/registrations/smsf-non-3gpp-access) and query parameters (supported-features).



Figure 5.3.2.5.6-1: Requesting a UE's SMSF Registration Information for Non-3GPP Access

1. The NF service consumer (e.g. NEF) sends a GET request to the resource representing the UE's SMSF registration information for non-3GPP access, with query parameters indicating the supported-features.

2a. The UDM responds with "200 OK" with the message body containing the UE's SmsfRegistration for non-3GPP access.

2b. If the UE does not have required subscription data for SMS service or SMS service is barred, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

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

##### 5.3.2.5.7 SmfRegistration Information Retrieval

Figure 5.3.2.5.7-1 shows a scenario where the NF service consumer (e.g. NWDAF) sends a request to the UDM to retrieve the UE's SmfRegistration Information. The request contains the UE's identity (/{ueId}) which shall be a GPSI or SUPI, the type of the requested information (/registration/smf-registrations) and query parameters (single-nssai, dnn, supported-features).



Figure 5.3.2.5.7-1: Requesting a UE's SMF Registration Information

1. The NF service consumer (e.g. NWDAF) sends a GET request to the resource representing the UE's SMF registration information, with query parameters indicating the single-nssai, dnn, supported-features.

2a. The UDM responds with "200 OK" with the message body containing the UE's SmfRegistrationInfo.

2b. If there is no valid SMF Registration data for the UE, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.3.2.5.8 Individual SmfRegistration Information Retrieval

NF Service Consumer (e.g. AMF) may send request to UDM to retrieve individual SMF registration information identified by PDU Session ID.



Figure 5.3.2.5.8-1: Requesting individual SMF Registration Information

1. The NF service consumer (e.g. AMF) sends a GET request to the resource representing the individual SMF registration information.

2a. The UDM responds with "200 OK" with the message body containing the SmfRegistration corresponding to the indicated PDU session.

2b. If there is no valid SMF Registration data for the indicated PDU session, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.3.2.5.9 Location Information Retrieval

Figure 5.3.2.5.9-1 shows a scenario where the NF service consumer (e.g. (H)GMLC) sends a request to the UDM to retrieve the UE's Location Information. The request contains the UE's identity (/{ueId}), which shall be a GPSI or SUPI, and query parameters (supported-features).



Figure 5.3.2.5.9-1: Requesting a UE's Location Information

1. The NF service consumer (e.g. (H)GMLC) sends a GET request to the resource representing the UE's Location information, with query parameters indicating the supported-features.

2a. The UDM responds with "200 OK" with the message body containing the UE's LocationInfo.

The returned LocationInfo shall include the NF instance ID of the serving AMF ID, and may include the GUAMI of the serving AMF, the VGMLC address info.

2b. If there is no valid location information data for the UE, a response with HTTP status code "404 Not Found" shall be returned to the NF service including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.3.2.5.10 Retrieval Of Multiple UE Registration Data Sets

Figure 5.3.2.5.10-1 shows a scenario where the NF service consumer (e.g. HSS, NWDAF, NSSAAF) sends a request to the UDM to receive multiple UE registration data sets. In this example scenario the UE's AMF registration data sets are retrieved with a single request; see clause 6.2.6.3.6 for other data sets that can be retrieved with a single request. The request contains the resource of UE's registrations({ueId}/registrations) and query parameters identifying the requested registration data sets (in this example: ?registration-dataset-names=AMF\_3GPP, AMF\_NON\_3GPP).



Figure 5.3.2.5.10-1: Retrieval of Multiple UE Registration Data Sets

1. The NF Service Consumer (e.g. HSS, NWDAF) sends a GET request to the resource representing the UE registrations. Query parameters indicate the requested UE registration data sets.

2. The UDM responds with "200 OK" with the message body containing the requested UE registration data sets.

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

##### 5.3.2.5.11 IP-SM-GW Registration Information Retrieval

Figure 5.3.2.5.11-1 shows a scenario where the NF service consumer sends a request to the UDM to retrieve the UE's IP-SM-GW Registration Information. The request contains the UE's identity (/{ueId}) which shall be a SUPI.



Figure 5.3.2.5.11-1: Requesting a UE's IP-SM-GW Registration Information

1. The NF service consumer sends a GET request to the resource representing the UE's IP-SM-GW registration information for 3GPP access.

2. The UDM responds with "200 OK" with the message body containing the UE's IP-SM-GW Registration.

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

#### 5.3.2.6 Update

##### 5.3.2.6.1 General

The following procedures using the Update service operation are supported:

- Update a parameter (e.g. PEI, EPS Interworking Info, etc) in the AMF registration for 3GPP access

- Update a parameter (e.g.PEI) in the AMF registration for non-3GPP access

##### 5.3.2.6.2 Update A Parameter (e.g. PEI) in the AMF Registration For 3GPP Access

Figure 5.3.2.6.2-1 shows a scenario where the AMF sends a request to the UDM to update a parameter within the Amf3GppAccessRegistration resource. The request contains the UE's identity (/{ueId}) which shall be a SUPI and an instruction to modify a parameter (e.g. PEI).



Figure 5.3.2.6.2-1: AMF registration parameter update for 3GPP access

1. The AMF sends a PATCH request to the resource representing the UE's AMF registration for 3GPP access.

2a. On success, the UDM responds with "204 No Content".

2b. If the resource does not exist e.g. the UE is not registered yet, HTTP status code "404 Not Found" should be returned including additional error information in the response body (in the "ProblemDetails" element).

2c. If the resource exists, but the requesting AMF is not the one currently registered for the UE, HTTP status code "422 Unprocessable Request" should be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.3.2.6.3 Update A Parameter (e.g. PEI) in the AMF Registration For Non 3GPP Access

Figure 5.3.2.6.3-1 shows a scenario where the AMF sends a request to the UDM to update a parameter within the AmfNon3GppAccessRegistration resource. The request contains the UE's identity (/{ueId}) which shall be a SUPI and an instruction to modify a parameter (e.g. PEI).



Figure 5.3.2.6.3-1: AMF registration parameter update for non-3GPP access

1. The AMF sends a PATCH request to the resource representing the UE's AMF registration for non-3GPP access.

2a. On success, the UDM responds with "204 No Content".

2b. If the resource does not exist e.g. the UE is not registered yet, HTTP status code "404 Not Found" should be returned including additional error information in the response body (in the "ProblemDetails" element).

2c. If the resource exists, but the requesting AMF is not the one currently registered for the UE, HTTP status code "422 Unprocessable Request" should be returned including additional error information in the response body (in the "ProblemDetails" element).

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

#### 5.3.2.7 P-CSCF-RestorationNotification

##### 5.3.2.7.1 General

The following procedure using the P-CSCF-RestorationNotification service operation is supported:

- UDM initiated P-CSCF-Restoration

##### 5.3.2.7.2 UDM initiated P-CSCF-Restoration

Figure 5.3.2.7.2-1 shows a scenario where the UDM notifies the registered AMF or SMF about the need for P-CSCF restoration. The request contains the callback URI for P-CSCF restoration as received by the UDM during registration, and P-CSCF Restoration Indication.



Figure 5.3.2.7.2-1: UDM initiated P-CSCF Restoration

1. The UDM sends a POST request to the callbackReference as provided by the NF service consumer during the registration.

2. The AMF or SMF responds with "204 No Content".

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

#### 5.3.2.8 P-CSCF-RestorationTrigger

##### 5.3.2.8.1 General

The following procedure using the P-CSCF-RestorationTrigger service operation is supported:

- P-CSCF-RestorationTrigger

##### 5.3.2.8.2 P-CSCF-RestorationTrigger

Figure 5.3.2.8.2-1 shows a scenario where the HSS sends a request to the UDM to initiate P-CSCF restoration. The request contains the UE's identity which shall be a SUPI.



Figure 5.3.2.8.2-1: P-CSCF-RestorationTrigger

1. The HSS sends a POST request (custom method: restore-pcscf) to the UDM.

2. The UDM responds with "204 No Content".

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

#### 5.3.2.9 AMFDeregistration

##### 5.3.2.9.1 General

The following procedure using the AMFDeregistration service operation is supported:

- AMF-Deregistration

##### 5.3.2.9.2 AMF-Deregistration

Figure 5.3.2.9.2-1 shows a scenario where the HSS sends a request to the UDM to deregister the registered AMF. The request contains the UE's identity which shall be an IMSI.



Figure 5.3.2.9.2-1: AMF-Deregistration

1. The HSS sends a POST request (custom method: dereg-amf) to the resource representing the UE's registration for 3GPP access. This shall result in sending of Nudm\_UECM\_DeregistrationNotification to the AMF (see 3GPP TS 23.632 [32]) and setting the purgeFlag in the Amf3GppAccessRegistration stored in the UDR.

2a. The UDM responds with "204 No Content".

2b. If the user does not exist, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

#### 5.3.2.10 PEI-Update

##### 5.3.2.10.1 General

The following procedure using the PEI-Update service operation is supported:

- PEI Update

##### 5.3.2.10.2 PEI Update

Figure 5.3.2.10.2-1 shows a scenario where the HSS sends a request to the UDM to update the PEI attribute in the 3GPP Access Registration context. The request contains the UE's identity which shall be an IMSI.



Figure 5.3.2.10.2-1: PEI Update

1. The HSS sends a POST request (custom method: pei-update) to the resource representing the UE's registration for 3GPP access. This shall result in updating the pei attribute in the Amf3gppAccessRegistration object and storing it in UDR.

2a. The UDM responds with "204 No Content".

2b. If the user does not exist, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

## 5.4 Nudm\_UEAuthentication Service

### 5.4.1 Service Description

See 3GPP TS 23.501 [2] table 7.2.5-1.

### 5.4.2 Service Operations

#### 5.4.2.1 Introduction

For the Nudm\_UEAuthentication service the following service operations are defined:

- Get

- GetHssAv

- ResultConfirmation

The Nudm\_UEAuthentication service is used by the AUSF to request the UDM to select an authentication method, calculate a fresh authentication vector (AV) if required for the selected method, and provide it to the AUSF by means of the Get service operation. See 3GPP TS 33.501 [6] clause 14.2.2. The service may also be used by the AUSF to indicate to the UDM that the user is using a N5GC device behind Cable RGs in private networks or in isolated deployment scenarios with wireline access and that therefore the applicable authentication method shall be EAP based. See 3GPP TS 23.316 [37] clause 4.10a.

The Nudm\_UEAuthentication service is also used by the HSS to request UDM to generate the authentication vector(s) for EPS or IMS domain by means of GetHssAv service operation. See 3GPP TS 23.632 [32] clause 5.6.3.

The Nudm\_UEAuthentication service is also used by the AUSF to inform the UDM about the occurrence of a successful or unsuccessful authentication by means of the ResultConfirmation service operation. See3GPP TS 33.501 [6] clause 14.2.3.

The Nudm\_UEAuthentication service is also used by the AUSF to request the UDM to authenticate the FN-RG accessing to 5GC via W-AGF. See 3GPP TS 23.316 [37] clause 7.2.1.3.

The Nudm\_UEAuthentication service is also used by the NF service consumer to request the UDM to remove the UE authentication result during the Purge of subscriber data in AMF after the UE deregisters from the network or NAS SMC fails following the successful authentication in the registration procedure.

#### 5.4.2.2 Get

##### 5.4.2.2.1 General

The following procedure using the Get service operation is supported:

- Authentication Information Retrieval

- FN-RG Authentication

As part of this Authentication Information Retrieval operation, the UDM authorizes or rejects the subscriber to use the service provided by the registered NF, based on subscription data (e.g. roaming restrictions).

As part of this FN-RG Authentication operation, the UDM decides, based on the stored authentication profile of the SUPI and the authenticated indication that authentication has been completed by the W-AGF, that authentication by the home network is not required for the FN-RG.

##### 5.4.2.2.2 Authentication Information Retrieval

Figure 5.4.2.2.2-1 shows a scenario where the NF service consumer (AUSF) retrieves authentication information for the UE from the UDM (see also 3GPP TS 33.501 [6] clause 6.1.2). The request contains the UE's identity (supi or suci), the serving network name, and may contain resynchronization info.



Figure 5.4.2.2.2-1: NF service consumer requesting authentication information

1. The NF service consumer sends a POST request (custom method: generate-auth-data) to the resource representing the UE's security information.

2a. The UDM responds with "200 OK" with the message body containing the authentication data information.

The AUSF shall store the authentication data information for subsequent authentication processing. If the AUSF is configured to store Kausf (e.g. based on its support of SoRProtection / UPUProtection service operations), the AUSF shall preserve the Kausf and related information (e.g. SUPI) after the completion of the primary authentication.

2b. If the operation cannot be authorized due to e.g UE does not have required subcription data, none of the CAG IDs in the CAG cell match any of the CAG IDs in the allowed CAG list, access barring or roaming restrictions, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element). If the cellCagInfo is not received, the UDM shall not assume the UE is accessing from the PLMN and shall not stop the authenthcation if the UE is allowed to access 5GS via CAG cell(s) only.

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

##### 5.4.2.2.3 FN-RG Authentication

Figure 5.4.2.2.3-1 shows a scenario where the NF service consumer (AUSF) requests the UDM to authenticate the FN-RG accessing to 5GC via W-AGF. (see also 3GPP TS 23.316 [37] clause 7.2.1.3). The request contains the UE's identity (suci), and the authenticated indication.



Figure 5.4.2.2.3-1: NF service consumer requesting authentication information for FN-RG

1. The NF service consumer sends a GET request to the resource representing the UE's security information.

2a. The UDM responds with "200 OK" with the message body containing the authentication data information of FN-RG.

2b. If the operation cannot be authorized due to e.g. UE does not have required subcription data, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

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

#### 5.4.2.3 ResultConfirmationInform

##### 5.4.2.3.1 General

The following procedure using the ResultConfirmation service operation is supported:

- Authentication Confirmation

- Authentication Result Removal

##### 5.4.2.3.2 Authentication Confirmation

Figure 5.4.2.3.2-1 shows a scenario where the NF service consumer (AUSF) confirms the occurence of a successful or unsuccessful authentication in a serving network to the UDM (see also 3GPP TS 33.501 [6] clause 6.1.4.1a). The request contains the UE's identity (supi), and information about the authentication occurrence (AuthEvent).



Figure 5.4.2.3.2-1: NF service consumer confirms UE authentication

1. The NF service consumer sends a POST request to the resource representing the UE's authentication events. The payload body of the POST request shall contain a representation of the individual AuthEvent resource to be created. There shall be only one individual AuthEvent per UE per Serving Network identified by the supi in URI and servingNetworkName in AuthEvent.

2a. On success, the UDM responds with "201 Created" and the "Location" header shall be present and shall contain the URI of the created resource.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned.

##### 5.4.2.3.3 Authentication Result Removal

Figure 5.4.2.3.3-1 shows a scenario where the NF service consumer requests the UDM to remove the Authentication Result. The request contains the UE's identity (supi), the authEvent Id, and an indication to remove Authentication result.



Figure 5.4.2.3.3-1: NF service consumer removes the authentication result

1. The NF service consumer shall send a PUT request to the UDM. The payload of the body shall contain the indication to remove authentication result.

2a. On success, "204 No Content" shall be returned. The UDM shall remove the Authentication result of the UE by completely replacing the individual AuthEvent resource.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned.

#### 5.4.2.4 GetHssAv

##### 5.4.2.4.1 General

The following procedure using the GetHssAv service operation is supported:

- HSS Authentication Vector Retrieval

##### 5.4.2.4.2 HSS Authentication Vector Retrieval

Figure 5.4.2.4.2-1 shows a scenario where the NF service consumer (HSS) retrieves authentication vector(s) for the UE from the UDM (see also 3GPP TS 23.632 [32] clause 5.6.3). The request contains the UE's identity (SUPI), the authentication method, serving network id, and may contain resynchronization info.



Figure 5.4.2.4.2-1: NF service consumer requesting authentication vector(s)

1. The NF service consumer sends a POST request (custom method: generate-av) to the resource representing the UE's HSS security information; the type of requested AV is included as part of the resource URI.

2a. The UDM responds with "200 OK" with the message body containing the authentication vector(s).

2b. If the operation cannot be authorized due to e.g UE does not have required subcription data, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

2c. If the user does not exist, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

## 5.5 Nudm\_EventExposure Service

### 5.5.1 Service Description

See 3GPP TS 23.501 [2] table 7.2.5-1.

### 5.5.2 Service Operations

#### 5.5.2.1 Introduction

For the Nudm\_EventExposure service the following service operations are defined:

- Subscribe

- Unsubscribe

- Notify

- ModifySubscription

The Nudm\_EventExposure service is used by consumer NFs (e.g. NEF) to subscribe to notifications of event occurrence by means of the Subscribe service operation. For events that can be detected by the AMF, the UDM makes use of the appropriate AMF service operation to subscribe on behalf of the consumer NF (e.g. NEF).

The Nudm\_EventExposure service is also used by the consumer NFs (e.g. NEF) that have previously subscribed to notificatios, to unsubscribe by means of the Unsubscribe service operation. For events that can be detected by the AMF, the UDM makes use of the appropriate AMF service operation to unsubscribe on behalf of the consumer NF (e.g. NEF).

The Nudm\_EventExposure service is also used by the subscribed consumer NFs (e.g. NEF) to get notified by the UDM when a subscribed event occurs at the UDM by means of the Notify service operation. For subscribed events that can occur at the AMF, the consumer NF (e.g. NEF) makes use of the corresponding AMF service operation to get notified by the AMF directly without UDM involvement.

The Nudm\_EventExposure service is also used by the subscribed consumer NFs (e.g. NEF) to modify an existing subscription by means of the ModifySubscription service operation.

For details see 3GPP TS 23.502 [3] clause 4.15.

#### 5.5.2.2 Subscribe

##### 5.5.2.2.1 General

The following procedures using the Subscribe service operation are supported:

- Subscribe to Notification of event occurrence

##### 5.5.2.2.2 Subscription to Notification of event occurrence

Figure 5.5.2.2.2-1 shows a scenario where the NF service consumer sends a request to the UDM to subscribe to notifications of event occurrence (see also 3GPP TS 23.502 [3] figure 4.15.3.2.2-1 step 1 and 3GPP TS 23.502 [3] Figure 4.15.3.2.3b-1 step 1). The request contains a callback URI, the type of event that is monitored and additional information e.g. event filters and reporting options.



Figure 5.5.2.2.2-1: NF service consumer subscribes to notifications

1. The NF service consumer sends a POST request to the parent resource (collection of subscriptions) (.../{ueIdentity}/ee-subscriptions), to create a subscription as present in message body. The values ueIdentity shall take are specified in Table 6.4.3.2.2-1. The request may contain an expiry time, suggested by the NF Service Consumer, representing the time upto which the subscription is desired to be kept active and the time after which the subscribed event(s) shall stop generating notifications, the indication on whether the subscription applies also to EPC.  
  
If MTC Provider information and/or AF ID are received in the request, the UDM shall check whether the MTC Provider and/or the AF is allowed to perform this operation for the UE; otherwise, the UDM shall skip the MTC provider and/or AF authorization check.

2a. On success, the UDM responds with "201 Created" with the message body containing a representation of the created subscription. The Location HTTP header shall contain the URI of the created subscription. If the event subscription was for a group of UEs:

- The "maxNumOfReports" in the "reportingOptions" IE shall be applicable to each UE in the group;

- The UDM shall return the number of UEs in that group in the "numberOfUes" IE.

The NF service consumer shall keep track of the maximum number of reports reported for each UE in the event report and when "maxNumOfReports\*numberOfUes" limit is reached, the NF service consumer shall initiate the unsubscription of the notification towards the UDM (see clause 5.5.2.3.2).

The response, based on operator policy, may contain the expiry time, as determined by the UDM, after which the subscription becomes invalid. Once the subscription expires, if the NF Service Consumer wants to keep receiving notifications, it shall create a new subscription in the UDM. The NF Service Producer shall not provide the same expiry time for many subscriptions in order to avoid all of them expiring and recreating the subscription at the same time. If the expiry time is not included in the response, the NF Service Consumer shall not associate an expiry time for the subscription.

If the indication on whether the subscription applies also to EPC is included in the request, the response shall include the indication on whether the subscription was also successful in EPC domain.

If the event subscription was for a list events, the "maxNumOfReports" in the "reportingOptions" IE shall be applicable to each event. The NF service consumer shall keep track of the maximum number of reports reported for each event in the event report and when "maxNumOfReports\*number of events" limit is reached, the NF service consumer shall initiate the unsubscription of the notification towards the UDM (see clause 5.5.2.3.2).

If the NF Service Consumer has included the immediateFlag with value as "true" in the event subscription for an individual UE and the event requested for immediate reporting is reported by the UDM (e.g. "CHANGE\_OF\_SUPI\_PEI\_ASSOCIATION" or "ROAMING\_STATUS"), the UDM may include the current status of the event if available in the response.

If the NF Service Consumer has included the immediateFlag with value as "true" in the event subscription for an individual UE and the event requested for immediate reporting is reported by the AMF (e.g. LOCATION\_REPORT) and the NF service consumer has indicated supporting of "IERSR" feature (see clause 6.4.8), the UDM shall indicate the support of "IERSR" feature when subscribing to the event on the AMF (see clause 6.2.8 of 3GPP TS 29.518 [36]). UDM shall include the current status of the event if received from the AMF in subscription creation response.

If the NF Service Consumer has included the immediateFlag with value as "true" in the event subscription for an individual UE, the indication on whether the subscription applies also to EPC is included and set to "true" in the request and the NF service consumer has indicated supporting of "IERSR" feature (see clause 6.4.8), the UDM shall indicate the support of "ERIR" feature when subscribing to the event on the HSS (see clause 6.4.8 of 3GPP TS 29.563 [55]). UDM shall include the current status of the event in EPC if received from the HSS in subscription creation response.

NOTE: IERSR feature is not applicable to events detected by the SMF.

2b. If the user does not exist, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

2c. If there is no valid subscription data for the UE, i.e. based on the UE's subscription information monitoring of the requested EventType is not allowed, or the requested EventType is not supported, or when MTC Provider or AF are not allowed to perform this operation for the UE,HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.5.2.2.3 Void

#### 5.5.2.3 Unsubscribe

##### 5.5.2.3.1 General

The following procedures using the Unsubscribe service operation are supported:

- Unsubscribe to Notifications of event occurrence

##### 5.5.2.3.2 Unsubscribe to notifications of event occurrence

Figure 5.5.2.3.2-1 shows a scenario where the NF service consumer sends a request to the UDM to unsubscribe from notifications of event occurrence. The request contains the URI previously received in the Location HTTP header of the response to the subscription.



Figure 5.5.2.3.2-1: NF service consumer unsubscribes to notifications

1. The NF service consumer sends a DELETE request to the resource identified by the URI previously received during subscription creation.

2a. On success, the UDM responds with "204 No Content".

2b. If there is no valid subscription available (e.g. due to an unknown SubscriptionId value), HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

#### 5.5.2.4 Notify

##### 5.5.2.4.1 General

The following procedures using the Notify service operation are supported:

- Event Occurrence Notification

##### 5.5.2.4.2 Event Occurrence Notification

Figure 5.5.2.4.2-1 shows a scenario where the UDM notifies the NF service consumer (that has subscribed to receive such notification) about occurrence of an event (see also 3GPP TS 23.502 [3] figure 4.15.3.2.2-1 step 4a). The request contains the callbackReference URI as previously received in the EeSubscription (see clause 6.4.6.2.2).



Figure 5.5.2.4.2-1: Event Occurrence Notification

1. The UDM sends a POST request to the callbackReference as provided by the NF service consumer during the subscription, the request shall include in each report the Reference ID of the associated monitoring configuration.

2. The NF Service Consumer responds with "204 No Content".

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

#### 5.5.2.5 ModifySubscription

##### 5.5.2.5.1 General

The following procedures using the ModifySubscription service operation are supported:

- Modification of an EE-Subscription to notification of events

##### 5.5.2.5.2 Modification of a subscription

The service operation is invoked by a NF Service Consumer, e.g. NEF, towards the UDM, when it needs to modify an existing subscription previously created by itself at the UDM.

The NF Service Consumer shall modify the subscription by using HTTP method PATCH with the URI of the individual subscription resource (see clause 6.4.3.3) to be modified.



Figure 5.5.2.5.2-1: NF service consumer updates subscription

1. The NF service consumer (e.g. NEF) shall send a PATCH request to the resource representing a subscription. The modification may be for the events subscribed or for updating the event report options.

2a. On success, the request is accepted, the UDM shall respond with "204 No Content".

2b. If the resource does not exist e.g. the subscriptionId cannot be found, HTTP status code "404 Not Found" should be returned including additional error information in the response body (in the "ProblemDetails" element).

2c. If the modification can't be accepted, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in the "ProblemDetails" element).

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

## 5.6 Nudm\_ParameterProvision Service

### 5.6.1 Service Description

See 3GPP TS 23.501 [2] table 7.2.5-1.

### 5.6.2 Service Operations

#### 5.6.2.1 Introduction

For the Nudm\_ParameterProvision service the following service operations are defined:

- Update

- Create

- Delete

- Get

The Nudm\_ParameterProvision service is used by consumer NFs (e.g. NEF) to update a UE's or a group of UEs' subscription data by means of the Update service operation.

For details see 3GPP TS 23.502 [3] clause 4.15.6.2.

The Nudm\_ParameterProvision service can also be used by a NF Service Consumer (e.g. SOR-AF) to send updated Steering of Roaming Information for a UE to the UDM at any time, as specified in Annex C.3 of 3GPP°TS°23.122°[20].

#### 5.6.2.2 Update

##### 5.6.2.2.1 General

The following procedures using the Update service operation are supported:

- Subscription data update

- SoR Information update

- 5G VN Group modification

##### 5.6.2.2.2 Subscription data update

Figure 5.6.2.2.2-1 shows a scenario where the NF service consumer (e.g. NEF, AMF) sends a request to the UDM to update a UE's subscription data (see 3GPP TS 23.502 [3] figure 4.15.6.2-1 step 2 and also 3GPP TS 23.273 [38] Figure 6.12.1-1 step 2). The request contains the identifier of the UE's parameter provision data ( .../{ueId}/pp-data) and the modification instructions. The values ueId shall take are specified in Table 6.5.3.2.2-1.



Figure 5.6.2.2.2-1: NF service consumer updates subscription data

1. The NF service consumer (e.g. NEF, AMF) sends a PATCH request to the resource that represents a UE's modifiable subscription data.  
  
If MTC Provider information and/or AF ID are received in the request, the UDM shall check whether the MTC Provider and/or the AF is allowed to perform this operation for the UE; otherwise, the UDM shall skip the MTC provider and/or AF authorization check.

2a. The UDM responds with "204 No Content".

2b. If MTC Provider or AF are not allowed to perform this operation for the UE, HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

NOTE: Upon reception of an update or removal of maximum latency, maximum response time or DL Buffering Suggested Packet Count, UDM may need to adjust the value of active time and/or periodic registration timer and/or DL Buffering Suggested Packet Count and the UDM shall notify AMF and/or SMF if the values are updated (see clause 4.15.6.3a of 3GPP TS 23.502 [3]).

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

##### 5.6.2.2.3 5G VN Group modification

Figure 5.6.2.2.3-1 shows a scenario where the NF service consumer sends a request to the UDM to modify an external group id's group data. The request contains the external group identifier of the group and the modification instructions.



Figure 5.6.2.2.3-1: NF service consumer modifies a 5G VN Group

1. The NF service consumer sends a PATCH request to the resource that represents a 5G VN Group.  
  
If MTC Provider information and/or AF ID are received in the request, the UDM shall check whether the MTC Provider and/or the AF is allowed to perform this operation for the UE; otherwise, the UDM shall skip the MTC provider and/or AF authorization check.

2a. On success, the UDM responds with "204 No Content".

2b. If the external group id does not exist in the UDM, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

2c. If MTC Provider or AF are not allowed to perform this operation for the UE, HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

##### 5.6.2.2.4 SoR Information update

Figure 5.6.2.2.4-1 shows a scenario where the NF service consumer (e.g. SOR-AF) sends updated SoR Information for a UE to the UDM to trigger the sending of this updated SoR Information to the UE via the AMF (as per Annex C.3 of 3GPP TS 23.122 [20]). The request contains the identifier of the UE's parameter provision data ( .../{ueId}/pp-data), the SUPI in this case, and the modification instructions.



Figure 5.6.2.2.4-1: NF service consumer updates SoR Information for a UE

1. The NF service consumer (e.g. SOR-AF) sends a PATCH request to the resource that represents a UE's modifiable subscription data, containing updated Steering of Roaming Information for a UE.

The UDM, after contacting the AUSF to perform integrity protection and getting the related information (sorMacIausf and coutersor), shall immediately convey this updated SoR Information to the concerned UE by triggering a notification to the registered AMF (that has subscribed to receive notifications on change of AccessAndMobilitySubscriptionData) for the UE, if any, as per annex C.3 of 3GPP TS 23.122 [20]. Once the subscribing AMF is notified (or when no AMF has subscribed), the UDM shall delete the updated SorInfo and shall not send it as part of AccessAndMobilitySubscriptionData to an NF (e.g. AMF) retrieving the AccessAndMobilitySubscriptionData.

2a. The UDM responds with "204 No Content".

2b. If the operation cannot be authorized due to e.g UE isn't registered in the network, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

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

#### 5.6.2.3 Create

##### 5.6.2.3.1 General

The following procedures using the Create service operation are supported:

- 5G-VN-Group creation

##### 5.6.2.3.2 5G-VN-Group creation

Figure 5.6.2.3.2-1 shows a scenario where the NF service consumer sends a request to the UDM to create a 5G VN Group. The request contains the group's external identifier and the group configuration.



Figure 5.6.2.3.2-1: NF service consumer creates a 5G-VN-Group

1. The NF service consumer sends a PUT request to the resource .../5g-vn-groups/{extGroupId}, to create a 5G VN Group as present in the message body.  
  
If MTC Provider information and/or AF ID are received in the request, the UDM shall check whether the MTC Provider and/or the AF is allowed to perform this operation for the UE; otherwise, the UDM shall skip the MTC provider and/or AF authorization check.

2a. On success the UDM responds with "201 Created".

2b. If the creation can't be accepted (e.g. MTC Provider or AF are not allowed to perform this operation for the UE), HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in the "ProblemDetails" element).

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

#### 5.6.2.4 Delete

##### 5.6.2.4.1 General

The following procedures using the Delete service operation are supported:

- 5G-VN-Group deletion

##### 5.6.2.4.2 5G-VN-Group deletion

Figure 5.6.2.4.2-1 shows a scenario where the NF service consumer sends a request to the UDM to delete a 5G VN Group. The request contains the group's external identifier.



Figure 5.6.2.4.2-1: NF service consumer deletes a 5G-VN-Group

1. The NF service consumer sends a DELETE request to the resource .../5g-vn-groups/{extGroupId}, to delete the 5G VN Group identified by the external group id.  
  
If MTC Provider information and/or AF ID are received in the request, the UDM shall check whether the MTC Provider and/or the AF is allowed to perform this operation for the UE; otherwise, the UDM shall skip the MTC provider and/or AF authorization check.

2a. On success, the UDM responds with "204 No Content".

2b. If the external group id does not exist in the UDM, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

2c. If MTC Provider or AF are not allowed to perform this operation for the UE, HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

#### 5.6.2.5 Get

##### 5.6.2.5.1 General

The following procedures using the Get service operation are supported:

- 5G-VN-Group get

##### 5.6.2.5.2 5G-VN-Group get

Figure 5.6.2.5.2-1 shows a scenario where the NF service consumer sends a request to the UDM to get 5G VN Group. The request contains the group's external identifier.



Figure 5.6.2.5.2-1: NF service consumer gets 5G-VN-Group

1. The NF service consumer sends a GET request to the resource .../5g-vn-groups/{extGroupId}, to get the 5G VN Group identified by the external group id.

2a. On success, the UDM responds with "200 Ok" with the VPN Group Information

2b. If the external group id does not exist in the UDM, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

2c. If the original AF is not allowed to get this information, HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

## 5.7 Nudm\_NIDDAuthorization Service

### 5.7.1 Service Description

See 3GPP TS 23.501 [2] table 7.2.5-1.

### 5.7.2 Service Operations

#### 5.7.2.1 Introduction

For the Nudm\_NIDDAuthorization service the following service operations are defined:

- Get

- Notification

The Nudm\_NIDDAuthorization Service is used by Consumer NFs (NEF) to retrieve the UE's authorization for NIDD Configuration relevant to the consumer NF from the UDM by means of the Get service operation.

It is also used by the Consumer NFs (NEF) that have previously subscribed, to get notified by means of the Notification service operation when UDM decides to modify the subscribed data.

#### 5.7.2.2 Get

##### 5.7.2.2.1 General

The following procedures using the Get service operation are supported:

- NIDD Authorization Data Retrieval

##### 5.7.2.2.2 NIDD Authorization Data Retrieval

Figure 5.7.2.2.2-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to authorize the NIDD configuration request (see also 3GPP TS 23.502 [3] figure 4.25.3-1 step 4). The request contains the UE's identity (/{ueIdentity}), and information used for NIDD authorization (AuthorizationInfo).



Figure 5.7.2.2.2-1: Requesting a UE's NIDD Authorization Data

1. The NF service consumer (e.g. NEF) sends a POST request to invoke "authorize" custom method on the resource representing the UE's subscribed NIDD authorization information. The payload of the request shall be an object of "AuthorizationInfo" which shall contain NSSAI, DNN, MTC Provider Information, callback URI.  
  
If MTC Provider information and/or AF ID are received in the request, the UDM shall check whether the MTC Provider and/or the AF is allowed to perform this operation for the UE; otherwise, the UDM shall skip the MTC provider and/or AF authorization check.

2a. On success, the UDM responds with "200 OK" with the message body containing the single value or list of AuthorizationData (SUPI and GPSI) as relevant for the requesting NF service consumer.

2b. If there is no valid AuthorizationData for the UE Identity, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

2c. If SNSSAI and/or DNN are not authorized for this UE, or MTC Provider or AF are not allowed to perform this operation for the UE, HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

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

Editor's Note: On success if the response exceeds the maximum length of a message segmentation need to be introduced, how this is done is FFS.

#### 5.7.2.3 Notification

##### 5.7.2.3.1 General

The following procedures using the Notification service operation are supported:

- NIDD Authorization Data Update Notification

##### 5.7.2.3.2 NIDD Authorization Data Update Notification

Figure 5.7.2.3.2-1 shows a scenario where the UDM notifies the NF service consumer (that has subscribed to receive such notification) about subscription data change (see also 3GPP TS 23.502 [3] figure 4.25.6-1 step 1 and 2). The request contains the callbackReference URI as previously received by the UDM during NIDD Authorization Data Retrieval.



Figure 5.7.2.3.2-1: Requesting a UE's NIDD Authorization Data

1. The UDM sends a POST request to the callbackReference as provided by the NF service consumer during NIDD Authorization Data Retrieval.

2. The NF service consumer responds with "204 No Content".

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

## 5.8 Nudm\_MT Service

### 5.8.1 Service Description

See 3GPP TS 23.632 [32].

### 5.8.2 Service Operations

#### 5.8.2.1 Introduction

For the Nudm\_MT service the following service operations are defined:

- ProvideUeInfo

- ProvideLocationInfo

The Nudm\_MT service is used by the HSS to request the UDM to provide terminating access domain selection information and/or user state and/or 5GSRVCCInfo by means of the ProvideUeInfo service operation.

It is also used by the HSS to request the UE's Location Information in 5GC by means of the ProvideLocationInfo service operation.

#### 5.8.2.2 ProvideUeInfo

##### 5.8.2.2.1 General

The following procedure using the ProvideUeInfo service operation is supported:

- UE Information Retrieval

##### 5.8.2.2.2 UE Information Retrieval

Figure 5.8.2.2.2-1 shows a scenario where the NF service consumer (HSS) retrieves domain selection information and/or user state and/or 5GSRVCCInfo for a UE from the UDM. The request contains the UE's identity (supi).



Figure 5.8.2.2.2-1: NF service consumer requesting domain selection information

1. The NF service consumer sends a GET request to the UDM to query the UeInfo. Query parameters indicate that TadsInfo and/or UserState and/or 5GSRVCCInfo is requested.

2a. The UDM responds with "200 OK" with the message body containing the requested information.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" shall be returned and additional error information should be included in the response body (in the "ProblemDetails" element).

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

#### 5.8.2.3 ProvideLocationInfo

##### 5.8.2.3.1 General

The following procedure using the ProvideLocationInfo service operation is supported:

- Network Provided Location Information Request

##### 5.8.2.3.2 Network Provided Location Information Request

Figure 5.8.2.3.2-1 shows a scenario where the NF service consumer (HSS) request UE's location information from UDM. The request contains the UE's identity (supi), and requested information (current location, local time zone, RAT type, or serving node identity)



Figure 5.8.2.3.2-1: NF service consumer requesting domain selection information

1. The NF service consumer sends a POST request (custom method: provide-loc-info) to the resource representing UE's location information in 5GC.

2a. The UDM responds with "200 OK" with the message body containing the requested information.

2b. If there is no valid subscription data for the UE, or the requested information is not available, HTTP status code "404 Not Found" shall be returned and additional error information should be included in the response body (in the "ProblemDetails" element).

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

# 6 API Definitions

## 6.1 Nudm\_SubscriberDataManagement Service API

### 6.1.1 API URI

The Nudm\_SDM service shall use the Nudm\_SDM API.

The API URI of the Nudm\_SDM API shall be:

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

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

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The <apiName>shall be "nudm-sdm".

- The <apiVersion> shall be "v2".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.1.3.

### 6.1.2 Usage of HTTP

#### 6.1.2.1 General

HTTP/2, as defined in IETF RFC 7540 [13], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

HTTP messages and bodies for the Nudm\_SDM service shall comply with the OpenAPI [14] specification contained in Annex A2.

#### 6.1.2.2 HTTP standard headers

##### 6.1.2.2.1 General

The usage of HTTP standard headers shall be supported as specified in clause 5.2.2 of 3GPP TS 29.500 [4].

##### 6.1.2.2.2 Content type

The following content types shall be supported:

JSON, as defined in IETF RFC 8259 [15], signalled by the content type "application/json".

The Problem Details JSON Object (IETF RFC 7807 [16] signalled by the content type "application/problem+json"

JSON Merge Patch, as defined in IETF RFC 7396 [17], signalled by the content type "application/merge-patch+json"

##### 6.1.2.2.3 Cache-Control

As described in IETF RFC 7234 [26] clause 5.2, a "Cache-Control" header should be included in HTTP responses except for non-cacheable resources (e.g. UeContextInSmsfData). If it is included, it shall contain a "max-age" value, indicating the amount of time in seconds after which the received response is considered stale.

The "max-age" value shall be configurable by operator policy.

##### 6.1.2.2.4 ETag

As described in IETF RFC 7232 [25] clause 2.32, an "ETag" (entity-tag) header should be included in HTTP responses except for non-cacheable resources (e.g. UeContextInSmfData) to allow an NF Service Consumer performing a conditional request with "If-None-Match" header. If it is included, it shall contain a server-generated strong validator, that allows further matching of this value (included in subsequent client requests) with a given resource representation stored in the server or in a cache.

##### 6.1.2.2.5 If-None-Match

As described in IETF RFC 7232 [25] clause 3.2, an NF Service Consumer may issue conditional GET request towards UDM by including an "If-None-Match" header in HTTP requests containing one or several entity tags received in previous responses for the same resource.

##### 6.1.2.2.6 Last-Modified

As described in IETF RFC 7232 [25] clause 2.2, a "Last-Modified" header should be included in HTTP responses except for non-cacheable resources (e.g. SorAck) to allow an NF Service Consumer performing a conditional request with "If-Modified-Since" header.

##### 6.1.2.2.7 If-Modified-Since

As described in IETF RFC 7232 [25] clause 3.3, an NF Service Consumer may issue conditional GET request towards UDM, by including an "If-Modified-Since" header in HTTP requests.

##### 6.1.2.2.8 When to Use Entity-Tags and Last-Modified Dates

Both "ETag" and "Last-Modified" headers should be sent in the same HTTP response as stated in IETF RFC 7232 [25] clause 2.4.

NOTE: "ETag" is a stronger validator than "Last-Modified" and is preferred.

If the NF Service Producer included an "ETag" header with the resource then a conditional request for this resource shall be performed with the "If-None-Match" header.

#### 6.1.2.3 HTTP custom headers

##### 6.1.2.3.1 General

The usage of HTTP custom headers shall be supported as specified in clause 5.2.3 of 3GPP TS 29.500 [4].

### 6.1.3 Resources

#### 6.1.3.1 Overview



Figure 6.1.3.1-1: Resource URI structure of the nudm-sdm API

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

Table 6.1.3.1-1: Resources and methods overview

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Resource name (Archetype) | | | Resource URI | | | HTTP method or custom operation | | | Description | | |
| Supi (Document) | | | /{supi} | | | GET | | | Retrieve UE's subscription data | | |
| Nssai (Document) | | | /{supi}/nssai | | | GET | | | Retrieve the UE's subscribed Network Slice Selection Assistance Information | | |
| UeContextInAmfData (Document) | /{supi}/ue-context-in-amf-data | | | GET | | | Retrieve the UE's Context in AMF Data | | |
| AccessAndMobilitySubscriptionData (Document) | | | /{supi}/am-data | | | GET | | | Retrieve the UE's subscribed Access and Mobility Data | | |
| /{supi}/am-data/update-sor | | | update-sor (POST) | | | Trigger the update of Steering of Roaming Information at the UE | | |
| SorAck (Document) | | | /{supi}/am-data/sor-ack | | | PUT | | | Providing acknowledgement of Steering of Roaming | | |
| UpuAck (Document) | | | | | /{supi}/am-data/upu-ack | | | PUT | | | Providing acknowledgement of UE parameters update | | |
| CagAck (Document) | | | | | /{supi}/am-data/cag-ack | | | PUT | | | Providing acknowledgement of UE CAG configuration update | | |
| EnhancedCoverageRestrictionData | | | | | /{supi}/am-data/ecr-data | | | GET | | | Retrieve the UE's subscribed Enhance Coverage Restriction Data | | |
| SmfSelectionSubscriptionData (Document) | | | /{supi}/smf-select-data | | | GET | | | Retrieve the UE's subscribed SMF Selection Data | | |
| UeContextInSmfData (Document) | | | /{supi}/ue-context-in-smf-data | | | GET | | | Retrieve the UE's Context in SMF Data | | |
| SessionManagementSubscriptionData (Document) | | | /{supi}/sm-data | | | GET | | | Retrieve the UE's session management subscription data | | |
| SMSSubscriptionData (Document) | | | /{supi}/sms-data | | | GET | | | Retrieve the UE's SMS subscription data | | |
| SMSManagementSubscriptionData (Document) | | | /{supi}/sms-mng-data | | | GET | | | Retrieve the UE's SMS management subscription data | | |
| LcsPrivacySubscriptionData (Document) | | | /{ueId}/lcs-privacy-data | | | GET | | | Retrieve the UE's LCS privacy subscription data | | |
| LcsMobileOriginatedSubscriptionData (Document) | | | /{supi}/lcs-mo-data | | | GET | | | Retrieve the UE's LCS Mobile Originated subscription data | | |
| LcsBroadcastAssistanceSubscriptionData (Document) | | | /{supi}/lcs-bca-data | | | GET | | | Retrieve the UE's LCS Broadcast Assistance subscription data | | |
| V2xSubscriptionData (Document) | | | /{supi}/v2x-data | | | GET | | | Retrieve the UE's V2X subscription data | | |
| SdmSubscriptions (Collection) | | | /{ueId}/sdm-subscriptions | | | POST | | | Create a subscription | | |
| Individual subscription (Document) | | | /{ueId}/sdm-subscriptions/{subscriptionId} | | | DELETE | | | Delete the subscription identified by {subscriptionId}, i.e. unsubscribe | | |
| PATCH | | | Modify the sdm-subscription identified by {subscriptionId} | | |
| IdTranslationResult (Document) | | | /{ueId}/id-translation-result | | | GET | | | Retrieve a UE's SUPI or GPSI | | |
| UeContextInSmsfData (Document) | | | /{supi}/ue-context-in-smsf-data | | | GET | | | Retrieve the UE's Context in SMSF Data | | |
| TraceData  (Document) | | | /{supi}/trace-data | | | GET | | | Retrieve Trace Configuration Data | | |
| SharedData (Collection) | | | /shared-data | | | GET | | | Retrieve shared data | | |
| IndividualSharedData (Document) | | | /shared-data/{sharedDataId} | | | GET | | | Retrieve the individual Shared Data | | |
| SharedDataSubscriptions (Collection) | | | /shared-data-subscriptions | | | POST | | | Create a subscription | | |
| SharedDataIndividual subscription (Document) | | | /shared-data-subscriptions/{subscriptionId} | | | DELETE | | | Delete the subscription identified by {subscriptionId}, i.e. unsubscribe | | |
| PATCH | | | Modify the shared data subscription identified by {subscriptionId} | | |
| GroupIdentifiers  (Document) | | | /group-data/group-identifiers | | | GET | | | Retrieve group identifiers and the UE identifiers belong to the group identifiers. | | |
| SnssaisAck (Document) | | | /{supi}/am-data/subscribed-snssais-ack | | | PUT | | | Providing acknowledgement of UE for subscribed S-NSSAIs | | |

#### 6.1.3.2 Resource: Nssai (Document)

##### 6.1.3.2.1 Description

This resource represents the subscribed Nssai for a SUPI. It is queried by the AMF before registering, and is used to assist network slice selection. See 5.2.2.2.2 and 3GPP TS 23.501 [2] clause 5.15.3.

This resource is also queried by the PGW-C+SMF during PDN connection establishment in the EPC, and is used to select the S-NSSAI provided to the UE, see 3GPP TS 23.501 [2] clause 4.11.0a.5. The PGW-C+SMF shall not indicate support to "Nssaa" feature (see clause 6.1.8) in this query to UDM. If a slice is not present in the Nssai resource returned by UDM, i.e. not subscribed by the UE or subject to Network Slice-Specific Authentication and Authorization, the slice shall not be selected by the PGW-C+SMF.

##### 6.1.3.2.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/nssai

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

Table 6.1.3.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.2.3 Resource Standard Methods

6.1.3.2.3.1 GET

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

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| plmn-id | PlmnId | O | 0..1 | PLMN identity of the PLMN serving the UE |

If "plmn-id" is included, UDM shall return the Subscribed S-NSSAIs which the UE is subscribed to use in the PLMN identified by "plmn-id".

If "plmn-id" is not included, UDM shall return the Subscribed S-NSSAIs for HPLMN.

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

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

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

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| Nssai | M | 1 | 200 OK | Upon success, a response body containing the NSSAI shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.3.2.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.2.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

#### 6.1.3.3 Resource: SdmSubscriptions (Collection)

##### 6.1.3.3.1 Description

This resource is used to represent subscriptions to notifications.

The UDM will only recognize subscribed DNNs in this resource so for instance, if the SMF receives SessionManagementSubscriptionData for the Wildcard DNN, the SMF shall include the wildcard DNN in SdmSubscription. Any request for non-subscribed DNN will be rejected with "404 Not Found".

##### 6.1.3.3.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{ueId}/sdm-subscriptions

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

Table 6.1.3.3.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| ueId | VarUeId | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2) or Generic Public Subscription Identifier (see 3GPP TS 23.501 [2] clause 5.9.8)  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |

##### 6.1.3.3.3 Resource Standard Methods

6.1.3.3.3.1 POST

This method shall support the URI query parameters specified in table 6.1.3.3.3.1-1.

Table 6.1.3.3.3.1-1: URI query parameters supported by the POST method on this resource

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

This method shall support the request data structures specified in table 6.1.3.3.3.1-2 and the response data structures and response codes specified in table 6.1.3.3.3.1-3.

Table 6.1.3.3.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SdmSubscription | M | 1 | The subscription that is to be created. |

Table 6.1.3.3.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SdmSubscription | M | 1 | 201 Created | Upon success, a response body containing a representation of the created Individual subscription resource shall be returned including the accepted values, e.g. in case of partial success UDM shall return the list of monitores resource Uri successfully subscribed..  The HTTP response shall include a "Location" HTTP header that contains the resource URI of the created resource. When stateless UDM is deployed, the stateless UDM may use an FQDN identifying the UDM group to which the UDM belongs as the host part of the resource URI. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors::  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate one of the following application errors:  - UNSUPPORTED\_RESOURCE\_URI  This response shall not be cached. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

NOTE: In the scenario of stateless UDM deployment, it is assumed that stateless UDMs are organized into several UDM groups, and for each UDM group an FQDN can be allocated.

Table 6.1.3.3.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/sdm-subscriptions/{subscriptionId} |

#### 6.1.3.4 Resource: Individual subscription (Document)

##### 6.1.3.4.1 Description

This resource is used to represent an individual subscription to notifications.

##### 6.1.3.4.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{ueId}/sdm-subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 6.1.3.4.2-1.

Table 6.1.3.4.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| ueId | VarUeId | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2) or Generic Public Subscription Identifier (see 3GPP TS 23.501 [2] clause 5.9.8)  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |
| subscriptionId | string | The subscriptionId identifies an individual subscription to notifications. |

##### 6.1.3.4.3 Resource Standard Methods

6.1.3.4.3.1 DELETE

This method shall support the URI query parameters specified in table 6.1.3.4.3.1-1.

Table 6.1.3.4.3.1-1: URI query parameters supported by the DELETE method on this resource

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

This method shall support the request data structures specified in table 6.1.3.4.3.1-2 and the response data structures and response codes specified in table 6.1.3.4.3.1-3.

Table 6.1.3.4.3.1-2: Data structures supported by the Delete Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  | The request body shall be empty. |

Table 6.1.3.4.3.1-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Data type | | | P | Cardinality | | Response  codes | Description |
| n/a | | |  |  | | 204 No Content | Upon success, an empty response body shall be returned. |
| ProblemDetails | | O | | 0..1 | 404 Not Found | | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - SUBSCRIPTION\_NOT\_FOUND, see 3GPP TS 29.500 [4] table 5.2.7.2-1. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | | | | |

6.1.3.4.3.2 PATCH

This method shall support the URI query parameters specified in table 6.1.3.4.3.2-1.

Table 6.1.3.4.3.2-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.4.3.2-2 and the response data structures and response codes specified in table 6.1.3.4.3.2-3.

Table 6.1.3.4.3.2-2: Data structures supported by the PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SdmSubsModification | M | 1 | The modification Instruction |

Table 6.1.3.4.3.2-3: Data structures supported by the PATCH Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SdmSubscription | M | 1 | 200 OK | Upon success, the modified sdmSubscription shall be returned including the accepted values, e.g. in case of partial success UDM shall return the list of monitores resource Uri successfully subscribed. (NOTE 2) |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. (NOTE 2) |
| PatchResult | M | 1 | 200 OK | Upon success, the execution report is returned. (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - SUBSCRIPTION\_NOT\_FOUND, see 3GPP TS 29.500 [4] table 5.2.7.2-1. |
| ProblemDetails | O | 0..1 | 403 Forbidden | One or more attributes are not allowed to be modified.  The "cause" attribute may be used to indicate one of the following application errors:  - MODIFICATION\_NOT\_ALLOWED, see 3GPP TS 29.500 [4] table 5.2.7.2-1. |
| NOTE 1: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported.  NOTE 2: If the NF service consumer has not included in the supported-feature query parameter the "PatchReport" feature number, the UDM responds with SdmSubscription. If the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature number, the UDM shall respond with 204 No Content response indicating that all the modification instructions in the PATCH request have been implemented or with PatchResult indicating that some of the modification instructions in the PATCH request have been discarded. | | | | |

#### 6.1.3.5 Resource: AccessAndMobilitySubscriptionData (Document)

##### 6.1.3.5.1 Description

This resource represents the subscribed Access and Mobility Data for a SUPI. It is queried by the AMF after registering.

##### 6.1.3.5.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/am-data

This resource shall support the resource URI variables defined in table 6.1.3.5.2-1.

Table 6.1.3.5.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.5.3 Resource Standard Methods

6.1.3.5.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.5.3.1-1.

Table 6.1.3.5.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| plmn-id | PlmnId | O | 0..1 | PLMN identity of the PLMN serving the UE |

If "plmn-id" is included, UDM shall return the Access and Mobility Data for the SUPI associated to the PLMN identified by "plmn-id".

If "plmn-id" is not included, UDM shall return the Access and Mobility Data for the SUPI associated to the HPLMN.

This method shall support the request data structures specified in table 6.1.3.5.3.1-2 and the response data structures and response codes specified in table 6.1.3.5.3.1-3.

Table 6.1.3.5.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.5.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| AccessAndMobilitySubscriptionData | M | 1 | 200 OK | Upon success, a response body containing the Access and Mobility Subscription Data shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.3.5.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.5.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

##### 6.1.3.5.4 Resource Custom Operations

6.1.3.5.4.1 Overview

Table 6.1.3.5.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation Name | Custom operation URI | Mapped HTTP method | Description |
| update-sor | /{supi}/am-data/update-sor | POST | Trigger the update of Steering of Roaming information at the UE |

6.1.3.5.4.2 Operation: update-sor

6.1.3.5.4.2.1 Description

When a UE performs initial registration or emergency registration at an AMF (which already has AccessAndMobilitySubscriptionData stored) within a VPLMN, and the sorUpdateIndicatorList is present in AccessAndMobilitySubscriptionData and contains the corresponding registration type, the AMF shall make use of this operation to trigger the HPLMN to update steering of roaming information for the UE.

6.1.3.5.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.3.5.4.2.2-1 and the response data structure and response codes specified in table 6.1.3.5.4.2.2-2.

Table 6.1.3.5.4.2.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SorUpdateInfo | M | 1 | Contains the ID of the VPLMN |

Table 6.1.3.5.4.2.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Data type | P | Cardinality | | | Response  codes | Description |
| SorInfo | M | 1 | | | 200 OK | Upon success, a response body containing the updated Steering Of Roaming information shall be returned. |
| ProblemDetails | O | | 0..1 | 404 Not Found | | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND | |
| NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | | | |

#### 6.1.3.6 Resource: SmfSelectionSubscriptionData (Document)

##### 6.1.3.6.1 Description

This resource represents the subscribed SMF Selection Data for a SUPI. It is queried by the AMF after registering.

##### 6.1.3.6.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/smf-select-data

This resource shall support the resource URI variables defined in table 6.1.3.6.2-1.

Table 6.1.3.6.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.6.3 Resource Standard Methods

6.1.3.6.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.6.3.1-1.

Table 6.1.3.6.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| plmn-id | PlmnId | O | 0..1 | PLMN identity of the PLMN serving the UE |

If "plmn-id" is included, UDM shall return the SMF Selection Subscription Data for the SUPI associated to the PLMN identified by "plmn-id".

If "plmn-id" is not included, UDM shall return the SMF Selection Subscription Data for the SUPI associated to the HPLMN.

This method shall support the request data structures specified in table 6.1.3.6.3.1-2 and the response data structures and response codes specified in table 6.1.3.6.3.1-3.

Table 6.1.3.6.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.6.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmfSelectionSubscriptionData | M | 1 | 200 OK | Upon success, a response body containing the SMF Selection Subscription Data shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.3.6.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.6.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

#### 6.1.3.7 Resource: UeContextInSmfData (Document)

##### 6.1.3.7.1 Description

This resource represents the allocated SMFs for a SUPI. It is queried by the AMF after registering.

##### 6.1.3.7.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/ue-context-in-smf-data

This resource shall support the resource URI variables defined in table 6.1.3.7.2-1.

Table 6.1.3.7.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.7.3 Resource Standard Methods

6.1.3.7.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.7.3.1-1.

Table 6.1.3.7.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.7.3.1-2 and the response data structures and response codes specified in table 6.1.3.7.3.1-3.

Table 6.1.3.7.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.7.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| UeContextInSmfData | M | 1 | 200 OK | Upon success, a response body containing the UeContextInSmfData shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.8 Resource: SessionManagementSubscriptionData (Document)

##### 6.1.3.8.1 Description

This resource represents the Session Management subscription data for a SUPI. It is queried by the SMF during session setup, using query parameters representing the selected network slice and the DNN. The SMF is responsible for enforcing the user session management subscription data.

UDM will only recognize subscribed DNNs in this resource so for instance, in case SMF receives indication from AMF that the DNN was authorized based on the wildcard APN in the Selection Mode Value, SMF shall include the wildcard DNN in the query parameter and SMF will receive SessionManagementSubscriptionData for the Wildcard DNN. Any request for non-subscribed DNN will be rejected with "404 Not Found".

This resource is also queried by the PGW-C+SMF during PDN connection establishment in the EPC, to select the S-NSSAI for the APN/DNN of the PDN connection, see 3GPP TS 23.502 [3] clause 4.11.0a.5.

NOTE: The PGW-C+SMF shall also retrieve the Nssai resource from UDM, to avoid selection a slice that is subject to Network Slice-Specific Authentication and Authorization (see clause 6.1.3.2.1).

##### 6.1.3.8.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/sm-data

This resource shall support the resource URI variables defined in table 6.1.3.8.2-1.

Table 6.1.3.8.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| apiVersion | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.8.3 Resource Standard Methods

6.1.3.8.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.8.3.1-1.

Table 6.1.3.8.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| single-nssai | Snssai | O | 0..1 | When present without Slice Differentiator (sd), all slices identified by the given Slice/Service Type (sst) and any sd value (if any) shall be considered matching the query parameter. |
| dnn | Dnn | O | 0..1 | The DNN shall be the DNN Network Identifier only. |
| plmn-id | PlmnId | O | 0..1 | PLMN identity of the PLMN serving the UE |

JSON objects (such as Snssai, PlmnId…) shall be included directly as part of the URI query parameters by specifying in the OpenAPI file that the "Content-Type" of such parameters is "application/json".

If "singleNssai" is not included, and "dnn" is not included, UDM shall return all DNN configurations for all network slice(s).

If "singleNssai" is included, and "dnn" is not included, UDM shall return all DNN configurations for the requested network slice identified by "singleNssai".

If "singleNssai" is not included, and "dnn" is included, UDM shall return all DNN configurations identified by "dnn" for all network slices where such DNN is available.

If "singleNssai" is included, and "dnn" is included, UDM shall return the DNN configuration identified by "dnn", if such DNN is available in the network slice identified by "singleNssai".

For all the combinations about the inclusion of "dnn" and "singleNssai" as URI query parameters, if "plmn-id" is included, UDM shall return the configurations for the DNN and network slices associated to the PLMN identified by "plmn-id". Otherwise (i.e. if "plmn-id" is not included), UDM shall return the configurations for the DNN and network slices associated to the HPLMN.

This method shall support the request data structures specified in table 6.1.3.8.3.1-2 and the response data structures and response codes specified in table 6.1.3.8.3.1-3.

Table 6.1.3.8.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.8.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| array(SessionManagementSubscriptionData) | M | 1..N | 200 OK | Upon success, a response body containing the Session Management Subscription data shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.3.8.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.8.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

#### 6.1.3.9 Resource: SMSSubscriptionData (Document)

##### 6.1.3.9.1 Description

This resource represents the subscribed SMS Subscription Data for a SUPI. It is queried by the AMF after registering.

##### 6.1.3.9.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/sms-data

This resource shall support the resource URI variables defined in table 6.1.3.9.2-1.

Table 6.1.3.9.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.9.3 Resource Standard Methods

6.1.3.9.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.9.3.1-1.

Table 6.1.3.9.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| plmn-id | PlmnId | C | 0..1 | if absent, H-PLMN ID is used as default |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.9.3.1-2 and the response data structures and response codes specified in table 6.1.3.9.3.1-3.

Table 6.1.3.9.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.9.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmsSubscriptionData | M | 1 | 200 OK | Upon success, a response body containing the SMS Subscription Data shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.3.9.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.9.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

#### 6.1.3.10 Resource: SMSManagementSubscriptionData (Document)

##### 6.1.3.10.1 Description

This resource represents the subscribed SMS Management Data for a SUPI. It is queried by the SMSF after registering.

##### 6.1.3.10.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/sms-mng-data

This resource shall support the resource URI variables defined in table 6.1.3.10.2-1.

Table 6.1.3.10.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.10.3 Resource Standard Methods

6.1.3.10.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.10.3.1-1.

Table 6.1.3.10.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| plmn-id | PlmnId | C | 0..1 | if absent, H-PLMN ID is used as default |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.10.3.1-2 and the response data structures and response codes specified in table 6.1.3.10.3.1-3.

Table 6.1.3.10.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.10.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmsManagementSubscriptionData | M | 1 | 200 OK | Upon success, a response body containing the SMS Management Subscription Data shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.3.10.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.10.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

#### 6.1.3.11 Resource: Supi (Document)

##### 6.1.3.11.1 Description

This resource represents the subscription profile of the subscriber identified by a given SUPI.

##### 6.1.3.11.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}

This resource shall support the resource URI variables defined in table 6.1.3.11.2-1.

Table 6.1.3.11.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.11.3 Resource Standard Methods

6.1.3.11.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.11.3.1-1.

NOTE: The retrieval of these data sets can also be achieved by sending individual GET requests to the corresponding sub-resources under the {supi} resource. When multiple data sets need to be retrieved by the NF Service consumer, it is recommended to use a single GET request with query parameters rather than issuing multiple GET requests.

Table 6.1.3.11.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| dataset-names | DatasetNames | M | 1 | Contains names of the data sets that are required to retrieve. |
| plmn-id | PlmnId | C | 0..1 | If absent, H-PLMN ID is used as default.  This IE is only used for data sets whose DataSetNames are listed below:  "AM"  "SMF\_SEL"  "SMS\_SUB"  "SM"  "TRACE"  "SMS\_MNG" |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.11.3.1-2 and the response data structures and response codes specified in table 6.1.3.11.3.1-3.

Table 6.1.3.11.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.11.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SubscriptionDataSets | M | 1 | 200 OK | Upon success, a response body containing the requested data sets shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: The manadatory HTTP error status code for the GET method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |

Table 6.1.3.11.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.11.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

#### 6.1.3.12 Resource: IdTranslationResult (Document)

##### 6.1.3.12.1 Description

This resource represents the SUPI. It is queried by the NEF for GPSI to SUPI translation. See 3GPP TS 23.502 [3] clause 4.13.2.2.

##### 6.1.3.12.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{ueId}/id-translation-result

This resource shall support the resource URI variables defined in table 6.1.3.12.2-1.

Table 6.1.3.12.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| ueId | VarUeId | Represents the Generic Public Subscription Identifier (see 3GPP TS 23.501 [2] clause 5.9.8) or Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |

##### 6.1.3.12.3 Resource Standard Methods

6.1.3.12.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.12.3.1-1.

Table 6.1.3.12.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| app-port-id | AppPortId | C | 0..1 | If ueId is a SUPI in Resource URI variables, this shall be present and indicates Application port identity, see 3GPP TS 23.501 [2] clause 4.4.7 |

This method shall support the request data structures specified in table 6.1.3.12.3.1-2 and the response data structures and response codes specified in table 6.1.3.12.3.1-3.

Table 6.1.3.12.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.12.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| IdTranslationResult | M | 1 | 200 OK | Upon success, a response body containing the SUPI and optionally the MSISDN shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.3.12.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.12.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

#### 6.1.3.13 Resource: SorAck (Document)

##### 6.1.3.13.1 Description

This resource represents the acknowledgement of the SoR for a SUPI.

##### 6.1.3.13.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/am-data/sor-ack

This resource shall support the resource URI variables defined in table 6.1.3.13.2-1.

Table 6.1.3.13.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.13.3 Resource Standard Methods

6.1.3.13.3.1 PUT

This method shall support the URI query parameters specified in table 6.1.3.13.3.1-1.

Table 6.1.3.13.3.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.1.3.13.3.1-2 and the response data structures and response codes specified in table 6.1.3.13.3.1-3.

Table 6.1.3.13.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AcknowledgeInfo | M | 1 | Contains the SOR-MAC-Iue received from the UE. |

Table 6.1.3.13.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Successful receiving the SorXmacIue in the Request. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.14 Resource: TraceData (Document)

##### 6.1.3.14.1 Description

This resource represents the trace configuration data for a SUPI. It is queried by the AMF and SMF after registering.

##### 6.1.3.14.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/trace-data

This resource shall support the resource URI variables defined in table 6.1.3.14.2-1.

Table 6.1.3.14.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.14.3 Resource Standard Methods

6.1.3.14.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.14.3.1-1.

Table 6.1.3.14.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| plmn-id | PlmnId | O | 0..1 | PLMN identity of the PLMN serving the UE |

If "plmn-id" is included, UDM shall return the Trace Data for the SUPI associated to the PLMN identified by "plmn-id".

If "plmn-id" is not included, UDM shall return the Trace Data for the SUPI associated to the HPLMN.

This method shall support the request data structures specified in table 6.1.3.14.3.1-2 and the response data structures and response codes specified in table 6.1.3.14.3.1-3.

Table 6.1.3.14.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.14.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| TraceDataResponse | M | 1 | 200 OK | Upon success, a response body containing the Trace Data shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.3.14.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.14.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

#### 6.1.3.15 Resource: SharedData (Collection)

##### 6.1.3.15.1 Description

This resource represents the collection of data that can be shared by multiple UEs.

##### 6.1.3.15.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/shared-data

This resource shall support the resource URI variables defined in table 6.1.3.15.2-1.

Table 6.1.3.15.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |

##### 6.1.3.15.3 Resource Standard Methods

6.1.3.15.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.15.3.1-1.

Table 6.1.3.15.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| shared-data-ids | array(SharedDataId) | M | 1..N | Contains unique items |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.15.3.1-2 and the response data structures and response codes specified in table 6.1.3.15.3.1-3.

Table 6.1.3.15.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.15.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| array(SharedData) | M | 1..N | 200 OK | Upon success, a response body containing a list of SharedData shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.3.15.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.15.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

#### 6.1.3.16 Resource: SharedDataSubscriptions (Collection)

##### 6.1.3.16.1 Description

This resource is used to represent subscriptions to notifications for shared data.

##### 6.1.3.16.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/shared-data-subscriptions

This resource shall support the resource URI variables defined in table 6.1.3.16.2-1.

Table 6.1.3.16.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |

##### 6.1.3.16.3 Resource Standard Methods

6.1.3.16.3.1 POST

This method shall support the URI query parameters specified in table 6.1.3.16.3.1-1.

Table 6.1.3.16.3.1-1: URI query parameters supported by the POST method on this resource

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

This method shall support the request data structures specified in table 6.1.3.16.3.1-2 and the response data structures and response codes specified in table 6.1.3.16.3.1-3.

Table 6.1.3.16.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SdmSubscription | M | 1 | The subscription that is to be created. |

Table 6.1.3.16.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SdmSubscription | M | 1 | 201 Created | Upon success, a response body containing a representation of the created Individual subscription resource shall be returned.  The HTTP response shall include a "Location" HTTP header that contains the resource URI of the created resource. When stateless UDM is deployed, the stateless UDM shall use the FQDN identifying the UDM set to which the UDM belongs as the host part of the resource URI. |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate one of the following application errors:  - UNSUPPORTED\_RESOURCE\_URI  This response shall not be cached. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

NOTE: In the scenario of stateless UDM deployment, it is assumed that stateless UDMs are organized into several UDM sets, and each UDM set is allocated an FQDN.

Table 6.1.3.16.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-sdm/<apiVersion>/shared-data-subscriptions/{subscriptionId} |

#### 6.1.3.17 Resource: Individual subscription (Document)

##### 6.1.3.17.1 Description

This resource is used to represent an individual subscription to notifications for shared data.

##### 6.1.3.17.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/shared-data-subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 6.1.3.17.2-1.

Table 6.1.3.17.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| subscriptionId | string | The subscriptionId identifies an individual subscription to notifications. |

##### 6.1.3.17.3 Resource Standard Methods

6.1.3.17.3.1 DELETE

This method shall support the URI query parameters specified in table 6.1.3.17.3.1-1.

Table 6.1.3.17.3.1-1: URI query parameters supported by the DELETE method on this resource

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

This method shall support the request data structures specified in table 6.1.3.17.3.1-2 and the response data structures and response codes specified in table 6.1.3.17.3.1-3.

Table 6.1.3.17.3.1-2: Data structures supported by the Delete Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  | The request body shall be empty. |

Table 6.1.3.17.3.1-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The resource corresponding to the SubscriptionId can't be found.  The "cause" attribute may be used to indicate one of the following application errors::  - SUBSCRIPTION\_NOT\_FOUND, see 3GPP TS 29.500 [4] table 5.2.7.2-1. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

6.1.3.17.3.2 PATCH

This method shall support the URI query parameters specified in table 6.1.3.17.3.2-1.

Table 6.1.3.17.3.2-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.17.3.2-2 and the response data structures and response codes specified in table 6.1.3.17.3.2-3.

Table 6.1.3.17.3.2-2: Data structures supported by the PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SdmSubsModification | M | 1 | The modification Instruction |

Table 6.1.3.17.3.2-3: Data structures supported by the PATCH Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SdmSubscription | M | 1 | 200 OK | Upon success, the modified sdmSubscription shall be returned. (NOTE 2) |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. (NOTE 2) |
| PatchResult | M | 1 | 200 OK | Upon success, the execution report is returned. (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | The resource corresponding to the SubscriptionId can't be found.  The "cause" attribute may be used to indicate one of the following application errors:  - SUBSCRIPTION\_NOT\_FOUND, see 3GPP TS 29.500 [4] table 5.2.7.2-1. |
| ProblemDetails | O | 0..1 | 403 Forbidden | One or more attributes are not allowed to be modified.  The "cause" attribute may be used to indicate one of the following application errors:  - MODIFICATION\_NOT\_ALLOWED, see 3GPP TS 29.500 [4] table 5.2.7.2-1. |
| NOTE 1: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported.  NOTE 2: If the NF service consumer has not included in the supported-features query parameter the "PatchReport" feature number, the UDM responds with SdmSubscription. If the NF service consumer has included in the supported-features query parameter the "PatchReport" feature number, the UDM shall respond with 204 No Content response indicating that all the modification instructions in the PATCH request have been implemented or with PatchResult indicating that some of the modification instructions in the PATCH request have been discarded. | | | | |

#### 6.1.3.18 Resource: UeContextInSmsfData (Document)

##### 6.1.3.18.1 Description

This resource represents the allocated SMSFs for a SUPI.

##### 6.1.3.18.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/ue-context-in-smsf-data

This resource shall support the resource URI variables defined in table 6.1.3.18.2-1.

Table 6.1.3.18.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.18.3 Resource Standard Methods

6.1.3.18.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.18.3.1-1.

Table 6.1.3.18.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.18.3.1-2 and the response data structures and response codes specified in table 6.1.3.18.3.1-3.

Table 6.1.3.18.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.18.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| UeContextInSmsfData | M | 1 | 200 OK | Upon success, a response body containing the UeContextInSmsfData shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.19 Resource: UpuAck (Document)

##### 6.1.3.19.1 Description

This resource represents the acknowledgement of UE parameters update for a SUPI.

##### 6.1.3.19.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/am-data/upu-ack

This resource shall support the resource URI variables defined in table 6.1.3.19.2-1.

Table 6.1.3.19.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.19.3 Resource Standard Methods

6.1.3.19.3.1 PUT

This method shall support the URI query parameters specified in table 6.1.3.19.3.1-1.

Table 6.1.3.19.3.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.1.3.19.3.1-2 and the response data structures and response codes specified in table 6.1.3.19.3.1-3.

Table 6.1.3.19.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AcknowledgeInfo | M | 1 | Contains the UPU-MAC-Iue received from the UE and the provisioning time stamp as received within UpuInfo. |

Table 6.1.3.19.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Successful receiving the UpuXmacIue in the Request. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| NOTE: The manadatory HTTP error status code for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |

#### 6.1.3.20 Resource: GroupIdentifiers (Document)

##### 6.1.3.20.1 Description

This resource represents the Group Identifiers handled by UDM/UDR. It is queried by the NEF or GMLC for translation between External and Internal Group Identifiers or query the UE identifiers that belong to the provided External or Internal Group Identifier.

##### 6.1.3.20.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/group-data/group-identifiers

This resource shall support the resource URI variables defined in table 6.1.3.20.2-1.

Table 6.1.3.20.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |

##### 6.1.3.20.3 Resource Standard Methods

6.1.3.20.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.20.3.1-1.

Table 6.1.3.20.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| ext-groud-id | ExtGroupId | C | 0..1 | External Group ID |
| int-group-id | GroupId | C | 0..1 | Internal Group ID |
| ue-id-ind | boolean | C | 0..1 | Indication whether UE identifiers are required or not.  When present, it shall be set as following:  - true: UE identifiers are required  - false (default): UE identifiers are not required |
| NOTE: Either ext-group-id or int-group-id shall be present in the request. | | | | |

Either the ext-group-id or the int-group-id shall be present in the request.

This method shall support the request data structures specified in table 6.1.3.20.3.1-2 and the response data structures and response codes specified in table 6.1.3.20.3.1-3.

Table 6.1.3.20.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.20.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| GroupIdentifiers | M | 1 | 200 OK | Upon success, a response body containing the group identifier(s) shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - GROUP\_IDENTIFIER\_NOT\_FOUND |
| NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.3.20.3.1-4: Headers supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| If-None-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.2 |
| If-Modified-Since | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.3 |

Table 6.1.3.20.3.1-5: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Cache-Control | string | O | 0..1 | Cache-Control containing max-age, as described in IETF RFC 7234 [26], clause 5.2 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3 |
| Last-Modified | string | O | 0..1 | Timestamp for last modification of the resource, as described in IETF RFC 7232 [25], clause 2.2 |

#### 6.1.3.21 Resource: SnssaisAck (Document)

##### 6.1.3.21.1 Description

This resource represents the acknowledgement of UE for subscribed S-NSSAIs update for a SUPI.

##### 6.1.3.21.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/am-data/subscribed-snssais-ack

This resource shall support the resource URI variables defined in table 6.1.3.21.2-1.

Table 6.1.3.21.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.21.3 Resource Standard Methods

6.1.3.21.3.1 PUT

This method shall support the URI query parameters specified in table 6.1.3.21.3.1-1.

Table 6.1.3.21.3.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.1.3.21.3.1-2 and the response data structures and response codes specified in table 6.1.3.21.3.1-3.

Table 6.1.3.21.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AcknowledgeInfo | M | 1 | Contains the provisioning time stamp as received within the Nssai. |

Table 6.1.3.21.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Successful receiving the UE acknowledgement for subscribed S-NSSAIs update. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.22 Resource: CagAck (Document)

##### 6.1.3.22.1 Description

This resource represents the acknowledgement of UE for CAG update for a SUPI.

##### 6.1.3.22.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/am-data/cag-ack

This resource shall support the resource URI variables defined in table 6.1.3.22.2-1.

Table 6.1.3.22.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.22.3 Resource Standard Methods

6.1.3.22.3.1 PUT

This method shall support the URI query parameters specified in table 6.1.3.22.3.1-1.

Table 6.1.3..3.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.1.3.22.3.1-2 and the response data structures and response codes specified in table 6.1.3.22.3.1-3.

Table 6.1.3.22.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AcknowledgeInfo | M | 1 | Contains the provisioning time stamp as received within the CagInfo. |

Table 6.1.3.22.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Successful receiving the UE acknowledgement for CAG configuration update. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.23 Resource: LcsPrivacySubscriptionData (Document)

##### 6.1.3.23.1 Description

This resource represents the subscribed LCS Privacy Data for a UE. It is queried by the HGMLC or NEF.

##### 6.1.3.23.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{ueId}/lcs-privacy-data

This resource shall support the resource URI variables defined in table 6.1.3.23.2-1.

Table 6.1.3.23.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| ueId | VarUeId | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2) or Generic Public Subscription Identifier (see 3GPP TS 23.501 [2] clause 5.9.8)  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7]. |
| NOTE: SUPI is only used to retrieve Location Privacy profile by GMLC. | | |

##### 6.1.3.23.3 Resource Standard Methods

6.1.3.23.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.23.3.1-1.

Table 6.1.3.23.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

UDM shall return the LCS Privacy Data for the UE identified by the ueId.

This method shall support the request data structures specified in table 6.1.3.23.3.1-2 and the response data structures and response codes specified in table 6.1.3.23.3.1-3.

Table 6.1.3.23.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.23.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| LcsPrivacyData | M | 1 | 200 OK | Upon success, a response body containing the LCS Privacy Subscription Data shall be returned (see 3GPP TS 23.273 [38] clause 5.4.2) |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.24 Resource: LcsMobileOriginatedSubscriptionData (Document)

##### 6.1.3.24.1 Description

This resource represents the subscribed LCS Mobile Originated Data for a SUPI. It is queried by the AMF after registering.

##### 6.1.3.24.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/lcs-mo-data

This resource shall support the resource URI variables defined in table 6.1.3.24.2-1.

Table 6.1.3.24.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.24.3 Resource Standard Methods

6.1.3.24.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.24.3.1-1.

Table 6.1.3.24.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

UDM shall return the LCS Mobile Originated Data for the SUPI.

This method shall support the request data structures specified in table 6.1.3.24.3.1-2 and the response data structures and response codes specified in table 6.1.3.24.3.1-3.

Table 6.1.3.24.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.24.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| LcsMoData | M | 1 | 200 OK | Upon success, a response body containing the LCS Mobile Originated Subscription Data shall be returned (see 3GPP TS 23.273 [38] clause 5.4.2) |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.25 Resource: EnhancedCoverageRestrictionData

##### 6.1.3.25.1 Description

This resource represents the subscribed Enhance Coverage Restriction Data for a SUPI.

##### 6.1.3.25.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/am-data/ecr-data

This resource shall support the resource URI variables defined in table 6.1.3.25.2-1.

Table 6.1.3.25.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.25.3 Resource Standard Methods

6.1.3.25.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.25.3.1-1.

Table 6.1.3.25.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.25.3.1-2 and the response data structures and response codes specified in table 6.1.3.25.3.1-3.

Table 6.1.3.25.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.25.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| EnhancedCoverageRestrictionData | M | 1 | 200 OK | Upon success, a response body containing the Access and Mobility Subscription Data shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.26 Resource: UeContextInAmfData (Document)

##### 6.1.3.26.1 Description

This resource represents the allocated AMF for a SUPI.

##### 6.1.3.26.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/ue-context-in-amf-data

This resource shall support the resource URI variables defined in table 6.1.3.26.2-1.

Table 6.1.3.26.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.1.1 |
| supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.26.3 Resource Standard Methods

6.1.3.26.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.26.3.1-1.

Table 6.1.3.26.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.26.3.1-2 and the response data structures and response codes specified in table 6.1.3.26.3.1-3.

Table 6.1.3.26.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.26.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| UeContextInAmfData | M | 1 | 200 OK | Upon success, a response body containing the UeContextInAmfData shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.27 Resource: V2xSubscriptionData (Document)

##### 6.1.3.27.1 Description

This resource represents the subscribed V2X Data for a SUPI. It is queried by the AMF after registering.

##### 6.1.3.27.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/v2x-data

This resource shall support the resource URI variables defined in table 6.1.3.27.2-1.

Table 6.1.3.27.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.1.1 |
| supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.27.3 Resource Standard Methods

6.1.3.27.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.27.3.1-1.

Table 6.1.3.27.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.27.3.1-2 and the response data structures and response codes specified in table 6.1.3.27.3.1-3.

Table 6.1.3.27.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.27.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| V2xSubscriptionData | M | 1 | 200 OK | Upon success, a response body containing the V2X Subscription Data shall be returned (see 3GPP TS 23.273 [38] clause 5.4.2) |
| ProblemDetails | O | 1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.28 Resource: LcsBroadcastAssistanceSubscriptionData (Document)

##### 6.1.3.28.1 Description

This resource represents the subscribed LCS Broadcast Assistance Data Types for a SUPI. It is queried by the AMF.

##### 6.1.3.28.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/lcs-bca-data

This resource shall support the resource URI variables defined in table 6.1.3.28.2-1.

Table 6.1.3.28.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | **Definition** |
| apiRoot | See clause 6.1.1 |
| supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.1.3.28.3 Resource Standard Methods

6.1.3.28.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.28.3.1-1.

Table 6.1.3.28.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | **Description** |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| plmn-id | PlmnId | O | 0..1 | PLMN identity of the PLMN serving the UE |

If "plmn-id" is included, the UDM shall return the LCS Broadcast Assistance Data Types for the SUPI associated to the PLMN identified by "plmn-id".

If "plmn-id" is not included, the UDM shall return the LCS Broadcast Assistance Data Types for the SUPI associated to the HPLMN.

This method shall support the request data structures specified in table 6.1.3.x.3.1-2 and the response data structures and response codes specified in table 6.1.3.x.3.1-3.

Table 6.1.3.28.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.28.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | **Description** |
| LcsBroadcastAssistanceTypesData | M | 1 | 200 OK | Upon success, a response body containing the list of Broadcast Assistance Data Types Subscription Data shall be returned (see 3GPP TS 23.273 [38] clause 7.1) |
| ProblemDetails | O | 1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.1.3.29 Resource: IndividualSharedData (Document)

##### 6.1.3.29.1 Description

This resource represents the individual Shared Data.

##### 6.1.3.29.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/shared-data/{sharedDataId}

This resource shall support the resource URI variables defined in table 6.1.3.29.2-1.

Table 6.1.3.29.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| sharedDataId | SharedDataId | Contains the individual Shared Data Identifier. |

##### 6.1.3.29.3 Resource Standard Methods

6.1.3.29.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.29.3.1-1.

Table 6.1.3.29.3.1-1: URI query parameters supported by the GET method on this resource

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

This method shall support the request data structures specified in table 6.1.3.29.3.1-2 and the response data structures and response codes specified in table 6.1.3.29.3.1-3.

Table 6.1.3.29.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.29.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SharedData | M | 1 | 200 OK | Upon success, a response body containing the individual Shared Data shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

### 6.1.4 Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nudm\_SubscriberDataManagement Service.

### 6.1.5 Notifications

#### 6.1.5.1 General

This clause will specify the use of notifications and corresponding protocol details if required for the specific service. When notifications are supported by the API, it will include a reference to the general description of notifications support over the 5G SBIs specified in TS 29.500 / TS 29.501.

Table 6.1.5.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Resource URI | HTTP method or custom operation | Description  (service operation) |
| Data Change Notification | {callbackReference} | POST |  |

#### 6.1.5.2 Data Change Notification

The POST method shall be used for Data Change Notifications and the URI shall be as provided during the subscription procedure.

Resource URI: {callbackReference}

Support of URI query parameters is specified in table 6.1.5.2-1.

Table 6.1.5.2-1: URI query parameters supported by the POST method

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

Support of request data structures is specified in table 6.1.5.2-2 and of response data structures and response codes is specified in table 6.1.5.2-3.

Table 6.1.5.2-2: Data structures supported by the POST Request Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| ModificationNotification | M | 1 |  |

Table 6.1.5.2-3: Data structures supported by the POST Response Body

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing a different URI. The URI shall be an alternative URI of the resource located on an alternative service instance within the same NF or NF (service) set.  If an SCP redirects the message to another SCP then the location header field shall contain the same URI or a different URI pointing to the endpoint of the NF service consumer to which the notification should be sent. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing a different URI. The URI shall be an alternative URI of the resource located on an alternative service instance within the same NF or NF (service) set.  If an SCP redirects the message to another SCP then the location header field shall contain the same URI or a different URI pointing to the endpoint of the NF service consumer to which the notification should be sent. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND  See table 6.1.7.3-1 for the description of this error. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.1.5.2-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the Callback URI of the target NF Service Consumer (e.g. AMF) to which the request is redirected |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.5.2-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the Callback URI of the target NF Service Consumer (e.g. AMF) to which the request is redirected |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

### 6.1.6 Data Model

#### 6.1.6.1 General

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

Table 6.1.6.1-1 specifies the data types defined for the Nudm\_SDM service API.

Table 6.1.6.1-1: Nudm\_SDM specific Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| Nssai | 6.1.6.2.2 | Network Slice Selection Assistance Information |
| SdmSubscription | 6.1.6.2.3 | A subscription to notifications |
| AccessAndMobilitySubscriptionData | 6.1.6.2.4 | Access and Mobility Subscription Data |
| SmfSelectionSubscriptionData | 6.1.6.2.5 | SMF Selection Subscription Data |
| DnnInfo | 6.1.6.2.6 | Data Network Name and associated information (LBO roaming allowed flag) |
| SnssaiInfo | 6.1.6.2.7 | S-NSSAI and associated information (DNN Info) |
| SessionManagementSubscriptionData | 6.1.6.2.8 | User subscribed session management data |
| DnnConfiguration | 6.1.6.2.9 | User subscribed data network configuration |
| PduSessionTypes | 6.1.6.2.11 | Default/allowed session types for a data network |
| SscModes | 6.1.6.2.12 | Default/allowed SSC modes for a data network |
| SmsSubscriptionData | 6.1.6.2.13 |  |
| SmsManagementSubscriptionData | 6.1.6.2.14 | SMS Management Subscription Data |
| SubscriptionDataSets | 6.1.6.2.15 |  |
| UeContextInSmfData | 6.1.6.2.16 | UE Context In SMF Data |
| PduSession | 6.1.6.2.17 |  |
| IdTranslationResult | 6.1.6.2.18 | SUPI that corresponds to a given GPSI |
| ModificationNotification | 6.1.6.2.21 |  |
| IpAddress | 6.1.6.2.22 | IP address (IPv4, or IPv6, or IPv6 prefix) |
| UeContextInSmsfData | 6.1.6.2.23 |  |
| SmsfInfo | 6.1.6.2.24 |  |
| AcknowledgeInfo | 6.1.6.2.25 |  |
| SorInfo | 6.1.6.2.26 | Steering Of Roaming Information |
| SharedData | 6.1.6.2.27 | Subscription Data shared by multiple UEs |
| PgwInfo | 6.1.6.2.28 | Information about the DNNs/APNs and PGW-C+SMF FQDNs used in interworking with EPS |
| TraceDataResponse | 6.1.6.2.29 | Contains Trace Data or a shared data Id identifying shared Trace Data |
| SteeringContainer | 6.1.6.2.30 |  |
| SdmSubsModification | 6.1.6.2.31 | Modification instruction for a subscription to notifications |
| EmergencyInfo | 6.1.6.2.32 | Information about emergency session |
| UpuInfo | 6.1.6.2.33 | UE Parameters Update Information |
| GroupIdentifiers | 6.1.6.2.34 |  |
| NiddInformation | 6.1.6.2.35 | Non-IP Data Delivery information |
| CagData | 6.1.6.2.36 |  |
| CagInfo | 6.1.6.2.37 |  |
| DataSetName | 6.1.6.3.3 |  |
| PduSessionContinuityInd | 6.1.6.3.7 |  |
| AdditionalSnssaiData | 6.1.6.2.38 | Additional information specific to a slice |
| VnGroupData | 6.1.6.2.39 |  |
| AppDescriptor | 6.1.6.2.40 |  |
| AppPortId | 6.1.6.2.41 | Application Port Id |
| LcsPrivacyData | 6.1.6.2.42 |  |
| Lpi | 6.1.6.2.43 |  |
| UnrelatedClass | 6.1.6.2.44 |  |
| PlmnOperatorClass | 6.1.6.2.45 |  |
| ValidTimePeriod | 6.1.6.2.46 |  |
| LcsMoData | 6.1.6.2.47 |  |
| EcRestrictionDataWb | 6.1.6.2.48 | Enhance Coverage Restriction Data |
| ExpectedUeBehaviourData | 6.1.6.2.49 | Expected UE Behaviour Data |
| SuggestedPacketNumDl | 6.1.6.2.52 | Suggested Number of Downlink Packets |
| FrameRouteInfo | 6.1.6.2.54 | Frame Route Information |
| SorUpdateInfo | 6.1.6.2.55 |  |
| EnhancedCoverageRestrictionData | 6.1.6.2.56 | Enhanced Coverage Restriction Data |
| EdrxParameters | 6.1.6.2.57 | eDRX Parameters |
| PtwParameters | 6.1.6.2.58 | Paging Time Window Parameters |
| OperationMode | 6.1.6.3.12 | Operation Mode |
| SorUpdateIndicator | 6.1.6.3.13 | SoR Update Indicator |
| ExternalUnrelatedClass | 6.1.6.2.62 |  |
| AfExternal | 6.1.6.2.63 |  |
| LcsClientExternal | 6.1.6.2.64 |  |
| LcsClientGroupExternal | 6.1.6.2.65 |  |
| ServiceTypeUnrelatedClass | 6.1.6.2.66 |  |
| UeId | 6.1.6.2.67 |  |
| DefaultUnrelatedClass | 6.1.6.2.68 |  |
| UeContextInAmfData | 6.1.6.2.70 |  |
| V2xSubscriptionData | 6.1.6.2.71 | V2X Subscription Data |
| LcsBroadcastAssistanceTypesData | 6.1.6.2.72 | LCS Broadcast Assistance Data Types |
| DatasetNames | 6.1.6.2.73 | Data Set Names |
| DefaultDnnIndicator | 6.1.6.3.2 |  |
| LboRoamingAllowed | 6.1.6.3.2 |  |
| UeUsageType | 6.1.6.3.2 |  |
| MpsPriorityIndicator | 6.1.6.3.2 |  |
| McsPriorityIndicator | 6.1.6.3.2 |  |
| 3GppChargingCharacteristics | 6.1.6.3.2 | 3GPP Charging Characteristics |
| MicoAllowed | 6.1.6.3.2 |  |
| SmsSubscribed | 6.1.6.3.2 |  |
| SharedDataId | 6.1.6.3.2 |  |
| IwkEpsInd | 6.1.6.3.2 | Interworking with EPS Indication |
| SecuredPacket | 6.1.6.3.2 |  |
| UpuRegInd | 6.1.6.3.2 |  |
| ExtGroupId | 6.1.6.3.2 |  |
| NbIoTUePriority | 6.1.6.3.2 |  |
| CodeWord | 6.1.6.3.2 |  |
| AfId | 6.1.6.3.2 |  |
| LcsClientId | 6.1.6.3.2 |  |
| DataSetName | 6.1.6.3.3 |  |
| PduSessionContinuityInd | 6.1.6.3.7 |  |
| LocationPrivacyInd | 6.1.6.3.8 |  |
| PrivacyCheckRelatedAction | 6.1.6.3.9 |  |
| LcsClientClass | 6.1.6.3.10 |  |
| LcsMoServiceClass | 6.1.6.3.11 |  |
| OperationMode | 6.1.6.3.12 |  |
| SorUpdateIndicator | 6.1.6.3.13 |  |
| CodeWordInd | 6.1.6.3.14 |  |
| MdtUserConsent | 6.1.6.3.15 | MDT User Consent |

Table 6.1.6.1-2 specifies data types re-used by the Nudm\_SDM service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudm\_SDM service API.

Table 6.1.6.1-2: Nudm\_SDM re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| Dnn | 3GPP TS 29.571 [7] | Data Network Name with Network Identifier only; this type is used as key in a map of:  - DnnConfigurations; see clause 6.1.6.2.8;  - EpsIwkPgws; see clause 6.2.6.2.2;  - ExpectedUeBehaviourData; see clause 6.1.6.2.8; |
| DurationSec | 3GPP TS 29.571 [7] | Time value in seconds |
| ProblemDetails | 3GPP TS 29.571 [7] | Common data type used in response bodies |
| Snssai | 3GPP TS 29.571 [7] | Single NSSAI |
| Uri | 3GPP TS 29.571 [7] | Uniform Resource Identifier |
| Gpsi | 3GPP TS 29.571 [7] | Generic Public Subscription Identifier |
| RatType | 3GPP TS 29.571 [7] | Radio Access Technology Type |
| Area | 3GPP TS 29.571 [7] |  |
| ServiceAreaRestriction | 3GPP TS 29.571 [7] |  |
| CoreNetworkType | 3GPP TS 29.571 [7] |  |
| SupportedFeatures | 3GPP TS 29.571 [7] | see 3GPP TS 29.500 [4] clause 6.6 |
| PlmnId | 3GPP TS 29.571 [7] | PLMN Identity |
| PduSessionType | 3GPP TS 29.571 [7] |  |
| SubscribedDefaultQos | 3GPP TS 29.571 [7] | Subscribed Default QoS |
| Ambr | 3GPP TS 29.571 [7] |  |
| PduSessionId | 3GPP TS 29.571 [7] | PduSessionId is used as key in a map of PduSessions; see clause 6.1.6.2.16. |
| NfInstanceId | 3GPP TS 29.571 [7] |  |
| Supi | 3GPP TS 29.571 [7] |  |
| RfspIndex | 3GPP TS 29.571 [7] |  |
| SscMode | 3GPP TS 29.571 [7] |  |
| Ipv4Addr | 3GPP TS 29.571 [7] |  |
| Ipv6Addr | 3GPP TS 29.571 [7] |  |
| Ipv6Prefix | 3GPP TS 29.571 [7] |  |
| SorMac | 3GPP TS 29.509 [24] |  |
| SteeringInfo | 3GPP TS 29.509 [24] |  |
| AckInd | 3GPP TS 29.509 [24] |  |
| CounterSor | 3GPP TS 29.509 [24] |  |
| UpuMac | 3GPP TS 29.509 [24] |  |
| UpuData | 3GPP TS 29.509 [24] |  |
| UpuAckInd | 3GPP TS 29.509 [24] |  |
| CounterUpu | 3GPP TS 29.509 [24] |  |
| TraceData | 3GPP TS 29.571 [7] | Trace control and configuration parameters |
| NotifyItem | 3GPP TS 29.571 [7] |  |
| UpSecurity | 3GPP TS 29.571 [7] |  |
| ServiceName | 3GPP TS 29.510 [19] |  |
| OdbPacketServices | 3GPP TS 29.571 [7] |  |
| GroupId | 3GPP TS 29.571 [7] | This type is also used as key of a map in attributes:  - vnGroupInfo and sharedVnGroupDataIds; see clause 6.1.6.2.4, 6.1.6.2.8, 6.1.6.2.27; |
| DateTime | 3GPP TS 29.571 [7] |  |
| CagId | 3GPP TS 29.571 [7] |  |
| StnSr | 3GPP TS 29.571 [7] | Session Transfer Number for SRVCC |
| CMsisdn | 3GPP TS 29.571 [7] | Correlation MSISDN |
| OsId | 3GPP TS 29.519 [33] |  |
| Uint16 | 3GPP TS 29.571 [7] |  |
| RgWirelineCharacteristics | 3GPP TS 29.571 [7] |  |
| GeographicArea | 3GPP TS 29.572 [34] |  |
| LcsServiceType | 3GPP TS 29.572 [34] |  |
| ScheduledCommunicationTime | 3GPP TS 29.571 [7] | Scheduled Communication Time |
| LocationArea | 6.5.6.2.10 |  |
| StationaryIndication | 3GPP TS 29.571 [7] | Stationary Indication |
| TrafficProfile | 3GPP TS 29.571 [7] | Traffic Profile |
| ScheduledCommunicationType | 3GPP TS 29.571 [7] | Scheduled Communication Type |
| BatteryIndication | 3GPP TS 29.571 [7] | Battery Indication |
| AcsInfo | 3GPP TS 29.571 [7] | ACS Information |
| IPv4AddrMask | 3GPP TS 29.571 [7] |  |
| NefId | 3GPP TS 29.510 [19] |  |
| PatchResult | 3GPP TS 29.571 [7] |  |
| NrV2xAuth | 3GPP TS 29.571 [7] |  |
| LteV2xAuth | 3GPP TS 29.571 [7] |  |
| BitRate | 3GPP TS 29.571 [7] |  |
| MdtConfiguration | 3GPP TS 29.571 [7] |  |
| Uint64 | 3GPP TS 29.571 [7] |  |
| WirelineArea | 3GPP TS 29.571 [7] |  |
| WirelineServiceAreaRestriction | 3GPP TS 29.571 [7] |  |
| RedirectResponse | 3GPP TS 29.571 [7] | Response body of the redirect response message |
| Bytes | 3GPP TS 29.571 [7] | Binary data encoded as a base64 character string |

#### 6.1.6.2 Structured data types

##### 6.1.6.2.1 Introduction

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

##### 6.1.6.2.2 Type: Nssai

Table 6.1.6.2.2-1: Definition of type Nssai

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.1.8 |  |
| defaultSingleNssais | array(Snssai) | M | 1..N | A list of Single Nssais used as default. (NOTE) |  |
| singleNssais | array(Snssai) | O | 1..N | List of non default Single Nssais. (NOTE) |  |
| provisioningTime | DateTime | C | 0..1 | This attribute shall be present if the Nssai is sent to the AMF while reception has not yet been acknowledged from the UE; otherwise shall be absent. This attribute serves as Network Slicing Subscription Change Indication. |  |
| additionalSnssaiData | map(AdditionalSnssaiData) | O | 1..N | A map (list of key-value pairs where singleNssai converted to string serves as key) of additional information related to this single Nssai. | Nssaa |
| NOTE: If the NF consumer does not support Nssaa optional feature, the UDM shall not include S-NSSAI(s) subject to Network Slice-Specific Authentication and Authorization in Get response messages, immediate reports within Subscribe response messages, or data change notifications where the data change is limited to S-NSSAI(s) subject to Network Slice-Specific Authentication and Authorization. | | | | | |

##### 6.1.6.2.3 Type: SdmSubscription

Table 6.1.6.2.3-1: Definition of type SdmSubscription

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | | Applicability | |
| nfInstanceId | | NfInstanceId | | M | | 1 | | Identity of the NF Instance creating the subscription. | |  | |
| implicitUnsubscribe | | boolean | | O | | 0..1 | | If present with value true indicates that the subscription expires when the subscribing NF (AMF, SMF, SMSF) identified by the nfInstanceId ceases to be registered at the UDM.  When the subscribing NF is an SMF, this means that the subscription is terminated by UDM when the last PDU session of such SMF is deregistered for a given SUPI.  If the subscribing NF (AMF. SMF, SMSF) is not registered when the SDM subscription with implicitUnsubscribe indicator set to true is received by the UDM, the UDM should return a confirmed expiry time in the expires attribute to the subscribing NF even when the expires attribute is absent from the request.  See NOTE 1. | |  | |
| expires | | DateTime | | C | | 0..1 | | If present, indicates the point in time at which the subscription expires. Shall be present if implicitUnsubscribe is absent or false. Within a POST request the proposed expiry time is conveyed whereas in a POST response or PATCH response the confirmed expiry time is returned. | |  | |
| callbackReference | | Uri | | M | | 1 | | URI provided by the NF service consumer to receive notifications | |  | |
| amfServiceName | | ServiceName | | O | | 0..1 | | When present, this IE shall contain the name of the AMF service to which Data Change Notifications are to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]). This IE may be included if the NF service consumer is an AMF. | |  | |
| monitoredResourceUris | | array(Uri) | | M | | 1..N | | A set of URIs that identify the resources for which a change triggers a notification.  The URI shall take the form of either an absolute URI or an absolute-path reference as defined in IETF RFC 3986 [31].  See NOTE 3. | |  | |
| singleNssai | | Snssai | | O | | 0..1 | | This IE may be present if the consumer is SMF.  This attribute shall be also used as filter for the Nudr notifications when sdmSubscription is included in subscriptionDataSubscription in Nudr POST operation.  See NOTE 2. | |  | |
| dnn | | Dnn | | O | | 0..1 | | This IE may be present if the consumer is SMF.  This attribute shall be also used as filter for the Nudr notifications when sdmSubscription is included in subscriptionDataSubscription in Nudr POST operation.  When present, this IE shall contain the Network Identifier only, or Wildcard DNN.  See NOTE 2. | |  | |
| subscriptionId | | string | | C | | 0..1 | | This attribute shall be present if the SdmSubscription is sent in a GET response message on Nudr. It identifies the individual sdmSubscription stored in the UDR and may be used by the UDM to delete an expired or implicitly unsubscribed sdmSubscription. | |  | |
| plmnId | | PlmnId | | C | | 0..1 | | If present, it indicates the PLMN of the NF Instance creating the subscription (i.e., the PLMN serving the UE).  It shall be present if the NF Instance is located in a different PLMN than the UDM.  If absent, the Home PLMN ID is used as default. | |  | |
| immediateReport | | boolean | | O | | 0..1 | | This IE indicates whether immediate report is needed or not.  When present, this IE shall be set as following:  - true: immediate report is required  - false (default) immediate report is not required | | ImmediateReport | |
| report | | SubscriptionDataSets | | C | | 0..1 | | This IE shall be present in Subscribe response, if the immediateReport attribute is set to "true" in Subscribe request.  When present, this IE shall contain the representation of subscription data sets that to be monitored, i.e. listed in monitoredResourceUris attribute. | | ImmediateReport | |
| supportedFeatures | | SupportedFeatures | | O | | 0..1 | | See clause 6.1.8 These are the features supported by the NF subscribing at the UDM. | |  | |
| contextInfo | | ContextInfo | | C | | 0..1 | | This IE if present may contain e.g. the headers received by the UDM along with the SdmSubscription.  Shall be absent on Nudm and may be present on Nudr. | |  | |
| uniqueSubscription | | boolean | | O | | 0..1 | | When present, this IE shall be set to indicate whether the subscription is a unique subscription, as specified in clause 5.2.2.3.2 and clause 5.2.2.3.3:  - true: the subscription is unique  - false: the subscription is not unique | | LimitedSubscriptions | |
| NOTE 1: The subscription expires if the last registration identified by the nfInstanceId for the UE is deregistered at the UDM, e.g. the UDM shall remove the SdmSubscription of the SMF, if the UE's last PDU session SMF registration of this SMF is deregistered.  NOTE 2: If "singleNssai" is not included, and "dnn" is not included, the UDM shall notify the data change of all DNN configurations and network slice(s).  If "singleNssai" is included, and "dnn" is not included, the UDM shall notify the data change of network slice identified by "singleNssai" and all DNN configurations for the requested network slice identified by "singleNssai".  If "singleNssai" is not included, and "dnn" is included, the UDM shall notify the data change of all network slices where such DNN is available and all DNN configurations identified by "dnn".  If "singleNssai" is included, and "dnn" is included, the UDM shall notify the data change of network slice identified by "singleNssai" where such DNN is available and the DNN configuration identified by "dnn", if such DNN is available in the network slice identified by "singleNssai".  NOTE 3: The UDM should handle only the relative-path part (apiSpecificResourceUriPart, see 3GPP TS 29.501 [5] clause 4.4.1) and ignore possible inconsistencies in the base URI part. | | | | | | | | | | | |

##### 6.1.6.2.4 Type: AccessAndMobilitySubscriptionData

Table 6.1.6.2.4-1: Definition of type AccessAndMobilitySubscriptionData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.1.8 |  |
| gpsis | array(Gpsi) | O | 0..N | List of Generic Public Subscription Identifier; see 3GPP TS 29.571 [7] |  |
| internalGroupIds | array(GroupId) | O | 1..N | List of internal group identifier; see 3GPP TS 23.501 [2] clause 5.9.7 |  |
| sharedVnGroupDataIds | map(SharedDataId) | O | 1..N | A map of identifiers of shared 5G VN group data (list of key-value pairs whereGroupId serves as key; see clause 6.1.6.1).  This attribute is only applicable to the Nudm interface and shall not be included over the Nudr interface. |  |
| subscribedUeAmbr | AmbrRm | O | 0..1 |  |  |
| nssai | Nssai | O | 0..1 | Network Slice Selection Assistance Information |  |
| ratRestrictions | array(RatType) | O | 0..N | List of RAT Types that are restricted in 5GC and EPC; see 3GPP TS 29.571 [7] (NOTE 2) |  |
| forbiddenAreas | array(Area) | O | 0..N | List of forbidden areas in 5GS |  |
| serviceAreaRestriction | ServiceAreaRestriction | O | 0..1 | Subscribed Service Area Restriction |  |
| coreNetworkTypeRestrictions | array(CoreNetworkType) | O | 0..N | List of Core Network Types that are restricted.  The use of the value "5GC" is deprecated on Nudm and shall be discarded by the receiving AMF. |  |
| rfspIndex | RfspIndexRm | O | 0..1 | Index to RAT/Frequency Selection Priority; |  |
| subsRegTimer | DurationSecRm | O | 0..1 | Subscribed periodic registration timer; (see clause 5.20 of 3GPP TS 23.501 [2], clause 4.15.3.2.3b and 4.15.6.3a of 3GPP TS 23.502 [3] and 3GPP TS 29.571 [7] |  |
| ueUsageType | UeUsageType | O | 0..1 |  |  |
| mpsPriority | MpsPriorityIndicator | O | 0..1 |  |  |
| mcsPriority | McsPriorityIndicator | O | 0..1 |  |  |
| activeTime | DurationSecRm | O | 0..1 | subscribed active time for PSM UEs (see clause 5.20 of 3GPP TS 23.501 [2] and clause 4.15.3.2.3b and 4.15.6.3a of 3GPP TS 23.502 [3]). |  |
| sorInfo | SorInfo | O | 0..1 | On Nudm, this IE shall be present if the UDM shall send the information for Steering of Roaming during registration or the subscription data update to the UE. The UDM may detect the need to send sorInfo by retrieving context information from the UDR.  (NOTE 4) |  |
| sorInfoExpectInd | Boolean | C | 0..1 | Contains the indication on whether or not the UE is expecting to receive SoR information at initial registration.  - When set to true; it indicates that the UE is expecting to receive SoR information at initial registration in a VPLMN, i.e. the UDM shall send SoR information to the AMF on Nudm even when nothing was received from UDR or SOR-AF. In case the UDM was not able to obtain SoR information, SoR information sent on Nudm shall contain the indication that "no change" is needed.  - When set to false: it indicates that the UE is not expecting to receive SoR information at initial registration, i.e. the UDM shall send SoR information to the AMF based on operator policy.  This attribute may be present on Nudr interface and shall be absent on UDM interface.  The UDM shall ignore this attribute if the UE is not roaming out of its HPLMN. |  |
| sorafRetrieval | boolean | C | 0..1 | Contains the indication on whether or not SoR information shall be retrieved from the SOR-AF.  - When set to true: it indicates that the UDM shall retrieve SoR information from the SOR-AF.  - When set to false or absent: it indicates that the retrieval of SorInfo from the SOR-AF is not required.  This attribute may be present on Nudr interface and shall be absent on Nudm interface.  The UDM shall ignore this attribute if it is received in Nudr but the UE is not roaming out of its HPLMN. |  |
| sorUpdateIndicatorList | array(SorUpdateIndicator) | C | 1..N | When present, it contains the list of SoR Update Indicators;  - It shall indicate that the AMF shall retrieve SoR information when the UE performs Registration with NAS Registration Type "Initial Registration" if the value "INITIAL\_REGISTRATION" is included;  - And/or it shall indicate that the AMF shall retrieve SoR information when the UE performs Registration with NAS Registration Type "Emergency Registration" if the value "EMERGENCY\_REGISTRATION" is included.  When absent on Nudm interface, it indicates that the AMF is not requested to retrieve SoR information when the UE performs Registration with either NAS Registration Type "Initial Registration" or NAS Registration Type "Emergency Registration".  The UDM shall ignore this attribute if the UE is not roaming out of its HPLMN. |  |
| upuInfo | UpuInfo | O | 0..1 | This IE shall be present if the UDM shall send the information for UE Parameters Update after the UE has been successfully authenticated and registered to the 5G system. |  |
| micoAllowed | MicoAllowed | O | 0..1 | Indicates whether the UE subscription allows MICO mode. |  |
| sharedAmDataIds | array(SharedDataId) | O | 0..N | Identifier of shared Access And Mobility Subscription data | SharedData |
| odbPacketServices | OdbPacketServices | O | 0..1 | Operator Determined Barring for Packet Oriented Services (NOTE 3). |  |
| subscribedDnnList | array(Dnn) | O | 0..N | List of the subscribed DNNs for the UE (including optionally the Wildcard DNN). Used to determine the list of LADN available to the UE as defined in clause 5.6.5 of TS 23.501 [2].  When present, this IE shall contain the Network Identifier only. |  |
| serviceGapTime | DurationSec | O | 0..1 | Used to set the Service Gap timer for Service Gap Control (see TS 23.501 [2] clause 5.26.16 and TS 23.502 [3] clause 4.2.2.2.2). |  |
| mdtUserConsent | MdtUserConsent | O | 0..1 | When present, this IE shall indicate whether the user has given his consent for MDT activation or not (see clause 4.9 of 3GPP TS 32.422 [48]).  When absent, "CONSENT\_NOT\_GIVEN" is the default value. |  |
| mdtConfiguration | MdtConfiguration | C | 0..1 | This IE shall be present if the MDT task is activated.  When present, this IE shall contain MDT configuration data for UE (see clause 4.1.2.17 of 3GPP TS 32.422 [48]). |  |
| traceData | TraceData | O | 0..1 | Trace requirements about the UE, only sent to AMF in the HPLMN or one of its equivalent PLMN(s) |  |
| cagData | CagData | O | 0..1 | Closed Access Group Data.  Shall be absent if both - no CAG is subscribed for the serving PLMN and - an acknowledgement from the UE is not pending. | CAGFeature |
| stnSr | StnSr | O | 0..1 | This IE shall be present if the UE is subscribed to 5G SRVCC.  When present, it indicates the STN-SR (Session Transfer Number for SRVCC) of the UE. |  |
| cMsisdn | CMsisdn | O | 0..1 | This IE shall be present if the UE is subscribed to 5G SRVCC.  When present, it indicates the C-MSISDN (Correlation MSISDN) of the UE. |  |
| nbIoTUePriority | NbIoTUePriority | O | 0..1 | Indicates NB IoT UE priority which is used by the NG-RAN to prioritise resource allocation between UEs accessing via NB-IoT(see clause 5.31.17 of 3GPP TS 23.501 [2]). |  |
| nssaiInclusionAllowed | boolean | O | 0..1 | Indicates that the UE is allowed to include NSSAI in the RRC connection establishment in clear text for 3GPP access, as specified in clause 5.15.9 of 3GPP TS 23.501 [2] and clause 4.2.2.2.2 of 3GPP TS 23.502 [3].  true: indicates that NSSAI can be included in RRC connection establishment by the UE.  false or absent: indicates that NSSAI cannot be included. |  |
| rgWirelineCharacteristics | RgWirelineCharacteristics | O | 0..1 | Indicates the RG Level Wireline Access Characteristics as specified in 3GPP TS 23.316 [37]. |  |
| ecRestrictionDataWb | EcRestrictionDataWb | O | 0..1 | Indicates Enhanced Coverage Restriction Data for WB-N1 mode.  If absent, indicates Enhanced Coverage is not restricted for WB-N1 mode. |  |
| ecRestrictionDataNb | boolean | O | 0..1 | If present, this IE shall indicate whether Enhanced Coverage for NB-N1 mode is restricted or not.  true: Enhanced Coverage for NB-N1 mode is restricted.  false or absent: Enhanced Coverage for NB-N1 mode is allowed. |  |
| expectedUeBehaviour | ExpectedUeBehaviourData | O | 0..1 | Indicates Expected UE Behaviour parameters associated with AMF(see clause 5.20 of 3GPP TS 23.501 [2] and clause  4.15.6.3 of 3GPP TS 23.502 [3]).  This attribute is only applicable to the Nudm interface and shall not be included over the Nudr interface. |  |
| primaryRatRestrictions | array(RatType) | O | 0..N | List of RAT Types that are restricted for use as primary RAT in 5GC and EPC; see 3GPP TS 29.571 [7] (NOTE 2) |  |
| secondaryRatRestrictions | array(RatType) | O | 0..N | List of RAT Types that are restricted for use as secondary RAT in 5GC and EPC; see 3GPP TS 29.571 [7] (NOTE 2) |  |
| edrxParametersList | array(EdrxParameters) | O | 1..N | List of subscribed the extended idle mode DRX parameters (see clause 5.31.7.2.1 of 3GPP TS 23.501 [2]). |  |
| ptwParametersList | array(PtwParameters) | O | 1..N | List of subscribed the Paging Time Window parameters (see clause 5.31.7.2.1 of 3GPP TS 23.501 [2]). |  |
| iabOperationAllowed | boolean | O | 0..1 | Indicates that the UE is allowed for IAB operation as specified in 3GPP TS 23.501 [2].  true: indicates that the UE is allowed for IAB operation.  false or absent: indicates that the UE is not allowed for IAB operation. |  |
| wirelineForbiddenAreas | array(WirelineArea) | O | 0..N | List of forbidden areas for 5G-BRG/5G-CRG/FN-CRG |  |
| wirelineServiceAreaRestriction | WirelineServiceAreaRestriction | O | 0..1 | Subscribed Service Area Restriction for 5G-BRG/5G-CRG/FN-CRG |  |
| NOTE 1: AccessAndMobilitySubscriptionData can be UE-individual data or shared data. UE-individual data take precedence over shared data. E.g.: When an attribute of type array is present but empty within UE-Individual data and present (with any cardinality) in shared data, the empty array takes precedence. Similarly, when a nullable attribute is present with value null within the individual data and present (with any value) in shared data, the null value takes precedence (i.e. for the concerned UE the attribute is considered absent).  NOTE 2: If the primaryRatRestrictions and secondaryRatRestrictions attributes are supported by the sender, the sender shall include the list of RAT Types that are restricted, if any, in the ratRestrictions attribute, shall include the list of RAT Types that are restricted for use as primary RAT, if any, in the primaryRatRestrictions attribute and shall include the list of RAT Types that are restricted for use as secondary RAT, if any, in the secondaryRatRestrictions attribute. If the primaryRatRestrictions and secondaryRatRestrictions attributes are supported by the receiver, the receiver shall use the data in the primaryRatRestrictions attribute, if received, as the list of RAT Types that are restricted for use as primary RAT, and shall use the data in the secondaryRatRestrictions attribute, if received, as the list of RAT Types that are restricted for use as secondary RAT, otherwise the receiver shall use the data in the ratRestrictions attribute, if received, as the list of RAT Types that are restricted. If the secondaryRatRestictions attribute is included in the subscription profile, the content may be sent to MME during inter RAT handover from NR SA to EN-DC, for the purpose of adequate SGW selection at MME based on subscription profile, and to avoid allocating unnecessary resources for secondary RAT at EPC if it is restricted.  NOTE 3: The AMF shall take responsibility to perform PDU session related actions subject to change of OdbPacketService, e.g. release existing PDU session.  NOTE 4: The UDM shall ignore the content of sorInfo received on Nudr if "sorafRetrieval" is set to true. | | | | |  |

##### 6.1.6.2.5 Type: SmfSelectionSubscriptionData

Table 6.1.6.2.5-1: Definition of type SmfSelectionSubscriptionData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.1.8 |  |
| subscribedSnssaiInfos | map(SnssaiInfo) | O | 0..N | List of S-NSSAIs and associated information (DNN Info); see 3GPP TS 23.501 [2] clause 6.3.2. A map (list of key-value pairs where singleNssai converted to string serves as key; see 3GPP TS 29.571 [7]) of arrays of DnnInfo |  |
| sharedSnssaiInfosId | SharedDataId | O | 0..1 | Identifier of shared SnssaiInfos. | SharedData |
| NOTE: A single UE-individual subscribedSnssaiInfo (within subscribedSnssaiInfos) may clash with a sharedSnssaiInfo (i.e. both have the same singleNssai value as key). In this case the UE-individual subscribedSnssaiInfo takes precedence. | | | | |  |

##### 6.1.6.2.6 Type: DnnInfo

Table 6.1.6.2.6-1: Definition of type DnnInfo

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| dnn | | Dnn | | M | | 1 | | Data Network Name with Network Identifier only., or Wildcard DNN (NOTE) | |
| defaultDnnIndicator | | DefaultDnnIndicator | | O | | 0..1 | | Indicates whether this DNN is the default DNN: true: The DNN is the default DNN (NOTE); false: The DNN is not the default DNN; If this attribute is absent it means the DNN is not the default DNN. | |
| lboRoamingAllowed | | LboRoamingAllowed | | O | | 0..1 | | Indicates whether local breakout for the DNN is allowed when roaming: true: Allowed; false: Not allowed; If this attribute is absent it means not allowed. | |
| iwkEpsInd | | IwkEpsInd | | O | | 0..1 | | Indicates whether interworking with EPS is subscribed:  true: Subscribed; false: Not subscribed; If this attribute is absent it means not subscribed. | |
| dnnBarred | | boolean | | C | | 0..1 | | Indicates whether the DNN is barred. Absence and false indicates "not barred". This attribute is only used on the Nudr interface. The UDM shall handle barred DNNs received from the UDR as not subscribed. | |
| invokeNefInd | | boolean | | O | | 0..1 | | Indicates whether the NEF based infrequent small data transfer shall be used for the PDU Session associated with the S-NSSAI and DNN.  true: Used; false: Not used; If this attribute is absent it means not used. | |
| smfList | | array(NfInstanceId) | | O | | 1..N | | Indicate the associated SMF(s) if the static IP address/prefix is used. | |
| sameSmfInd | | boolean | | O | | 0..1 | | Indicates whether the same SMF for multiple PDU sessions to the same DNN and S-NSSAI is required.  true: Required; false: Not required; If this attribute is absent it means not required. | |
| NOTE: If the dnn attribute contains the value of the Wildcard DNN ("\*"), the defaultDnnIndicator shall not be set to true. | | | | | | | | | |

##### 6.1.6.2.7 Type: SnssaiInfo

Table 6.1.6.2.7-1: Definition of type SnssaiInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| dnnInfos | array(DnnInfo) | M | 1..N | list of Data Network Names for an S-NSSAI and associated information |

##### 6.1.6.2.8 Type: SessionManagementSubscriptionData

Table 6.1.6.2.8-1: Definition of type SessionManagementSubscriptionData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| singleNssai | Snssai | M | 1 | A single Network Slice Selection Assistance Information |  |
| dnnConfigurations | map(DnnConfiguration) | O | 0..N | Additional DNN configurations for the network slice; A map (list of key-value pairs where DNN, or optionally the Wildcard DNN, serves as key; see clause 6.1.6.1) of DnnConfigurations.  (NOTE 1) |  |
| internalGroupIds | array(GroupId) | O | 1..N | List of internal group identifier; see 3GPP TS 23.501 [2] clause 5.9.7 |  |
| sharedVnGroupDataIds | map(SharedDataId) | O | 1..N | A map of identifiers of shared 5G VN group data (list of key-value pairs where GroupId serves as key; see clause 6.1.6.1).  This attribute is only applicable to the Nudm interface and shall not be included over the Nudr interface. |  |
| traceData | TraceData | O | 0..1 | Trace requirements about the UE, only sent to SMF in the HPLMN or one of its equivalent PLMN(s) |  |
| sharedDnnConfigurationsId | SharedDataId | O | 0..1 | Identifier of shared data for DNN configuration. | SharedData |
| sharedTraceDataId | SharedDataId | O | 0..1 | Identifier of shared data for trace requirements |  |
| odbPacketServices | OdbPacketServices | O | 0..1 | Operator Determined Barring for Packet Oriented Services (NOTE 2). |  |
| expectedUeBehaviourList | map(ExpectedUeBehaviourData) | O | 1..N | A map of ExpectedUeBehaviourDatas associated with SMF (DNN serves as key; see clause 6.1.6.1), see clause 5.20 of 3GPP TS 23.501 [2] and clause  4.15.6.3 of 3GPP TS 23.502 [3].  This attribute is only applicable to the Nudm interface and shall not be included over the Nudr interface. |  |
| suggestedPacketNumDlList | map(SuggestedPacketNumDl) | O | 1..N | A map (list of key-value pairs where dnn serves as key; see clause 6.1.6.1) of SuggestedPacketNumDls which are associated with SMF (see clause 5.20 of 3GPP TS 23.501 [2] and clause  4.15.6.3 of 3GPP TS 23.502 [3]).  This attribute is only applicable to the Nudm interface and shall not be included over the Nudr interface. |  |
| 3gppChargingCharacteristics | 3GppChargingCharacteristics | O | 0..1 | Subscribed charging characteristics data associated to the subscription. |  |
| NOTE 1: A given UE-individual dnnConfiguration (within dnnConfigurations) may clash with a shared dnnConfiguration (i.e. both have the same dnn value as key). In this case the clashing attributes of the UE-individual dnnConfiguration take precedence.  NOTE 2: The SMF shall not trigger PDU session release when receiving change of OdbPacketService. Only the AMF take responsibility to perform PDU session related actions subject to change of ODB setting, e.g. release existing PDU session. | | | | |  |

##### 6.1.6.2.9 Type: DnnConfiguration

Table 6.1.6.2.9-1: Definition of type DnnConfiguration

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| pduSessionTypes | | PduSessionTypes | | M | | 1 | | Default/Allowed session types | |
| sscModes | | SscModes | | M | | 1 | | Default/Allowed SSC modes | |
| iwkEpsInd | | IwkEpsInd | | O | | 0..1 | | Indicates whether interworking with EPS is subscribed:  true: Subscribed; false: Not subscribed; If this attribute is absent it means not subscribed. | |
| 5gQosProfile | | SubscribedDefaultQos | | O | | 0..1 | | 5G QoS parameters associated to the session for a data network | |
| sessionAmbr | | Ambr | | O | | 0..1 | | The maximum aggregated uplink and downlink bit rates to be shared across all Non-GBR QoS Flows in each PDU Session | |
| 3gppChargingCharacteristics | | 3GppChargingCharacteristics | | O | | 0..1 | | Subscribed charging characteristics data associated to the session for a data network. (NOTE 1) | |
| staticIpAddress | | array(IpAddress) | | O | | 1..2 | | Subscribed static IP address(es) of the IPv4 and/or IPv6 type | |
| upSecurity | | UpSecurity | | O | | 0..1 | | When present, this IE shall indicate the security policy for integrity protection and encryption for the user plane. | |
| pduSessionContinuityInd | | PduSessionContinuityInd | | O | | 0..1 | | When present, this IE shall indicate how to handle a PDU Session when UE the moves to or from NB-IoT.  If this attribute is absent it means that Local policy shall be used. | |
| niddNefId | | NefId | | O | | 0..1 | | Indicates the identity of the NEF to be selected for NIDD service for this DNN. | |
| niddInfo | | NiddInformation | | O | | 0..1 | | When present, this IE shall indicate information used for SMF-NEF Connection. | |
| redundantSessionAllowed | | boolean | | O | | 0..1 | | Indicates whether redundant PDU Sessions are allowed:  true: Allowed; false: Not allowed; If this attribute is absent it means not allowed. | |
| acsInfo | | AcsInfo | | O | | 0..1 | | When present, this IE shall include the ACS information for the 5G-RG as defined in BBF TR-069 [42] or in BBF TR-369 [43]. | |
| ipv4FrameRouteList | | array(FrameRouteInfo) | | O | | 1..N | | List of Frame Route information of IPv4, see clause 5.6.14 of 3GPP TS 23.501 [2]. | |
| ipv6FrameRouteList | | array(FrameRouteInfo) | | O | | 1..N | | List of Frame Route information of IPv6, see clause 5.6.14 of 3GPP TS 23.501 [2]. | |
| atsssAllowed | | boolean | | O | | 0..1 | | Indicates whether this DNN supports ATSSS, i.e. whether Multi-Access PDU session is allowed to this DNN.  true: Allowed; false (default): Not allowed; If this attribute is absent it means this DNN does not allow ATSSS. | |
| secondaryAuth | | boolean | | O | | 0..1 | | Indicates whether secondary authentication and authorization is needed.  true: required.  false: not required.  If absent, it indicates that secondary authentication is not required by subscription data, but it still may be required by local policies at the SMF.  (NOTE 2) | |
| dnAaaIpAddressAllocation | | boolean | | O | | 0..1 | | Indicates whether the SMF is required to request the UE IP address from the DN-AAA server for PDU Session Establishment.  true: required  false: not required  If absent, it indicates that the request by SMF of the UE IP address from the DN-AAA server is not required by subscription data, but it still may be required by local policies at the SMF. | |
| dnAaaAddress | | IpAddress | | O | | 0..1 | | The address information of DN-AAA server, used for secondary authentication and authorization.  (NOTE 2) | |
| iptvAccCtrlInfo | | string | | O | | 0..1 | | The IPTV access control information used in IPTV access procedure, see clause 7.7.1.1.2 of 3GPP TS 23.316 [37]. | |
| NOTE 1: When present, this attribute shall take precedence over the "3gppChargingCharacteristics" attribute in the SessionManagementSubscriptionData level.  NOTE 2: These attributes shall be consistent with the information received on the 5GVnGroupData (see clause 6.5.6.2.7), in the Nudm\_PP API. | | | | | | | | | |

##### 6.1.6.2.10 Void

##### 6.1.6.2.11 Type: PduSessionTypes

Table 6.1.6.2.11-1: Definition of type PduSessionTypes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| defaultSessionType | PduSessionType | M | 1 | Default session type |
| allowedSessionTypes | array(PduSessionType) | O | 1..N | Additional session types allowed for the data network |

##### 6.1.6.2.12 Type: SscModes

Table 6.1.6.2.12-1: Definition of type SscModes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| defaultSscMode | SscMode | M | 1 | Default SSC mode |
| allowedSscModes | array(SscMode) | O | 1..2 | Additional SSC modes allowed for the data network |

##### 6.1.6.2.13 Type: SmsSubscriptionData

Table 6.1.6.2.13-1: Definition of type SmsSubscriptionData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| smsSubscribed | SmsSubscribed | C | 0..1 | Indicates whether the UE subscription allows SMS delivery over NAS. Shall not be absent unless the feature SharedData is supported and smsSubscribed is present within shared data. |
| sharedSmsSubsDataId | SharedDataId | C | 0..1 | Identifier of shared data. Shall be present if smsSubscribed is absent. |

##### 6.1.6.2.14 Type: SmsManagementSubscriptionData

Table 6.1.6.2.14-1: Definition of type SmsManagementSubscriptionData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.1.8 |  |
| mtSmsSubscribed | boolean | C | 0..1 | Indicates the SMS teleservice subscription for MT-SMS. Shall not be absent unless the feature SharedData is supported and mtSmsSubscribed is present within shared data. |  |
| mtSmsBarringAll | boolean | C | 0..1 | Barring of all MT-SMS |  |
| mtSmsBarringRoaming | boolean | C | 0..1 | Barring of MT-SMS when roaming outside the Home Public Land Mobile Network (PLMN) country |  |
| moSmsSubscribed | boolean | C | 0..1 | Indicates the SMS teleservice subscription for MO-SMS. Shall not be absent unless the feature SharedData is supported and mtSmsSubscribed is present within shared data. |  |
| moSmsBarringAll | boolean | C | 0..1 | Barring of all MO-SMS |  |
| moSmsBarringRoaming | boolean | C | 0..1 | Barring of MO-SMS when roaming outside the Home Public Land Mobile Network (PLMN) country |  |
| traceData | TraceData | O | 0..1 | Trace requirements about the UE, only sent to SMSF in HPLMN |  |
| sharedSmsMngDataIds | array(SharedDataId) | C | 1..N | Identifier of shared data. Shall be present if mtSmsSubscribed and/or moSmsSubscribed and/or traceData are absent. | SharedData |

##### 6.1.6.2.15 Type: SubscriptionDataSets

Table 6.1.6.2.15-1: Definition of type SusbcriptionDataSets

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| amData | | AccessAndMobilitySubscriptionData | | O | | 0..1 | | Access and Mobility Subscription Data | |
| smfSelData | | SmfSelectionSubscriptionData | | O | | 0..1 | | SMF Selection Subscription Data | |
| uecAmfData | | UeContextInAmfData | | O | | 0..1 | | UE Context In AMF Data | |
| uecSmfData | | UeContextInSmfData | | O | | 0..1 | | UE Context In SMF Data | |
| uecSmsfData | | UeContextInSmsfData | | O | | 0..1 | | UE Context In SMSF Data | |
| smsSubsData | | SmsSubscriptionData | | O | | 0..1 | | SMS Subscription Data | |
| smData | | array(SessionManagementSubscriptionData) | | O | | 1..N | | Session Management Subscription Data | |
| traceData | | TraceData | | O | | 0..1 | | Trace Data. The Null value indicates that trace is not active. | |
| smsMngData | | SmsManagementSubscriptionData | | O | | 0..1 | | SMS Management Subscription Data | |
| lcsPrivacyData | | LcsPrivacyData | | O | | 0..1 | | LCS Privacy Subscription Data | |
| lcsMoData | | LcsMoData | | O | | 0..1 | | LCS Mobile Originated Subscription Data | |
| v2xData | | V2xSubscriptionData | | O | | 0..1 | | V2x Subscription Data | |
| lcsBroadcastAssistanceTypesData | | LcsBroadcastAssistanceTypesData | | O | | 0..1 | | LCS List of Broadcast Assistance Data Types Subscription Data | |

##### 6.1.6.2.16 Type: UeContextInSmfData

Table 6.1.6.2.16-1: Definition of type UeContextInSmfData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| pduSessions | map(PduSession) | O | 0..N | A map (list of key-value pairs where pduSessionId converted from integer to string serves as key; see clause 6.1.6.1) of PduSessions. |
| pgwInfo | array(PgwInfo) | O | 1..N | Information about the DNNs/APNs and PGW-C+SMF FQDNs used in interworking with EPS |
| emergencyInfo | EmergencyInfo | O | 0..1 | Information about emergency session |

##### 6.1.6.2.17 Type: PduSession

Table 6.1.6.2.17-1: Definition of type PduSession

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| dnn | Dnn | M | 1 | Data Network Name with Network Identifier only. |
| smfInstanceId | NfInstanceId | M | 1 | NF Instance Id of the SMF |
| plmnId | PlmnId | M | 1 | PLMN Id of the SMF |
| singleNssai | Snssai | O | 0..1 | A single Network Slice Selection Assistance Information.  (NOTE) |
| NOTE: For supporting selection of the same SMF if a UE requests multiple PDU sessions associated with the same DNN and same S-NSSAI, the S-NSSAI associated to the PDU session is required to be included. | | | | |

##### 6.1.6.2.18 Type: IdTranslationResult

Table 6.1.6.2.18-1: Definition of type IdTranslationResult

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.1.8 |
| supi | Supi | M | 1 | SUPI |
| gpsi | Gpsi | C | 0..1 | If ueId is a SUPI in Resource URI variables, this shall be present and indicates an MSISDN or external identifier. |

##### 6.1.6.2.19 Void

##### 6.1.6.2.20 Void

##### 6.1.6.2.21 Type: ModificationNotification

Table 6.1.6.2.21-1: Definition of type ModificationNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| notifyItems | array(NotifyItem) | M | 1..N |  |

##### 6.1.6.2.22 Type: IpAddress

Table 6.1.6.2.22-1: Definition of type IpAddress

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| ipv4Addr | Ipv4Addr | C | 0..1 |  |
| ipv6Addr | Ipv6Addr | C | 0..1 |  |
| ipv6Prefix | Ipv6Prefix | C | 0..1 |  |
| NOTE: Either ipv4Addr, or ipv6Addr, or ipv6Prefix shall be present. | | | | |

##### 6.1.6.2.23 Type: UeContextInSmsfData

Table 6.1.6.2.23-1: Definition of type UeContextInSmsfData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| smsfInfo3GppAccess | SmsfInfo | O | 0..1 | SMSF Info for 3GPP Access |
| smsfInfoNon3GppAccess | SmsfInfo | O | 0..1 | SMSF Info for Non 3GPP Access |

##### 6.1.6.2.24 Type: SmsfInfo

Table 6.1.6.2.24-1: Definition of type SmsfInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| smsfInstanceId | NfInstanceId | M | 1 | NF Instance Id of the SMSF |
| plmnId | PlmnId | M | 1 | PLMN Id of the SMSF |

##### 6.1.6.2.25 Type: AcknowledgeInfo

Table 6.1.6.2.25: Definition of type AcknowledgeInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| sorMacIue | SorMac | C | 0..1 | Shall be present when the Acknowledgement is sent to acknowledge receipt of SorInfo. |
| upuMacIue | UpuMac | C | 0..1 | Shall be present when the Acknowledgement is sent to acknowledge receipt of UpuInfo. |
| provisioningTime | DateTime | M | 1 | the provisioning time is used to correlate the acknowledgement with the modification request, to address glare cases when multiple modifications are ongoing simultaneously. |
| ueNotReachable | boolean | O | 0..1 | Transmission of SorInfo / UE Parameter Update data to the UE was not successful due to the UE not being reachable. default: false may be present if sorMacIue and upuMacIue are absent. |

##### 6.1.6.2.26 Type: SorInfo

Table 6.1.6.2.26: Definition of type SorInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| ackInd | AckInd | M | 1 | Contains the indication on whether an acknowledgement from UE is to be requested to the UE. |
| sorMacIausf | SorMac | C | 0..1 | Contains the SoR-MAC-IAUSF. Shall be present when SorInfo is sent within AccessAndMobilitySubscriptionData on Nudm, and shall be absent when sent on Nudr or within PpData. |
| countersor | CounterSor | C | 0..1 | Contains the CounterSoR. Shall be present when SorInfo is sent within AccessAndMobilitySubscription on Nudm, and shall be absent when sent on Nudr or within PpData. |
| steeringContainer | SteeringContainer | C | 0..1 | When present, this information contains the information needed to update the "Operator Controlled PLMN Selector with Access Technology" list stored in the USIM either as an array of preferred PLMN/AccessTechnologies combinations in priority order (with the first entry in the array indicating the highest priority and the last entry indicating the lowest) or a secured packet.  If no change of the "Operator Controlled PLMN Selector with Access Technology" list stored in the USIM is needed, then this attribute shall be absent.  This attribute shall be present when SorInfo is sent within PpData. |
| provisioningTime | DateTime | M | 1 | Point in time of SorInfo provisioning at the UDR or SOR-AF. |

##### 6.1.6.2.27 Type: SharedData

Table 6.1.6.2.27-1: Definition of type SharedData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| sharedDataId | SharedDataId | M | 1 | Identifier of the shared data |
| sharedAmData | AccessAndMobilitySubscriptionData | O | 0..1 | Shared Access and Mobility Subscription Data |
| sharedSmsSubsData | SmsSubscriptionData | O | 0..1 | Shared SMS Subscription Data |
| sharedSmsMngSubsData | SmsManagementSubscriptionData | O | 0..1 | Shared SMS Management Subscription Data |
| sharedDnnConfigurations | map(DnnConfiguration) | O | 1..N | Shared DNN configurations |
| sharedTraceData | TraceData | O | 0..1 | Shared Trace Data |
| sharedSnssaiInfos | map(SnssaiInfo) | O | 1..N | Shared Snssai Infos |
| sharedVnGroupDatas | map(VnGroupData) | O | 1..N | A map of shared 5G VN group data (list of key-value pairs where GroupId serves as key; see clause 6.1.6.1). |
| Note 1: Exactly one of sharedAmData, sharedSmsSubsData, sharedSmsMngSubsData sharedDnnConfigurations, sharedTraceData and sharedSnssaiInfos shall be present.  Note 2: The attributes sharedAmData, sharedSmsSubsData and SharedSmsMngSubsData shall not contain sharedDataIds  Note 3: When shared data clash with individual data, individual data shall take precedence. | | | | |

##### 6.1.6.2.28 Type: PgwInfo

Table 6.1.6.2.28-1: Definition of type PgwInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| dnn | Dnn | M | 1 | DNN/APN with Network Identifier only. |
| pgwFqdn | string | M | 1 | FQDN of the PGW-C+SMF |
| plmnId | PlmnId | O | 0..1 | PLMN where the PGW-C+SMF is located |
| epdgInd | boolean | O | 0..1 | If present, it indicates whether access is from ePDG or not.  true: access is from ePDG.  false or absent: access is not from ePDG |

##### 6.1.6.2.29 Type: TraceDataResponse

Table 6.1.6.2.29-1: Definition of type TraceDataResponse

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| traceData | TraceData | C | 0..1 | UE-individual trace data. Shall not be absent unless the feature SharedData is supported and traceData is present within shared data. |  |
| sharedTraceDataId | SharedDataId | C | 0..1 | Shared data identifier. Shall be present if traceData is absent. |  |

##### 6.1.6.2.30 Type: SteeringContainer

Table 6.1.6.2.30-1: Definition of type SteeringContainer as a list of mutually exclusive alternatives

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| array(SteeringInfo) | 1..N | List of PLMN/AccessTechnologies combinations. |
| SecuredPacket | 1 | A Secured packet containing one or more APDUs commands dedicated to Remote File Management or command responses (see ETSI TS 102.225 [28]). |

##### 6.1.6.2.31 Type: SdmSubsModification

Table 6.1.6.2.31-1: Definition of type SdmSubsModification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| expires | DateTime | O | 0..1 | If present, indicates the point in time at which the subscription expires. Within a PATCH request the proposed new expiry time is conveyed. |
| monitoredResourceUris | array(Uri) | O | 1..N | If present, indicates the updated resources URIs to be monitored.  The URI shall take the form of either an absolute URI or an absolute-path reference as defined in IETF RFC 3986 [31].  See NOTE. |
| NOTE: The UDM should handle only the relative-path part (apiSpecificResourceUriPart, see 3GPP TS 29.501 [5] clause 4.4.1) and ignore possible inconsistencies in the base URI part. | | | | |

##### 6.1.6.2.32 Type: EmergencyInfo

Table 6.1.6.2.32-1: Definition of type EmergencyInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| pgwFqdn | string | C | 0..1 | FQDN of the PGW-C+SMF for emergency session; either pgwFqdn or ipAddress shall be present. |
| pgwIpAddress | IpAddress | C | 0..1 | IP address of the PGW-C+SMF for emergency session |
| smfInstanceId | NfInstanceId | O | 0..1 | NF Instance Id of the SMF for emergency session |
| epdgInd | boolean | O | 0..1 | If present, it indicates whether access is from ePDG or not.  true: access is from ePDG.  false or absent: access is not from ePDG. |

##### 6.1.6.2.33 Type: UpuInfo

Table 6.1.6.2.33-1: Definition of type UpuInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| upuDataList | array(UpuData) | M | 1..N | This information defines the UE Parameters Update (UPU).  A secured packet with the Routing indicator update data is included and/or the Default configured NSSAI update data are included on Nudm.  An unsecured Routing indicator update data or secured packet with the Routing indicator update data, and/or the Default configured NSSAI update data are included on Nudr. |
| upuRegInd | UpuRegInd | M | 1 | Contains the indication of whether the re-registration is requested. |
| upuAckInd | UpuAckInd | M | 1 | Contains the indication of whether the acknowledgement from UE is needed. |
| upuMacIausf | UpuMac | C | 0..1 | Contains the UPU-MAC-IAUSF. Shall be present when UpuInfo is sent within AccessAndMobilitySubscriptionData on Nudm, and shall be absent when sent on Nudr. |
| counterUpu | CounterUpu | C | 0..1 | Contains the CounterUPU. Shall be present when UpuInfo is sent within AccessAndMobilitySubscriptionData on Nudm, and shall be absent when sent on Nudr. |
| provisioningTime | DateTime | M | 1 | Point in time of provisioning of UPU by the UDR. |

##### 6.1.6.2.34 Type: GroupIdentifiers

Table 6.1.6.2.34-1: Definition of type GroupIdentifiers

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| extGroupId | ExtGroupId | C | 0..1 | This IE shall contain the External Group ID associated to the provided Internal Group ID. |
| intGroupId | GroupId | C | 0..1 | This IE shall contain the Internal Group ID associated to the provided External Group ID.. |
| ueIdList | array(UeId) | C | 1..N | This IE shall contain a list of the UE identifiers that belong to the provided Internal/External Group ID if they are required. |

##### 6.1.6.2.35 Type: NiddInformation

Table 6.1.6.2.35-1: Definition of type NiddInformation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| afId | string | M | 1 | The string identifying the AF as the owner of associated NIDD Configuration on T8 interface, which is carried in {scsAsId} URI variable in NIDD API (see clause 5.6.3.2.2 of 3GPP TS 29.122 [45]). |
| gpsi | Gpsi | O | 0..1 | Generic Public Subscription Identifier |
| extGroupId | ExternalGroupId | O | 0..1 | Indicates External Group Identifier which the user belongs to. |

##### 6.1.6.2.36 Type: CagData

Table 6.1.6.2.36-1: Definition of type CagData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| cagInfos | map(CagInfo) | M | 0..N | A map (list of key-value pairs where PlmnId converted to string serves as key; see 3GPP TS 29.571 [7]) of CagInfo  An empty map indicates that for no PLMN CAG is subscribed and shall only be sent when provisioningTime is present (i.e. when acknowledgement from the UE is pending).  If provisioningTime is present (i.e. the acknowledgement from the UE is still pending), the complete map of CagInfo (i.e. for all PLMNs) shall be present; otherwise only the CagInfo relevant to the Serving PLMN should be present. |
| provisioningTime | DateTime | C | 0..1 | This attribute shall be present if the CagData is sent to the AMF while reception has not yet been acknowledged from the UE; otherwise shall be absent. Presence of this attribute indicates that the AMF needs to update the UE with the complete map of CagInfo.  This attribute serves as CAG information Subscription Change Indication |

##### 6.1.6.2.37 Type: CagInfo

Table 6.1.6.2.37-1: Definition of type CagInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| allowedCagList | array(CagId) | M | 1..N | List of allowed CAG Ids. |
| cagOnlyIndicator | boolean | O | 0..1 | true indicates that the UE is restricted to only access 5GS via CAG cells;  absence and false indicate that the UE is not restricted to only access 5GS via CAG cells. |

##### 6.1.6.2.38 Type: AdditionalSnssaiData

Table 6.1.6.2.38-1: Definition of type AdditionalSnssaiData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| requiredAuthnAuthz | boolean | O | 0..1 | Indicates whether an S-NSSAI is subject to Network Slice-Specific Authentication and Authorization:  - true: subject to network slice-specific authentication and authorization  - false, or absent: not subject to network slice-specific authentication and authorization |

##### 6.1.6.2.39 Type: VnGroupData

Table 6.1.6.2.39-1: Definition of type VnGroupData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| pduSessionTypes | PduSessionTypes | O | 0..1 | Allowed session types |
| dnn | Dnn | O | 0..1 | Data Network Name with Network Identifier only. (NOTE) |
| singleNssai | Snssai | O | 0..1 | Single Nssai |
| appDescriptors | array(AppDescriptor) | O | 1..N | List of Application Descriptors |
| NOTE: Only a 1:1 mapping between DNN and 5G VN group is supported in this release | | | | |

##### 6.1.6.2.40 Type: AppDescriptor

Table 6.1.6.2.40-1: Definition of type AppDescriptor

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| osId | OsId | O | 0..1 | OS identifier, does not include an OS version number |
| appId | string | O | 0..1 | Application identifier, does not include a version number for the application |

##### 6.1.6.2.41 Type: AppPortId

Table 6.1.6.2.41-1: Definition of type AppPortId

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| destinationPort | Uint16 | O | 1 | Indicates the receiving port of application in the receving device or AF. |
| originatorPort | Uint16 | O | 1 | Indicates the sending port of application in sending device. |

##### 6.1.6.2.42 Type: LcsPrivacyData

Table 6.1.6.2.42-1: Definition of type LcsProfileData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| lpi | Lpi | O | 0..1 | If present, indicates the Location Privacy Indication (see 3GPP TS 23.273 [38] clause 5.4.2.3)  If absent, indicates that location for UE is allowed. |
| unrelatedClass | UnrelatedClass | O | 0..1 | Indicates Call/Session unrelated Classes for the user (see 3GPP TS 23.273 [38] clause 5.4.2.2.3). |
| plmnOperatorClasses | array(PlmnOperatorClass) | O | 1..N | Indicates PLMN Operator Class for the user (see 3GPP TS 23.273 [38] clause 5.4.2.2.4). |

##### 6.1.6.2.43 Type: Lpi

Table 6.1.6.2.43-1: Definition of type Lpi

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| locationPrivacyInd | LocationPrivacyInd | M | 1 | Indication of one of the following mutually exclusive global settings:  - Location is disallowed  - Location is allowed |
| validTimePeriod | ValidTimePeriod | O | 0..1 | If present, indicate Time period during which the Location Privacy Indication is valid.  If absent, indicates there is no time limitation. |

##### 6.1.6.2.44 Type: UnrelatedClass

Table 6.1.6.2.44-1: Definition of type UnrelatedClass

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| defaultUnrelatedClass | | DefaultUnrelatedClass | | M | | 1 | | The default Call/Session unrelated Class subscription for unidentified value added LCS clients or AFs. | |
| externalUnrelatedClass | | ExternalUnrelatedClass | | O | | 0..1 | | The Call/Session unrelated Class subscriptions for identified value added LCS Clients, AFs and value added LCS Client groups. | |
| serviceTypeUnrelatedClasses | | array(ServiceTypeUnrelatedClass) | | O | | 1..X( NOTE 2) | | The Call/Session unrelated Class subscriptions for identified service types for UE.( NOTE 1) | |
| NOTE 1: It is possible that there are multiple serviceTypeUnrelatedClasses, whose maximum number is decied by total number of service type defined in 3GPP TS 22.071 [47],  NOTE 2: X indicates the total number of service type defined in 3GPP TS 22.071 [47]. | | | | | | | | | |

##### 6.1.6.2.45 Type: PlmnOperatorClass

Table 6.1.6.2.45-1: Definition of type PlmnOperatorClass

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| lcsClientClass | LcsClientClass | M | 1 | Indicated the PLMN operator class of LCS client that are allowed to locate the particular UE (see 3GPP TS 23.273 [38] clause 5.4.2.2.4). |
| lcsClientIds | array(LcsClientId) | M | 1..N | List of LCS clients for the corresponding LCS Client Class |

##### 6.1.6.2.46 Type: ValidTimePeriod

Table 6.1.6.2.46-1: Definition of type ValidTimePeriod

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| startTime | DateTime | O | 0..1 | If present, indicates the start time  If absent, indicates there is no start time, and it shall be valid immediately.  (NOTE 1) |
| endTime | DateTime | O | 0..1 | If present, indicates the end time.  If absent, indicates there is no end time.  (NOTE 1) |
| NOTE 1: The end time shall be later than start time. | | | | |

##### 6.1.6.2.47 Type: LcsMoData

Table 6.1.6.2.47-1: Definition of type LcsMoData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| allowedServiceClasses | array(LcsMoServiceClass) | M | 1..N | List of MO-LR services allowed for a UE subscriber |

##### 6.1.6.2.48 Type: EcRestrictionDataWb

Table 6.1.6.2.48-1: Definition of type EcRestrictionData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | P | Cardinality | Description |
| ecModeARestricted | | boolean | O | 0..1 | If present, indicates whether Enhanced Coverage Mode A is restricted or not.  true: Enhanced Coverage Mode A is restricted.  false or absent: Enhanced Coverage Mode A is not restricted. |
| ecModeBRestricted | | boolean | O | 0..1 | If present, indicates whether Enhanced Coverage Mode B is restricted or not.  true: Enhanced Coverage Mode B is restricted.  false or absent: Enhanced Coverage Mode B is not restricted. |
| NOTE: At least one of the attributes ecModeARestricted and ecModeBRestricted shall be contained, and If the value of attribute ecModeARestricted is set to true, the value of attribute ecModeBRestricted shall be set to true. | | | | | |

##### 6.1.6.2.49 Type: ExpectedUeBehaviourData

Table 6.1.6.2.49-1: Definition of type ExpectedUeBehaviourData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| stationaryIndication | StationaryIndication | O | 0..1 | Identifies whether the UE is stationary or mobile (see TS 23.502 [3] clause 4.15.6.3). |
| communicationDurationTime | DurationSec | O | 0..1 | Indicates for how long the UE will normally stay in CM-Connected for data transmission (see TS 23.502 [3] clause 4.15.6.3). |
| periodicTime | DurationSec | O | 0..1 | Identifies interval time of periodic communication (see TS 23.502 [3] clause 4.15.6.3). |
| scheduledCommunicationTime | ScheduledCommunicationTime | O | 0..1 | Identifies time and day of the week when the UE is available for communication (see TS 23.502 [3] clause 4.15.6.3). |
| scheduledCommunicationType | ScheduledCommunicationType | O | 0..1 | Indicates that the Scheduled Communication Type (see TS 23.502 [3] clause 4.15.6.3).  (Note 5) |
| expectedUmts | array(LocationArea) | O | 1..N | Identifies the UE's expected geographical movement. The attribute is only applicable in 5G (see TS 23.502 [3] clause 4.15.6.3).  (NOTE 3, NOTE 4) |
| trafficProfile | TrafficProfile | O | 0..1 | Identifies the type of data transmission: single packet transmission (UL or DL), dual packet transmission (UL with subsequent DL or DL with subsequent UL), multiple packets transmission |
| batteryIndication | BatteryIndication | O | 0..1 | Indicates the power consumption type(s) of the UE (see TS 23.502 [3] clause 4.15.6.3). |
| validityTime | DateTime | O | 0..1 | If present, identifies when the expected UE behaviour parameters expire and shall be deleted locally if it expire (see TS 23.502 [3] clause 4.15.6.3).  (NOTE 2) |
| NOTE 1: At least one of optional parameters (expect for validityTime) above shall be present.  NOTE 2: If this attribute is omitted, no expiry for the expected UE behaviour parameters applies.  NOTE 3: The first instance of the attribute represents the start of the location, and the last one represents the stop of the location.  NOTE 4: The parameter expectedUmts is only used by AMF.  NOTE 5: The value of attribute "scheduledCommunicationType" shall be used together with the value of "scheduledCommunicationTime". | | | | |

##### 6.1.6.2.50 Void

##### 6.1.6.2.51 Void

##### 6.1.6.2.52 Type: SuggestedPacketNumDl

Table 6.1.6.2.52-1: Definition of type SuggestedPacketNumDl

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| suggestedPacketNumDl | integer | M | 1 | Value in number of packets. |
| validityTime | DateTime | O | 0..1 | If present, identifies the time to which the Network Configuration Parameters expire and shall be deleted locally if it expire (see TS 23.502 [3] clause 4.15.6.3a).  (NOTE 1) |
| NOTE 1: If this attribute is omitted, no expiry for the expected UE behaviour parameters applies. | | | | |

##### 6.1.6.2.53 Void

##### 6.1.6.2.54 Type: FrameRouteInfo

Table 6.1.6.2.54-1: Definition of type FrameRouteInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| ipv4Mask | IPv4AddrMask | C | 0..1 | Indicates IPv4 address mask. |
| ipv6Prefix | Ipv6Prefix | C | 0..1 | Indicates IPv6 prefix. |
| NOTE: Either ipv4Mask or ipv6Prefix shall be present. | | | | |

##### 6.1.6.2.55 Type: SorUpdateInfo

Table 6.1.6.2.55-1: SorUpdateInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| vplmnId | PlmnId | M | 1 | Serving node PLMN identity. |

##### 6.1.6.2.56 Type: EnhancedCoverageRestrictionData

Table 6.1.6.2.56-1: Definition of type EnhancedCoverageRestrictionData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| plmnEcInfoList | array(PlmnEcInfo) | O | 1..N | It may indicate a complete list of serving PLMNs where Enhanced Coverage Restriction shall be allowed and the detailed enhanced coverage restriction configuration under per the PLMN. |

##### 6.1.6.2.57 Type: EdrxParameters

Table 6.1.6.2.57-1: EdrxParameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| ratType | RatType | M | 1 | This IE shall indicate the RAT type which eDRX value are applicable to.  Only the following values are allowed:  "EUTRA" "NBIOT" "LTE-M" |
| edrxValue | string | M | 1 | This IE shall indicate eDRX Cycle length value, it shall be encoded as a string of bits 4 to 1 of octet 3 in the "Extended DRX parameter" IE (see Figure 10.5.5.32 of 3GPP TS 24.008 [46]).  Pattern: '^([0-1]{4})$' |
| NOTE: The relationship between values of ratType and edrxValue shall be in line with clause 10.5.5.32 of 3GPP TS 24.008 [46]. | | | | |

##### 6.1.6.2.58 Type: PtwParameters

Table 6.1.6.2.58-1: PtwParameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| operationMode | OperationMode | M | 1 | This IE shall indicate the Operation Mode which PTW value are applicable to. |
| ptwValue | string | M | 1 | This IE shall indicate RAT specific Subscribed Paging Time Window length value, it shall be encoded as a string of bits 8 to 5 of octet 3 in the "Extended DRX parameter" IE (see Figure 10.5.5.32 of 3GPP TS 24.008 [46]).  Pattern: '^([0-1]{4})$' |
| NOTE: The relationship between values of operationMode and ptwValue shall be in line with clause 10.5.5.32 of 3GPP TS 24.008 [46]. | | | | |

##### 6.1.6.2.59 Void

##### 6.1.6.2.60 Void

##### 6.1.6.2.61 Type: Void

##### 6.1.6.2.62 Type: ExternalUnrelatedClass

Table 6.1.6.2.62-1: Definition of type ExternalUnrelatedClass

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| lcsClientExternals | array(LcsClientExternal) | O | 1..N | The list of Call/session Unrelated Class identified by LCS client in the external LCS client list for the list |
| afExternals | array(AfExternal) | O | 1..N | The list of Call/session Unrelated Class identified by AF in the external LCS client list |
| lcsClientGroupExternals | array(LcsClientGroupExternal) | O | 1..N | The list of Call/session Unrelated Class identified by LCS client group in the external LCS client list |

##### 6.1.6.2.63 Type: AfExternal

Table 6.1.6.2.63-1: Definition of type AfExternal

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| afId | AfId | O | 0..1 | AF Identifier (see 3GPP TS 23.273 [38] clause 5.4.2.2.3) |
| allowedGeographicArea | array(GeographicArea) | O | 1..N | Indicates Geographical area where positioning is allowed (see 3GPP TS 23.273 [38] clause 5.4.2.2.3). |
| privacyCheckRelatedAction | PrivacyCheckRelatedAction | O | 0..1 | Indicates action related to privacy check.  (NOTE) |
| validTimePeriod | ValidTimePeriod | O | 0..1 | Time period when positioning is allowed |
| NOTE: "LOCATION\_ALLOWED\_WITHOUT\_NOTIFICATION" is default value and "LOCATION\_NOT\_ALLOWED" is not optional for the attribute. | | | | |

##### 6.1.6.2.64 Type: LcsClientExternal

Table 6.1.6.2.64-1: Definition of type LcsClientExternal

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| lcsClientId | LcsClientId | O | 0..1 | Lcs Client Identifier (see 3GPP TS 23.273 [38] clause 5.4.2.2.3) |
| allowedGeographicArea | array(GeographicArea) | O | 1..N | Indicates Geographical area where positioning is allowed (see 3GPP TS 23.273 [38] clause 5.4.2.2.3). |
| privacyCheckRelatedAction | PrivacyCheckRelatedAction | O | 0..1 | Indicates action related to privacy check.  (NOTE) |
| validTimePeriod | ValidTimePeriod | O | 0..1 | Time period when positioning is allowed |
| NOTE: "LOCATION\_ALLOWED\_WITHOUT\_NOTIFICATION" is default value and "LOCATION\_NOT\_ALLOWED" is not optional for the attribute. | | | | |

##### 6.1.6.2.65 Type: LcsClientGroupExternal

Table 6.1.6.2.65-1: Definition of type LcsClientGroupExternal

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| lcsClientGroupId | ExtGroupId | O | 0..1 | LCS Client Group Identifier |
| allowedGeographicArea | array(GeographicArea) | O | 1..N | Indicates Geographical area where positioning is allowed (see 3GPP TS 23.273 [38] clause 5.4.2.2.3). |
| privacyCheckRelatedAction | PrivacyCheckRelatedAction | O | 0..1 | Indicates action related to privacy check.  (NOTE) |
| validTimePeriod | ValidTimePeriod | O | 0..1 | Time period when positioning is allowed |
| NOTE: "LOCATION\_ALLOWED\_WITHOUT\_NOTIFICATION" is default value and "LOCATION\_NOT\_ALLOWED" is not optional for the attribute. | | | | |

##### 6.1.6.2.66 Type: ServiceTypeUnrelatedClass

Table 6.1.6.2.66-1: Definition of type ServiceTypeUnrelatedClass

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| serviceType | | LcsServiceType | | M | | 1 | | One of the service type defined in 3GPP TS 22.071 [47]. | |
| allowedGeographicArea | | array(GeographicArea) | | O | | 1..N | | Indicates Geographical area where positioning is allowed (see 3GPP TS 23.273 [38] clause 5.4.2.2.3). | |
| privacyCheckRelatedAction | | PrivacyCheckRelatedAction | | O | | 0..1 | | Indicates action related to privacy check.  (NOTE) | |
| codeWordInd | | CodeWordInd | | O | | 0..1 | | Indication that codeword shall be checked in UE or one or more codeword values to be checked in GMLC | |
| validTimePeriod | | ValidTimePeriod | | O | | 0..1 | | Time period when positioning is allowed | |
| codeWordList | | array(CodeWord) | | C | | 1..N | | This IE shall be present when codeWordInd is " CODEWORD\_CHECK\_IN\_GMLC".  When present, this IE shall contain one or more CodeWords used by GMLC for verification. | |
| NOTE: "LOCATION\_ALLOWED\_WITHOUT\_NOTIFICATION" is default value and "LOCATION\_NOT\_ALLOWED" is not optional for the attribute. | | | | | | | | | |

##### 6.1.6.2.67 Type: UeId

Table 6.1.6.2.67-1: Definition of type UeId

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| supi | Supi | M | 1 | This IE shall indicate the SUPI. |
| gpsiList | array(gpsi) | O | 1..N | This IE shall indicate a list of GPSIs that is associated with the SUPI. |

##### 6.1.6.2.68 Type: DefaultUnrelatedClass

Table 6.1.6.2.68-1: Definition of type DefaultUnrelatedClass

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| allowedGeographicArea | array(GeographicArea) | O | 1..N | Indicates Geographical area where positioning is allowed (see 3GPP TS 23.273 [38] clause 5.4.2.2.3). |
| privacyCheckRelatedAction | PrivacyCheckRelatedAction | O | 0..1 | Indicates action related to privacy check.  (NOTE) |
| codeWordInd | CodeWordInd | O | 0..1 | Indication that codeword shall be checked in UE or one or more codeword values to be checked in GMLC |
| validTimePeriod | ValidTimePeriod | O | 0..1 | Time period when positioning is allowed |
| codeWordList | array(CodeWord) | C | 1..N | This IE shall be present when codeWordInd is present with value "CODEWORD\_CHECK\_IN\_GMLC".  When present, this IE shall contain one or more CodeWords used by GMLC for verification. |
| NOTE: "LOCATION\_NOT\_ALLOWED" is default value and only values "LOCATION\_NOT\_ALLOWED", "LOCATION\_ALLOWED\_WITHOUT\_NOTIFICATION", "LOCATION\_ALLOWED\_WITHOUT\_RESPONSE", "LOCATION\_RESTRICTED\_WITHOUT\_RESPONSE" can be contained. | | | | |

##### 6.1.6.2.69 Type: ContextInfo

Table 6.1.6.2.69-1: Definition of type ContextInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| origHeaders | array(string) | O | 1..N | Headers received by the UDM from NFs consuming Nudm services. The encoding of the header shall comply with clause 3.2 of IETF RFC 7230 [50] |

##### 6.1.6.2.70 Type: UeContextInAmfData

Table 6.1.6.2.70-1: Definition of type UeContextInAmfData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| epsInterworkingInfo | EpsInterworkingInfo | O | 0..1 | This IE contains the associations between APN/DNN and PGW-C+SMF selected by the AMF for EPS interworking. |

##### 6.1.6.2.71 Type: V2xSubscriptionData

Table 6.1.6.2.71-1: Definition of type V2xSubscriptionData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| nrV2xServicesAuth | NrV2xAuth | O | 0..1 | Indicates whether the UE is authorized to use the NR sidelink for V2X services. |
| lteV2xServicesAuth | LteV2xAuth | O | 0..1 | Indicates whether the UE is authorized to use the LTE sidelink for V2X services. |
| nrUePc5Ambr | BitRate | O | 0..1 | Indicates UE-PC5-AMBR for V2X communication over PC5 reference point for NR PC5. |
| ltePc5Ambr | BitRate | O | 0..1 | Indicates UE-PC5-AMBR for V2X communication over PC5 reference point for LTE PC5. |

##### 6.1.6.2.72 Type: LcsBroadcastAssistanceTypesData

Table 6.1.6.2.72-1: Definition of type LcsBroadcastAssistanceTypesData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| locationAssistanceType | Bytes | M | 1 | This IE contains a bitmap, encoded as a base64 string, which indicates the broadcast location assistance data types for which the UE is subscribed to receive ciphering keys used to decipher broadcast assistance data. A bit set to 1 indicates that the UE is subscribed to receive ciphering keys applicable to corresponding positioning SIB type.  The bits are ordered as following in the bitmap:   * first octet is the right-most octet. E.g. in "0x0123", “first octet” would be "0x23" and “second octet” would be "0x01" * bit 1 is the right-most bit and bit 8 is the left-most bit in the octet. E.g. for octet "0x01", “bit 1” would be "1", and “bit 2” to "bit 8" would be "0"   The mapping of the bits to the positioning SIB types is as follows:  -- bit 8 in the first octet maps to positioning SIB Type 1-1  -- bit 7 in the first octet maps to positioning SIB Type 1-2  -- bit 6 in the first octet maps to positioning SIB Type 1-3  -- bit 5 in the first octet maps to positioning SIB Type 1-4  -- bit 4 in the first octet maps to positioning SIB Type 1-5  -- bit 3 in the first octet maps to positioning SIB Type 1-6  -- bit 2 in the first octet maps to positioning SIB Type 1-7  -- bit 1 in the first octet maps to positioning SIB Type 1-8  -- bit 8 in the second octet maps to positioning SIB Type 2-1  -- bit 7 in the second octet maps to positioning SIB Type 2-2  -- bit 6 in the second octet maps to positioning SIB Type 2-3  -- bit 5 in the second octet maps to positioning SIB Type 2-4  -- bit 4 in the second octet maps to positioning SIB Type 2-5  -- bit 3 in the second octet maps to positioning SIB Type 2-6  -- bit 2 in the second octet maps to positioning SIB Type 2-7  -- bit 1 in the second octet maps to positioning SIB Type 2-8  -- bit 8 in the third octet maps to positioning SIB Type 2-9  -- bit 7 in the third octet maps to positioning SIB Type 2-10  -- bit 6 in the third octet maps to positioning SIB Type 2-11  -- bit 5 in the third octet maps to positioning SIB Type 2-12  -- bit 4 in the third octet maps to positioning SIB Type 2-13  -- bit 3 in the third octet maps to positioning SIB Type 2-14  -- bit 2 in the third octet maps to positioning SIB Type 2-15  -- bit 1 in the third octet maps to positioning SIB Type 2-16  -- bit 8 in the fourth octet maps to positioning SIB Type 2-17  -- bit 7 in the fourth octet maps to positioning SIB Type 2-18  -- bit 6 in the fourth octet maps to positioning SIB Type 2-19  -- bit 5 in the fourth octet maps to positioning SIB Type 2-20  -- bit 4 in the fourth octet maps to positioning SIB Type 2-21  -- bit 3 in the fourth octet maps to positioning SIB Type 2-22  -- bit 2 in the fourth octet maps to positioning SIB Type 2-23  -- bit 1 in the fourth octet maps to positioning SIB Type 2-24  -- bit 7 in the fifth octet maps to positioning SIB Type 2-25  -- bit 6 in the fifth octet maps to positioning SIB Type 3-1  -- bit 5 in the fifth octet maps to positioning SIB Type 4-1  -- bit 4 in the fifth octet maps to positioning SIB Type 5-1  -- bit 3 in the fifth octet maps to positioning SIB Type 6-1  -- bit 2 in the fifth octet maps to positioning SIB Type 6-2  -- bit 1 in the fifth octet maps to positioning SIB Type 6-3  Any unassigned bits are spare and shall be coded as zero. Non-included bits shall be treated as being coded as zero. |

##### 6.1.6.2.73 Type: DatasetNames

Table 6.1.6.2.73-1: Definition of type DatasetNames

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| array(DataSetName) | 2..N | List of names of the data sets |

#### 6.1.6.3 Simple data types and enumerations

##### 6.1.6.3.1 Introduction

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

##### 6.1.6.3.2 Simple data types

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

Table 6.1.6.3.2-1: Simple data types

|  |  |  |
| --- | --- | --- |
| Type Name | Type Definition | Description |
| DefaultDnnIndicator | boolean | Indicates whether a DNN is the default DNN |
| LboRoamingAllowed | boolean | This flag indicates whether local breakout is allowed when roaming. |
| UeUsageType | integer | Indicates the usage characteristics of the UE, enables the selection of a specific Dedicated Core Network for EPS interworking |
| MpsPriorityIndicator | boolean | Indicates whether UE is subscribed to multimedia priority service |
| McsPriorityIndicator | boolean | Indicates whether UE is subscribed to mission critical service |
| 3GppChargingCharacteristics | string | 16-bit string identifying charging characteristics as specified in 3GPP TS 32.255 [11] Annex A and 3GPP TS 32.298 [12] clause 5.1.2.2.7, in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the charging characteristics shall appear first in the string, and the character representing the 4 least significant bits of the charging characteristics shall appear last in the string.  Example:  The charging characteristic 0x123A shall be encoded as "123A". |
| MicoAllowed | boolean | Indicates whether MICO mode is allowed for the UE. |
| SmsSubscribed | boolean | Indicates whether the UE subscription allows SMS delivery over NAS. |
| SharedDataId | string | Identifies globally and uniquely a piece of subscription data shared by multiple UEs. The value shall start with the HPLMN id (MCC/MNC) followed by a hyphen followed by a local Id as allocated by the home network operator.  pattern: "^[0-9]{5,6}-.+$" |
| IwkEpsInd | boolean | Indicates whether Interworking with EPS is supported |
| SecuredPacket | string | Indicates the secured packet as specified in 3GPP TS 24.501 [27]. It is encoded using base64 and represented as a String.  Format: byte |
| UpuRegInd | boolean | true indicates that re-registration is requested after the successful UE parameters update. |
| ExtGroupId | string | String containing a External Group ID.  Pattern: "^extgroupid-[^@]+@[^@]+$" |
| NbIoTUePriority | integer | Unsigned integer indicating the NB-IoT UE Priority (see clause 5.31.17 of 3GPP TS 23.501 [8]), the value is between 0 and 255 and lower value indicates higher priority. |
| CodeWord | string | Indicates the codeword as specified in 3GPP TS 23.273 [38] clause 5.4.2.2.3. |
| AfId | string | AF Identifier (see 3GPP TS 23.273 [38] clause 5.4.2.2.3) |
| LcsClientId | string | Lcs Client Identifier (see 3GPP TS 23.273 [38] clause 5.4.2.2.3) |

##### 6.1.6.3.3 Enumeration: DataSetName

Table 6.1.6.3.3-1: Enumeration DataSetName

|  |  |
| --- | --- |
| Enumeration value | Description |
| "AM" | Access and Mobility Subscription Data |
| "SMF\_SEL" | SMF Selection Subscription Data |
| "UEC\_SMF" | UE Context in SMF Data |
| "UEC\_SMSF" | UE Context in SMSF Data |
| "SMS\_SUB" | SMS Subscription Data |
| "SM" | Session Management Subscription Data |
| "TRACE" | Trace Data |
| "SMS\_MNG" | SMS Management Subscription Data |
| "LCS\_PRIVACY" | LCS Privacy Subscription Data |
| "LCS\_MO" | LCS Mobile Originated Subscription Data |
| "UEC\_AMF" | UE Context in AMF Data |
| "V2X" | V2X Subscription Data |
| "LCS\_BCA" | LCS Broadcast Assistance Subscription Data |

Note: The current naming conventions for Enumerations (uppercase with underscore), when their intended usage is for query parameters is not consistent with the naming conventions for URI components (lowercase with hyphen).

##### 6.1.6.3.4 Void

##### 6.1.6.3.5 Void

##### 6.1.6.3.6 Void

##### 6.1.6.3.7 Enumeration: PduSessionContinuityInd

Table 6.1.6.3.7-1: Enumeration PduScContinuity

|  |  |
| --- | --- |
| Enumeration value | Description |
| "MAINTAIN\_PDUSESSION" | Maintain the PDU session |
| "RECONNECT\_PDUSESSION" | Disconnect the PDU session with a reactivation request |
| "RELEASE\_PDUSESSION" | Disconnect PDU session without reactivation request |

##### 6.1.6.3.8 Enumeration: LocationPrivacyInd

Table 6.1.6.3.8-1: Enumeration LocationPrivacyInd

|  |  |
| --- | --- |
| Enumeration value | Description |
| "LOCATION\_DISALLOWED" | Location for UE is disallowed |
| "LOCATION\_ALLOWED" | Location for UE are allowed |

##### 6.1.6.3.9 Enumeration: PrivacyCheckRelatedAction

Table 6.1.6.3.9-1: Enumeration PrivacyCheckRelatedAction

|  |  |
| --- | --- |
| Enumeration value | Description |
| "LOCATION\_NOT\_ALLOWED" | Location not allowed |
| "LOCATION\_ALLOWED\_WITH\_NOTIFICATION" | Location allowed with notification |
| "LOCATION\_ALLOWED\_WITHOUT\_NOTIFICATION" | Location allowed without notification |
| "LOCATION\_ALLOWED\_WITHOUT\_RESPONSE" | Location with notification and privacy verification; location allowed if no response |
| "LOCATION\_RESTRICTED\_WITHOUT\_RESPONSE" | Location with notification and privacy verification; location restricted if no response |

##### 6.1.6.3.10 Enumeration: LcsClientClass

Table 6.1.6.3.10-1: Enumeration LcsClientClass

|  |  |
| --- | --- |
| Enumeration value | Description |
| "BROADCAST\_SERVICE" | LCS client broadcasting location related information |
| "OM\_IN\_HPLMN" | O&M LCS client in the HPLMN |
| "OM\_IN\_VPLMN" | O&M LCS client in the VPLMN |
| "ANONYMOUS\_LOCATION\_SERVICE" | LCS client recording anonymous location information |
| "SPECIFIC\_SERVICE" | LCS Client supporting a bearer service, teleservice or supplementary service to the target UE |

##### 6.1.6.3.11 Enumeration: LcsMoServiceClass

Table 6.1.6.3.11-1: Enumeration LcsMoServiceClass

|  |  |
| --- | --- |
| Enumeration value | Description |
| "BASIC\_SELF\_LOCATION" | UE requests own location |
| "AUTONOMOUS\_SELF\_LOCATION" | UE requests location assistance data |
| "TRANSFER\_TO\_THIRD\_PARTY" | UE requests transfer of own location to another LCS Client |

##### 6.1.6.3.12 Enumeration: OperationMode

Table 6.1.6.3.12-1: Enumeration OperationMode

|  |  |
| --- | --- |
| Enumeration value | Description |
| "WB\_S1" | WB-S1 mode |
| "NB\_S1" | NB-S1 mode |
| "WB\_N1" | WB-N1 mode |
| "NB\_N1" | NB-N1 mode |

##### 6.1.6.3.13 Enumeration: SorUpdateIndicator

Table 6.1.6.3.13-1: Enumeration SorUpdateIndicator

|  |  |
| --- | --- |
| Enumeration value | Description |
| "INITIAL\_REGISTRATION" | NAS registration type "Initial Registration" |
| "EMERGENCY\_REGISTRATION" | NAS registration type "Emergency Registration" |

##### 6.1.6.3.14 Enumeration: CodeWordInd

Table 6.1.6.3.14-1: Enumeration CodeWordInd

|  |  |
| --- | --- |
| Enumeration value | Description |
| "CODEWORD\_CHECK\_IN\_UE" | codeword shall be checked in UE |
| "CODEWORD\_CHECK\_IN\_GMLC" | one or more codeword values to be checked in GMLC |

##### 6.1.6.3.15 Enumeration: MdtUserConsent

Table 6.1.6.3.15-1: Enumeration MdtUserConsent

|  |  |
| --- | --- |
| Enumeration value | Description |
| "CONSENT\_GIVEN" | It shall indicate the user has given his consent for MDT activation. |
| "CONSENT\_NOT\_GIVEN" | It shall indicate the user hasn't given his consent for MDT activation. |

### 6.1.7 Error Handling

#### 6.1.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

#### 6.1.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

#### 6.1.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nudm\_ SubscriberDataManagement service. The following application errors listed in Table 6.1.7.3-1 are specific for the Nudm\_ SubscriberDataManagement service.

Table 6.1.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| NF\_CONSUMER\_REDIRECT\_ONE\_TXN | 307 Temporary Redirect | The request has been asked to be redirected to a specified target for one transaction. |
| CONTEXT\_NOT\_FOUND | 308 Permanent Redirect | The request has been asked to be redirected to a specified target. |
| DATA\_NOT\_FOUND | 404 Not Found | The requested UE subscription data is not found/does not exist.  This error is applicable to all Nudm\_SDM GET operations. |
| USER\_NOT\_FOUND | 404 Not Found | The user does not exist  This error is applicable to all Nudm\_SDM GET operations. |
| CONTEXT\_NOT\_FOUND | 404 Not Found | It is used during the modification of an existing subscription when no corresponding context exists. |
| GROUP\_IDENTIFIER\_NOT\_FOUND | 404 Not Found | The requested Group Identifier does not exist. |
| SUBSCRIPTION\_NOT\_FOUND | 404 Not Found | The subscription does not exist. |
| UNSUPPORTED\_RESOURCE\_URI | 501 Not Implemented | The SDM Subscription contains unsupported resource URI to be monitored. |

### 6.1.8 Feature Negotiation

The optional features in table 6.1.8-1 are defined for the Nudm\_SDM API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.1.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | SharedData | When receiving a Nudm\_SDM\_Get service operation request to retrieve a UE's individual subscription data, and the request does not contain a supported-features query parameter indicating support of this feature, the UDM shall not include Shared Data Ids in the response. Instead the UDM may – based on operator policy – take no further action (i.e. allow the UE to get services based on only the UE's individual subscription data), or send the shared data as individual data (this may result in notifications of individual subscription data change – if so subscribed – when shared data, which are sent as individual data, are modified, and/or when the UE's Shared Data IDs are modified). |
| 2 | ImmediateReport | When a NF consumer detects the UDM support ImmediateReport feature, it can indicate an immediateReport flag when invoking Nudm\_SDM\_Subscribe service operation. If UDM supports ImmediateReport received Nudm\_SDM\_Subscribe service operation request, it shall return the resource representation(s) of the monitored resource(s) in the service operation response body. |
| 3 | PatchReport | If some of the modifications included in the PATCH request are not successfully implemented, the UDM reports the result of PATCH request execution to the consumer. See clause 5.2.7.2 of 3GPP TS 29.500 [4]. |
| 4 | Nssaa | If the NF consumer does not support this feature, the UDM shall not include information of S-NSSAI(s) subject to Network Slice-Specific Authentication and Authorization in Get response messages, immediate reports within Subscribe response messages, or data change notifications where the data change is limited to S-NSSAI(s) subject to Network Slice-Specific Authentication and Authorization. |
| 5 | CAGFeature | If the NF consumer does not support this feature, the UDM shall not include CAG information list in the message body with "200 OK" response (clause 5.2.2.2.3). The UDM performs action as executes step 2c of clause 5.3.2.2.2 and 5.3.2.2.3 if UE is allowed to access 5GS via CAG cell(s) only. |
| 13 | LimitedSubscriptions | An NF consumer supporting this feature shall use one subscription for the changes of subscription data sets per UE without additional filter criteria, or with a specific filter criteria (e.g. dnn and/or singleNssai).  An NF consumer supporting this feature shall use one subscription for the changes of shared data sets. |

### 6.1.9 Security

As indicated in 3GPP TS 33.501 [6] and 3GPP TS 29.500 [4], the access to the Nudm\_SDM API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [18]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [19]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nudm\_SDM API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [19], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nudm\_SDM service.

The Nudm\_SDM API defines a single scope "nudm-sdm" for OAuth2 authorization (as specified in 3GPP TS 33.501 [6]) for the entire API, and it does not define any additional scopes at resource or operation level.

## 6.2 Nudm\_UEContextManagement Service API

### 6.2.1 API URI

URIs of this API shall have the following root:

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

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

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The <apiName>shall be "nudm-uecm".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.2.3.

### 6.2.2 Usage of HTTP

#### 6.2.2.1 General

HTTP/2, as defined in IETF RFC 7540 [13], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

HTTP messages and bodies for the Nudm\_UECM service shall comply with the OpenAPI [14] specification contained in Annex A3.

#### 6.2.2.2 HTTP standard headers

##### 6.2.2.2.1 General

The usage of HTTP standard headers shall be supported as specified in clause 5.2.2 of 3GPP TS 29.500 [4].

##### 6.2.2.2.2 Content type

The following content types shall be supported:

JSON, as defined in IETF RFC 8259 [15], signalled by the content type "application/json".

The Problem Details JSON Object (IETF RFC 7807 [16] signalled by the content type "application/problem+json"

JSON Merge Patch, as defined in IETF RFC 7396 [17], signalled by the content type "application/merge-patch+json"

#### 6.2.2.3 HTTP custom headers

##### 6.2.2.3.1 General

The usage of HTTP custom headers shall be supported as specified in clause 5.2.3 of 3GPP TS 29.500 [4].

### 6.2.3 Resources

#### 6.2.3.1 Overview



Figure 6.2.3.1-1: Resource URI structure of the Nudm\_UECM API

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

Table 6.2.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name (Archetype) | Resource URI | HTTP method or custom operation | Description |
| Registrations  (Document) | /{ueId}/registrations | GET | Retrieve UE's registration data sets |
| Amf3GppAccessRegistration (Document) | /{ueId}/registrations/amf-3gpp-access | PUT | Update the AMF registration for 3GPP access |
| PATCH | Modify the AMF registration for 3GPP access |
| GET | Retrieve the AMF registration information for 3GPP access |
| /{ueId}/registrations/amf-3gpp-access/dereg-amf | dereg-amf (POST) | Trigger AMF deregistration due to mobility from 5GC to EPC |
| /{ueId}/registrations/amf-3gpp-access/pei-update | pei-update  (POST) | Updates the PEI in the 3GPP Access Registration context |
| AmfNon3GppAccessRegistration (Document) | /{ueId}/registrations/amf-non-3gpp-access | PUT | Update the AMF registration for non 3GPP access |
| PATCH | Modify the AMF registration for non 3GPP access |
| GET | Retrieve the AMF registration information for non 3GPP access |
| SmfRegistrations (Store) | /{ueId}/registrations/smf-registrations | GET | Retrieve the SMF registration information |
| IndividualSmfRegistration (Document) | /{ueId}/registrations/smf-registrations/{pduSessionId} | PUT | Create an SMF registration identified by PDU Session Id |
| DELETE | Delete an individual SMF registration |
| GET | Retrieve the SMF registration information identified by PDU Session Id. |
| Smsf3GppAccessRegistration (Document) | /{ueId}/registrations/smsf-3gpp-access | PUT | Create or Update the SMSF registration |
| DELETE | Delete the SMSF registration for 3GPP access |
| PATCH | Modify the SMSF registration |
| GET | Retrieve the SMSF registration information |
| SmsfNon3GppAccessRegistration (Document) | /{ueId}/registrations/smsf-non-3gpp-access | PUT | Create or Update the SMSF registration for non 3GPP access |
| DELETE | Delete the SMSF registration for non 3GPP access |
| PATCH | Modify the SMSF registration for non 3GPP access |
| GET | Retrieve the SMSF registration information for non 3GPP access |
| Location(Document) | /{ueId}/registrations/location | GET | Retrieve the UE's location information by GMLC or NEF |
| IpSmGwRegistration (Document) | /{ueId}/registrations/ip-sm-gw | PUT | Create or Update the IP-SM-GW registration |
| DELETE | Delete the IP-SM-GW registration |
| GET | Retrieve the IP-SM-GW registration information |

#### 6.2.3.2 Resource: Amf3GppAccessRegistration (Document)

##### 6.2.3.2.1 Description

This resource represents the registered AMF for 3GPP access.

##### 6.2.3.2.2 Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/amf-3gpp-access

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

Table 6.2.3.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.2.1 |
| ueId | VarUeId | Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2) SUPI (i.e. imsi or nai or gli or gci) is used with the PUT and PATCH methods; SUPI (i.e. imsi or nai) or GPSI (i.e. msisdn or extid) is used with the GET method.  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |

##### 6.2.3.2.3 Resource Standard Methods

6.2.3.2.3.1 PUT

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

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

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

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

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

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| Amf3GppAccessRegistration | M | 1 | The AMF registration for 3GPP access is replaced with the received information. |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| Amf3GppAccessRegistration | M | 1 | 201 Created | Upon success, a response body containing a representation of the created Individual Amf3GppAccessRegistration resource shall be returned. |
| Amf3GppAccessRegistration | M | 1 | 200 OK | Upon success, a response body containing a representation of the updated Individual Amf3GppAccessRegistration resource shall be returned. |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - UNKNOWN\_5GS\_SUBSCRIPTION  - NO\_PS\_SUBSCRIPTION  - ROAMING\_NOT\_ALLOWED  - ACCESS\_NOT\_ALLOWED  - RAT\_NOT\_ALLOWED  - REAUTHENTICATION\_REQUIRED |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.2.3.2.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/amf-3gpp-access |

6.2.3.2.3.2 PATCH

This method shall support the URI query parameters specified in table 6.2.3.2.3.2-1.

Table 6.2.3.2.3.2-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.2.3.2.3.2-2 and the response data structures and response codes specified in table 6.2.3.2.3.2-3.

Table 6.2.3.2.3.2-2: Data structures supported by the PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| Amf3GppAccessRegistrationModification | M | 1 | The AMF registration for 3GPP access is modified with the received information. |

Table 6.2.3.2.3.2-3: Data structures supported by the PATCH Response Body on this resource

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Data type | | P | Cardinality | Response  codes | | Description | |
| n/a | |  |  | 204 No Content | | Upon success, an empty response body is returned. (NOTE 2) | |
| PatchResult | | M | | 1 | | 200 OK | | Upon success, the execution report is returned. (NOTE 2) | |
| ProblemDetails | | O | | 0..1 | | 403 Forbidden | | The "cause" attribute may be used to indicate one of the following application errors:  - INVALID\_GUAMI | |
| ProblemDetails | | O | 0..1 | 404 Not Found | | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND  - USER\_NOT\_FOUND | |
| ProblemDetails | | O | 0..1 | 422 Unprocessable Entity | | The "cause" attribute may be used to indicate one of the following application errors:  - UNPROCESSABLE\_REQUEST | |
| NOTE 1: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported.  NOTE 2: If all the modification instructions in the PATCH request have been implemented, the UDM shall respond with 204 No Content response; if some of the modification instructions in the PATCH request have been discarded, and the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature number, the UDM shall respond with PatchResult. | | | | | | | |

6.2.3.2.3.3 GET

This method shall support the URI query parameters specified in table 6.2.3.2.3.3-1.

Table 6.2.3.2.3.3-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.2.3.2.3.3-2 and the response data structures and response codes specified in table 6.2.3.2.3.3-3.

Table 6.2.3.2.3.3-2: Data structures supported by the GET Request Body on this resource

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

Table 6.2.3.2.3.3-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| Amf3GppAccessRegistration | M | 1 | 200 OK | Upon success, a response body containing the Amf3GppAccessRegistration shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

##### 6.2.3.2.4 Resource Custom Operations

6.2.3.2.4.1 Overview

Table 6.2.3.2.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation Name | Custom operation URI | Mapped HTTP method | Description |
| dereg-amf | /{ueId}/registrations/amf-3gpp-access/dereg-amf | POST | Trigger AMF deregistration due to mobility from 5GC to EPC |
| pei-update | /{ueId}/registrations/amf-3gpp-access/pei-update | POST | Updates PEI in the AMF 3GPP Registration context |

6.2.3.2.4.2 Operation: dereg-amf

6.2.3.2.4.2.1 Description

The dereg-amf custom operation is used by the NF service consumer (HSS) to trigger AMF deregistration due to mobility from 5GS to EPC. For details see 3GPP TS 23.632 [32].

6.2.3.2.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.3.2.4.2.2-1 and the response data structure and response codes specified in table 6.2.3.2.4.2.2-2.

Table 6.2.3.2.4.2.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AmfDeregInfo | M | 1 | Contains the deregistration reason |

Table 6.2.3.2.4.2.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |

6.2.3.2.4.3 Operation: pei-update

6.2.3.2.4.3.1 Description

The pei-update custom operation is used by the NF service consumer (HSS) to trigger an update of the PEI stored in the AMF 3GPP Registration context. For details see 3GPP TS 23.632 [32].

6.2.3.2.4.3.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.3.2.4.3.2-1 and the response data structure and response codes specified in table 6.2.3.2.4.3.2-2.

Table 6.2.3.2.4.3.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| PeiUpdateInfo | M | 1 | Contains the PEI provided by the NF service consumer |

Table 6.2.3.2.4.3.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |

#### 6.2.3.3 Resource: AmfNon3GppAccessRegistration (Document)

##### 6.2.3.3.1 Description

This resource represents the registered AMF for non 3GPP access.

##### 6.2.3.3.2 Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/amf-non-3gpp-access/

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

Table 6.2.3.3.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.2.1 |
| ueId | VarUeId | Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2) SUPI (i.e. imsi or nai or gli or gci) is used with the PUT and PATCH methods; SUPI (i.e. imsi or nai) or GPSI (i.e. msisdn or extid) is used with the GET method.  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |

##### 6.2.3.3.3 Resource Standard Methods

6.2.3.3.3.1 PUT

This method shall support the URI query parameters specified in table 6.2.3.3.3.1-1.

Table 6.2.3.3.3.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.2.3.3.3.1-2 and the response data structures and response codes specified in table 6.2.3.3.3.1-3.

Table 6.2.3.3.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AmfNon3GppAccessRegistration | M | 1 | The AMF registration for non 3GPP access is replaced with the received information. |

Table 6.2.3.3.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| AmfNon3GppAccessRegistration | M | 1 | 201 Created | Upon success, a response body containing a representation of the created Individual AmfNon3GppAccessRegistration resource shall be returned. |
| AmfNon3GppAccessRegistration | M | 1 | 200 OK | Upon success, a response body containing a representation of the updated Individual AmfNon3GppAccessRegistration resource shall be returned. |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - UNKNOWN\_5GS\_SUBSCRIPTION  - NO\_PS\_SUBSCRIPTION  - ROAMING\_NOT\_ALLOWED  - ACCESS\_NOT\_ALLOWED  - RAT\_NOT\_ALLOWED  - REAUTHENTICATION\_REQUIRED |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.2.3.3.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/amf-non-3gpp-access |

6.2.3.3.3.2 PATCH

This method shall support the URI query parameters specified in table 6.2.3.3.3.2-1.

Table 6.2.3.3.3.2-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.2.3.3.3.2-2 and the response data structures and response codes specified in table 6.2.3.3.3.2-3.

Table 6.2.3.3.3.2-2: Data structures supported by the PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AmfNon3GppAccessRegistrationModification | M | 1 | The AMF registration for non 3GPP access is modified with the received information. |

Table 6.2.3.3.3.2-3: Data structures supported by the PATCH Response Body on this resource

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Data type | | P | Cardinality | Response  codes | | Description | |
| n/a | |  |  | 204 No Content | | Upon success, an empty response body shall be returned. (NOTE 2) | |
| PatchResult | | M | | 1 | | 200 OK | | Upon success, the execution report is returned. (NOTE 2) | |
| ProblemDetails | | O | 0..1 | 404 Not Found | | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND  - USER\_NOT\_FOUND | |
| ProblemDetails | | O | 0..1 | 422 Unprocessable Entity | | The "cause" attribute may be used to indicate one of the following application errors:  - UNPROCESSABLE\_REQUEST | |
| NOTE 1: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported.  NOTE 2: If all the modification instructions in the PATCH request have been implemented, the UDM shall respond with 204 No Content response; if some of the modification instructions in the PATCH request have been discarded, and the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature number, the UDM shall respond with PatchResult. | | | | | | | |

6.2.3.3.3.3 GET

This method shall support the URI query parameters specified in table 6.2.3.3.3.3-1.

Table 6.2.3.3.3.3-1: URI query parameters supported by the GET method on this resource

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

This method shall support the request data structures specified in table 6.2.3.3.3.3-2 and the response data structures and response codes specified in table 6.2.3.3.3.3-3.

Table 6.2.3.3.3.3-2: Data structures supported by the GET Request Body on this resource

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

Table 6.2.3.3.3.3-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| AmfNon3GppAccessRegistration | M | 1 | 200 OK | Upon success, a response body containing the AmfNon3GppAccessRegistration shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.2.3.4 Resource: SmfRegistrations

##### 6.2.3.4.1 Description

This resource is used to represent SMF registrations.

##### 6.2.3.4.2 Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/smf-registrations

This resource shall support the resource URI variables defined in table 6.2.3.4.2-1.

Table 6.2.3.4.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.4.1 |
| ueId | VarUeId | Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |

##### 6.2.3.4.3 Resource Standard Methods

6.2.3.4.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.4.3.1-1.

Table 6.2.3.4.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| single-nssai | Snssai | O | 0..1 | When present without Slice Differentiator (sd), all slices identified by the given Slice/Service Type (sst) and any sd value (if any) shall be considered matching the query parameter. |
| dnn | Dnn | O | 0..1 | The DNN shall be the DNN Network Identifier only. |

JSON objects (such as Snssai, Dnn…) shall be included directly as part of the URI query parameters by specifying in the OpenAPI file that the "Content-Type" of such parameters is "application/json".

If "single-nssai" is not included, and "dnn" is not included, UDM shall return all SMF registrations for all DNN(s) and network slice(s).

If "single-nssai" is included, and "dnn" is not included, UDM shall return all SMF registrations for all DNN(s) and the requested network slice identified by "single-nssai".

If "single-nssai" is not included, and "dnn" is included, UDM shall return all SMF registrations for all network slices where such DNN is available.

If "single-nssai" is included, and "dnn" is included, UDM shall return the all SMF registrations identified by "dnn" and "single-nssai".

This method shall support the request data structures specified in table 6.2.3.4.3.1-2 and the response data structures and response codes specified in table 6.2.3.4.3.1-3.

Table 6.2.3.4.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.2.3.4.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmfRegistrationInfo | M | 1 | 200 OK | Upon success, a response body containing the SmfRegistrationInfo shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be set to one of the following application errors:  - CONTEXT\_NOT\_FOUND  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.2.3.5 Resource: IndividualSmfRegistration (Document)

##### 6.2.3.5.1 Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/smf-registrations/{pduSessionId}

This resource shall support the resource URI variables defined in table 6.2.3.5.1-1.

Table 6.2.3.5.1-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| ueId | VarUeId | Represents the Subscription Identifier (see 3GPP TS 23.501 [2] clause 5.9.2) SUPI (i.e. imsi or nai or gli or gci) is used with the PUT, DELETE and PATCH methods;  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |
| pduSessionId | PduSessionId | The pduSessionId identifies an individual SMF registration. |

##### 6.2.3.5.2 Resource Standard Methods

6.2.3.5.2.1 PUT

This method shall support the URI query parameters specified in table 6.2.3.5.2.1-1.

Table 6.2.3.5.2.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.2.3.5.2.1-2 and the response data structures and response codes specified in table 6.2.3.5.2.1-3.

Table 6.2.3.5.2.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SmfRegistration | M | 1 | The registration that is to be created |

Table 6.2.3.5.2.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmfRegistration | M | 1 | 201 Created | Upon success, a response body containing a representation of the created Individual SmfRegistration resource shall be returned. |
| SmfRegistration | M | 1 | 200 OK | Upon success, a response body containing a representation of the updated Individual SmfRegistration resource shall be returned. |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - ROAMING\_NOT\_ALLOWED  - DNN\_NOT\_ALLOWED |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.2.3.5.2.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/smf-registrations/{pduSessionId} |

6.2.3.5.2.2 DELETE

This method shall support the URI query parameters specified in table 6.2.3.5.2.2-1.

Table 6.2.3.5.2.2-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| smf-set-id | NfSetId | O | 0..1 | The smf-set-id may be used by the UDM to guard against deletion of registrations by NFs that do not belong to the same NF set as the registered SMF. |
| smf-instance-id | NfInstanceId | O | 0..1 | If the smf-set-id is not present, the smf-instance-id may be used by the UDM to guard against deletion of registrations by NF that is not the registered SMF. |

This method shall support the request data structures specified in table 6.2.3.5.2.2-2 and the response data structures and response codes specified in table 6.2.3.5.2.2-3.

Table 6.2.3.5.2.2-2: Data structures supported by the DELETE Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  | The request body shall be empty. |

Table 6.2.3.5.2.2-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

6.2.3.5.2.3 GET

This method shall support the URI query parameters specified in table 6.2.3.5.2.3-1.

Table 6.2.3.5.2.3-1: URI query parameters supported by the GET method on this resource

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

This method shall support the request data structures specified in table 6.2.3.5.2.3-2 and the response data structures and response codes specified in table 6.2.3.5.2.3-3.

Table 6.2.3.5.2.3-2: Data structures supported by the GET Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  | The request body shall be empty. |

Table 6.2.3.5.2.3-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmfRegistration | M | 1 | 200 OK | Upon success, a response body containing the SmfRegistration shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be set to one of the following application errors:  - CONTEXT\_NOT\_FOUND  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.2.3.6 Resource: Smsf3GppAccessRegistration (Document)

##### 6.2.3.6.1 Description

This resource represents the registered SMSF for 3GPP access.

##### 6.2.3.6.2 Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/smsf-3gpp-access

This resource shall support the resource URI variables defined in table 6.2.3.6.2-1.

Table 6.2.3.6.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.2.1 |
| ueId | VarUeId | Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2) SUPI (i.e. imsi or nai or gli or gci) is used with the PUT, DELETE and PATCH methods; GPSI (i.e. msisdn or extid) is used with the GET method.  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |

##### 6.2.3.6.3 Resource Standard Methods

6.2.3.6.3.1 PUT

This method shall support the URI query parameters specified in table 6.2.3.6.3.1-1.

Table 6.2.3.6.3.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.2.3.6.3.1-2 and the response data structures and response codes specified in table 6.2.3.6.3.1-3.

Table 6.2.3.6.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SmsfRegistration | M | 1 | The SMSF registration for 3GPP access is created or updated with the received information. |

Table 6.2.3.6.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmsfRegistration | M | 1 | 201 Created | Upon success, a response body containing a representation of the created Individual SmsfRegistration resource shall be returned. |
| SmsfRegistration | M | 1 | 200 OK | Upon success, a response body containing a representation of the updated Individual SmsfRegistration resource shall be returned. |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - UNKNOWN\_5GS\_SUBSCRIPTION  - ACCESS\_NOT\_ALLOWED  - ROAMING\_NOT\_ALLOWED |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.2.3.6.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/smsf-3gpp-access |

6.2.3.6.3.2 DELETE

This method shall support the URI query parameters specified in table 6.2.3.6.3.2-1.

Table 6.2.3.6.3.2-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| smsf-set-id | NfSetId | O | 0..1 | The smsf-set-id may be used by the UDM to guard against deletion of registrations by NFs that do not belong to the same NF set as the registered SMSF. |

This method shall support the request data structures specified in table 6.2.3.6.3.2-2 and the response data structures and response codes specified in table 6.2.3.6.3.2-3.

Table 6.2.3.6.3.2-2: Data structures supported by the DELETE Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  | The request body shall be empty. |

Table 6.2.3.6.3.2-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

6.2.3.6.3.3 GET

This method shall support the URI query parameters specified in table 6.2.3.6.3.3-1.

Table 6.2.3.6.3.3-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.2.3.6.3.3-2 and the response data structures and response codes specified in table 6.2.3.6.3.3-3.

Table 6.2.3.6.3.3-2: Data structures supported by the GET Request Body on this resource

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

Table 6.2.3.6.3.3-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmsfRegistration | M | 1 | 200 OK | Upon success, a response body containing the SmsfRegistration shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.2.3.7 Resource: SmsfNon3GppAccessRegistration (Document)

##### 6.2.3.7.1 Description

This resource represents the registered SMSF for non 3GPP access.

##### 6.2.3.7.2 Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/smsf-non-3gpp-access

This resource shall support the resource URI variables defined in table 6.2.3.7.2-1.

Table 6.2.3.7.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.2.1 |
| ueId | VarUeId | Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2) SUPI (i.e. imsi or nai or gli or gci) is used with the PUT, DELETE and PATCH methods; GPSI (i.e. msisdn or extid) is used with the GET method.  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |

##### 6.2.3.7.3 Resource Standard Methods

6.2.3.7.3.1 PUT

This method shall support the URI query parameters specified in table 6.2.3.7.3.1-1.

Table 6.2.3.7.3.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.2.3.7.3.1-2 and the response data structures and response codes specified in table 6.2.3.7.3.1-3.

Table 6.2.3.7.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SmsfRegistration | M | 1 | The SMSF registration for non 3GPP access is created or updated with the received information. |

Table 6.2.3.7.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmsfRegistration | M | 1 | 201 Created | Upon success, a response body containing a representation of the created Individual SmsfRegistration for non 3GPP access resource shall be returned. |
| SmsfRegistration | M | 1 | 200 OK | Upon success, a response body containing a representation of the updated Individual SmsfRegistration for non 3GPP access resource shall be returned. |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:The "cause" attribute shall be set to the following application error:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - UNKNOWN\_5GS\_SUBSCRIPTION  - ACCESS\_NOT\_ALLOWED  - ROAMING\_NOT\_ALLOWED |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.2.3.7.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/smsf-non-3gpp-access |

6.2.3.7.3.2 DELETE

This method shall support the URI query parameters specified in table 6.2.3.7.2.2-1.

Table 6.2.3.7.2.2-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| smsf-set-id | NfSetId | O | 0..1 | The smsf-set-id may be used by the UDM to guard against deletion of registrations by NFs that do not belong to the same NF set as than the registered SMSF. |

This method shall support the request data structures specified in table 6.2.3.7.2.2-2 and the response data structures and response codes specified in table 6.2.3.5.2.2-3.

Table 6.2.3.7.2.2-2: Data structures supported by the DELETE Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  | The request body shall be empty. |

Table 6.2.3.7.2.2-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

6.2.3.7.3.3 GET

This method shall support the URI query parameters specified in table 6.2.3.7.3.3-1.

Table 6.2.3.7.3.3-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.2.3.7.3.3-2 and the response data structures and response codes specified in table 6.2.3.7.3.3-3.

Table 6.2.3.7.3.3-2: Data structures supported by the GET Request Body on this resource

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

Table 6.2.3.7.3.3-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SmsfRegistration | M | 1 | 200 OK | Upon success, a response body containing the SmsfRegistration shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.2.3.8 Resource: Location

##### 6.2.3.8.1 Description

This resource is used to represent UE's location information.

##### 6.2.3.8.2 Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/location

This resource shall support the resource URI variables defined in table 6.2.3.8.2-1.

Table 6.2.3.8.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.4.1 |
| ueId | VarUeId | Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |

##### 6.2.3.8.3 Resource Standard Methods

6.2.3.8.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.8.3.1-1.

Table 6.2.3.8.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.2.3.8.3.1-2 and the response data structures and response codes specified in table 6.2.3.8.3.1-3.

Table 6.2.3.8.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.2.3.8.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| LocationInfo | M | 1 | 200 OK | Upon success, a response body containing the locationInfo shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.2.3.9 Resource: Registrations

##### 6.2.3.9.1 Description

This resource represents the UE's registration data sets.

##### 6.2.3.9.2 Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations

This resource shall support the resource URI variables defined in table 6.2.3.9.2-1.

Table 6.2.3.9.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.2.1 |
| ueId | Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2) SUPI (i.e. imsi or nai) or GPSI (i.e. msisdn or extid) is used with the GET method.  pattern: "(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|.+)" |

##### 6.2.3.9.3 Resource Standard Methods

6.2.3.9.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.9.3.1-1.

NOTE: The retrieval of these registration data sets can also be achieved by sending individual GET requests to the corresponding sub-resources under the {ueId}/registraions resource. When multiple registration data sets need to be retrieved by the NF Service consumer, it is recommended to use a single GET request with query parameters rather than issuing multiple GET requests.

Table 6.2.3.9.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| registration-dataset-names | array(RegistrationDataSetName) | O | 2..N | If included, this IE shall contain the names of registration data sets to be retrieved. |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| single-nssai | Snssai | O | 0..1 | Only applicable if registration-dataset-names contains SMF\_PDU\_SESSIONS  When present without Slice Differentiator (sd), all slices identified by the given Slice/Service Type (sst) and any sd value (if any) shall be considered matching the query parameter. |
| dnn | Dnn | O | 0..1 | The DNN shall be the DNN Network Identifier only.  Only applicable if registration-dataset-names contains SMF\_PDU\_SESSIONS |

This method shall support the request data structures specified in table 6.2.3.9.3.1-2 and the response data structures and response codes specified in table 6.2.3.9.3.1-3.

Table 6.2.3.9.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.2.3.9.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| RegistrationDataSets | M | 1 | 200 OK | Upon success, a response body containing all the requested UE registration data sets shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute shall be set to one of the following application errors:  - CONTEXT\_NOT\_FOUND  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.2.3.10 Resource: IpSmGwRegistration

##### 6.2.3.10.1 Description

This resource represents the registered IP-SM-GW.

##### 6.2.3.10.2 Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/ip-sm-gw

This resource shall support the resource URI variables defined in table 6.2.3.10.2-1.

Table 6.2.3.10.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.2.1 |
| ueId | Represents the Subscription Identifier (SUPI).  pattern: "(imsi-[0-9]{5,15}|nai-.+|.+)" |

##### 6.2.3.10.3 Resource Standard Methods

6.2.3.10.3.1 PUT

This method shall support the URI query parameters specified in table 6.2.3.10.3.1-1.

Table 6.2.3.10.3.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.2.3.10.3.1-2 and the response data structures and response codes specified in table 6.2.3.10.3.1-3.

Table 6.2.3.10.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| IpSmGwRegistration | M | 1 | The IP-SM-GW registration is created or updated with the received information. |

Table 6.2.3.10.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| IpSmGwRegistration | M | 1 | 201 Created | Upon success, a response body containing a representation of the created IpSmGwRegistration resource shall be returned. |
| IpSmGwRegistration | M | 1 | 200 OK | Upon success, a response body containing a representation of the updated IpSmGwRegistration resource shall be returned. |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate any of the following application errors:  - UNKNOWN\_5GS\_SUBSCRIPTION |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate any of the following application errors:  - USER\_NOT\_FOUND |

6.2.3.10.3.2 DELETE

This method shall support the URI query parameters specified in table 6.2.3.10.3.2-1.

Table 6.2.3.10.3.2-1: URI query parameters supported by the DELETE method on this resource

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

This method shall support the request data structures specified in table 6.2.3.10.3.2-2 and the response data structures and response codes specified in table 6.2.3.10.3.2-3.

Table 6.2.3.10.3.2-2: Data structures supported by the DELETE Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  | The request body shall be empty. |

Table 6.2.3.10.3.2-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |

6.2.3.10.3.3 GET

This method shall support the URI query parameters specified in table 6.2.3.10.3.3-1.

Table 6.2.3.10.3.3-1: URI query parameters supported by the GET method on this resource

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

This method shall support the request data structures specified in table 6.2.3.10.3.3-2 and the response data structures and response codes specified in table 6.2.3.10.3.3-3.

Table 6.2.3.10.3.3-2: Data structures supported by the GET Request Body on this resource

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

Table 6.2.3.10.3.3-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| IpSmGwRegistration | M | 1 | 200 OK | Upon success, a response body containing the IpSmGwRegistration shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be set to indicate any of the following application errors:  - USER\_NOT\_FOUND  - CONTEXT\_NOT\_FOUND |

### 6.2.4 Custom Operations without associated resources

#### 6.2.4.1 Overview

Table 6.2.4.1-1: Custom operations without associated resources

|  |  |  |  |
| --- | --- | --- | --- |
| Operation Name | Custom operation URI | Mapped HTTP method | Description |
| Trigger P-CSCF Restoration | /restore-pcscf | POST | The UDM notifies the registered AMFs and SMFs that have subscribed (implicitly by providing a callback URI during registration) to receive notifications about P-CSCF Restoration. |

#### 6.2.4.2 Operation: Trigger P-CSCF Restoration

##### 6.2.4.2.1 Description

This custom operation is used by the NF service consumer (HSS) to trigger P-CSCF restoration.

##### 6.2.4.2.2 Operation Definition

This operation shall support the data structures and response codes specified in tables 6.2.4.2.2-1 and 6.2.4.2.2-2.

Table 6.2.4.2.2-1: Data structures supported by the Request Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| TriggerRequest | M | 1 | Identifies the subscriber for whom P-CSCF Restoration is requested |

Table 6.2.4.2.2-2: Data structures supported by the POST Response Body

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND |

### 6.2.5 Notifications

#### 6.2.5.1 General

This clause will specify the use of notifications and corresponding protocol details if required for the specific service. When notifications are supported by the API, it will include a reference to the general description of notifications support over the 5G SBIs specified in TS 29.500 / TS 29.501.

Table 6.2.5.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Resource URI | HTTP method or custom operation | Description  (service operation) |
| Deregistration Notification | {deregCallbackUri} | POST |  |
| P-CSCF Restoration Notification | {pcscfRestorationCallbackUri} | POST |  |

#### 6.2.5.2 Deregistration Notification

The POST method shall be used for Deregistration Notifications and the URI shall be as provided during the registration procedure.

Resource URI: {callbackReference}

Support of URI query parameters is specified in table 6.2.5.2-1.

Table 6.2.5.2-1: URI query parameters supported by the POST method

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

Support of request data structures is specified in table 6.2.5.2-2 and of response data structures and response codes is specified in table 6.2.5.2-3.

Table 6.2.5.2-2: Data structures supported by the POST Request Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| DeregistrationData | M | 1 | Includes Deregistration Reason |

Table 6.2.5.2-3: Data structures supported by the POST Response Body

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing a different URI. The URI shall be an alternative URI of the resource located on an alternative service instance within the same NF or NF (service) set.  If an SCP redirects the message to another SCP then the location header field shall contain the same URI or a different URI pointing to the endpoint of the NF service consumer to which the notification should be sent. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing a different URI. The URI shall be an alternative URI of the resource located on an alternative service instance within the same NF or NF (service) set.  If an SCP redirects the message to another SCP then the location header field shall contain the same URI or a different URI pointing to the endpoint of the NF service consumer to which the notification should be sent. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.2.5.2-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the Callback URI of the target NF Service Consumer (e.g. AMF) to which the request is redirected |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.2.5.2-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the Callback URI of the target NF Service Consumer (e.g. AMF) to which the request is redirected |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

#### 6.2.5.3 P-CSCF Restoration Notification

The POST method shall be used for P-CSCF Restoration Notifications and the URI shall be as provided during the registration procedure.

Resource URI: {callbackReference}

Support of URI query parameters is specified in table 6.2.5.3-1.

Table 6.2.5.3-1: URI query parameters supported by the POST method

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

Support of request data structures is specified in table 6.2.5.3-2 and of response data structures and response codes is specified in table 6.2.5.3-3.

Table 6.2.5.3-2: Data structures supported by the POST Request Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| PcscfRestorationNotification | M | 1 | contains the SUPI |

Table 6.2.5.3-3: Data structures supported by the POST Response Body

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing a different URI. The URI shall be an alternative URI of the resource located on an alternative service instance within the same NF or NF (service) set.  If an SCP redirects the message to another SCP then the location header field shall contain the same URI or a different URI pointing to the endpoint of the NF service consumer to which the notification should be sent. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing a different URI. The URI shall be an alternative URI of the resource located on an alternative service instance within the same NF or NF (service) set.  If an SCP redirects the message to another SCP then the location header field shall contain the same URI or a different URI pointing to the endpoint of the NF service consumer to which the notification should be sent. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 409 Conflict | The "cause" attribute may be used to indicate one of the following application errors:  - TEMPORARY\_REJECT\_REGISTRATION\_ONGOING  - TEMPORARY\_REJECT\_HANDOVER\_ONGOING |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.2.5.3-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the Callback URI of the target NF Service Consumer (e.g. AMF) to which the request is redirected |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.2.5.3-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the Callback URI of the target NF Service Consumer (e.g. AMF) to which the request is redirected |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

### 6.2.6 Data Model

#### 6.2.6.1 General

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

Table 6.2.6.1-1 specifies the data types defined for the Nudm\_UECM service API.

Table 6.2.6.1-1: Nudm\_UECM specific Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| Amf3GppAccessRegistration | 6.2.6.2.2 | The complete set of information relevant to the AMF where the UE has registered via 3GPP access. |
| AmfNon3GppAccessRegistration | 6.2.6.2.3 | The complete set of information relevant to the AMF where the UE has registered via non 3GPP access. |
| SmfRegistration | 6.2.6.2.4 | The complete set of information relevant to an SMF serving the UE |
| SmsfRegistration | 6.2.6.2.6 | The complete set of information relevant to the SMSF serving the UE. |
| DeregistrationData | 6.2.6.2.5 | Data sent with the Deregistration Notification |
| Amf3GppAccessRegistrationModification | 6.2.6.2.7 | Contains attributes of Amf3GppAccessRegistration that can be modified using PATCH |
| AmfNon3GppAccessRegistrationModification | 6.2.6.2.8 | Contains attributes of AmfNon3GppAccessRegistration that can be modified using PATCH |
| PcscfRestorationNotification | 6.2.6.2.9 | Information sent to the AMF or SMF when P-CSCF restoration is triggered. |
| NetworkNodeDiameterAddress | 6.2.6.2.10 |  |
| EpsIwkPgw | 6.2.6.2.11 |  |
| TriggerRequest | 6.2.6.2.12 |  |
| AmfDeregInfo | 6.2.6.2.13 |  |
| EpsInterworkingInfo | 6.2.6.2.14 |  |
| LocationInfo | 6.2.6.2.15 | Information used by (H)GMLC to send Location Service Request |
| RegistrationLocationInfo | 6.2.6.2.16 | Serving AMF, optional VGMLC and access type related informations used by (H)GMLC to send Location Request |
| VgmlcAddress | 6.2.6.2.17 | The address(es) of VGMLC |
| PeiUpdateInfo | 6.2.6.2.18 |  |
| RegistrationDataSets | 6.2.6.2.19 |  |
| IpSmGwRegistration | 6.2.6.2.20 |  |
| SmfRegistrationInfo | 6.2.6.2.20A | SMF Registration Information |
| PurgeFlag | 6.2.6.3.2 | This flag indicates whether or not the NF has deregistered. |
| E164Number | 6.2.6.3.2 |  |
| DualRegistrationFlag | 6.2.6.3.2 | Dual Registration Flag |
| DeregistrationReason | 6.2.6.3.3 |  |
| ImsVoPs | 6.2.6.3.4 |  |
| RegistrationReason | 6.2.6.3.5 |  |
| RegistrationDataSetName | 6.2.6.3.6 |  |

Table 6.2.6.1-2 specifies data types re-used by the Nudm\_uecm service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudm\_uecm service API.

Table 6.2.6.1-2: Nudm\_UECM re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| Dnn | 3GPP TS 29.571 [7] | Data Network Name with Network Identifier only. |
| NfInstanceId | 3GPP TS 29.571 [7] | Network Function Instance Identifier |
| PduSessionId | 3GPP TS 29.571 [7] | PDU Session ID |
| Pei | 3GPP TS 29.571 [7] | Permanent Equipment Identifier |
| ProblemDetails | 3GPP TS 29.571 [7] | Common data type used in response bodies |
| Uri | 3GPP TS 29.571 [7] | Uniform Resource Identifier |
| SupportedFeatures | 3GPP TS 29.571 [7] | see 3GPP TS 29.500 [4] clause 6.6 |
| Supi | 3GPP TS 29.571 [7] | see 3GPP TS 23.501 [2] clause 5.9.2 |
| Guami | 3GPP TS 29.571 [7] | Globally Unique AMF Identifier |
| PlmnId | 3GPP TS 29.571 [7] | PLMN Identity |
| DiameterIdentity | 3GPP TS 29.571 [7] |  |
| AccessType | 3GPP TS 29.571 [7] | Access Type |
| BackupAmfInfo | 3GPP TS 29.571 [7] | Backup AMFs |
| ServiceName | 3GPP TS 29.510 [19] |  |
| PatchResult | 3GPP TS 29.571 [7] |  |
| Gpsi | 3GPP TS 29.571 [7] | Generic Public Subscription Identitfier |
| Ipv4Addr | 3GPP TS 29.571 [7] | IPv4 address |
| Ipv6Addr | 3GPP TS 29.571 [7] | IPv6 address |
| Fqdn | 3GPP TS 29.510 [19] | Fully Qualified Domain Name |
| Snssai | 3GPP TS 29.571 [7] | Single NSSAI |
| RedirectResponse | 3GPP TS 29.571 [7] | Response body of the redirect response message |

#### 6.2.6.2 Structured data types

##### 6.2.6.2.1 Introduction

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

##### 6.2.6.2.2 Type: Amf3GppAccessRegistration

Table 6.2.6.2.2-1: Definition of type Amf3GppAccessRegistration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| amfInstanceId | NfInstanceId | M | 1 | The identity the AMF uses to register in the NRF. |
| deregCallbackUri | Uri | M | 1 | A URI provided by the AMF to receive (implicitly subscribed) notifications on deregistration.  The deregistration callback URI shall have unique information within AMF set to identify the UE to be deregistered. |
| guami | Guami | M | 1 | This IE shall contain the serving AMF's GUAMI. |
| ratType | RatType | M | 1 | This IE shall indicate the current RAT type of the UE. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.2.8 These are the features supported by the AMF. |
| purgeFlag | PurgeFlag | O | 0..1 | This flag indicates whether or not the AMF has deregistered. It shall not be included in the Registration service operation. |
| pei | Pei | O | 0..1 | Permanent Equipment Identifier.  Absence of PEI indicates that the PEI is not available at the AMF. In this case the UDM/UDR shall not delete the PEI value stored from a previous registration. |
| imsVoPs | ImsVoPs | O | 0..1 | Indicates per UE if "IMS Voice over PS Sessions" is homogeneously supported in all TAs in the serving AMF, or homogeneously not supported, or if support is non-homogeneous/unknown. Absence of this attribute shall be interpreted as "non homogenous or unknown" support. |
| amfServiceNameDereg | ServiceName | O | 0..1 | When present, this IE shall contain the name of the AMF service to which the Deregistration Notification is to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]). |
| pcscfRestorationCallbackUri | Uri | O | 0..1 | A URI provided by the AMF to receive (implicitly subscribed) notifications on the need for P-CSCF Restoration. |
| amfServiceNamePcscfRest | ServiceName | O | 0..1 | When present, this IE shall contain the name of the AMF service to which P-CSCF Restoration Notifications are to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]). This IE may be included if pcscfRestorationCallbackUri is present. |
| initialRegistrationInd | boolean | C | 0..1 | This IE shall be included by the AMF and set to true if the UE performs an Initial Registration. If the UE does not perform initial registration it shall be absent or set to false. When present and true, the UDM+HSS is requested to cancel previous registration in SGSN, if any.  Not applicable for Nudr and Nudm\_UECM GET operation.  (NOTE 2) |
| backupAmfInfo | array(BackupAmfInfo) | C | 1..N | This IE shall be included if the NF service consumer is an AMF and the AMF supports the AMF management without UDSF for the first interaction with UDM.  The UDM uses this attribute to do an NRF query in order to invoke later services in a backup AMF, e.g. Namf\_EventExposure. |
| drFlag | DualRegistrationFlag | O | 0..1 | Dual Registration flag. When present and true, this flag indicates that the UDM+HSS is requested not to send S6a-CLR to the registered MME/SGSN (if any). Otherwise, the registered MME (if any) shall be cancelled.  Not applicable for Nudr and Nudm\_UECM GET operation. |
| urrpIndicator | boolean | O | 0..1 | This IE indicates whether "UE\_REACHABILITY\_FOR\_SMS" event for this user has been subscribed or not:  - true: the event has been subscribed  - false, or absence of this attribute: the event for this user is currently not subscribed  (NOTE 1) |
| amfEeSubscriptionId | Uri | C | 0..1 | Shall be present if urrpIndicator is true and the UDM has subscribed to ReachabilityReport event for "UE Reachability for DL Traffic" at the AMF to receive One-Time UE Activity notification. It contains the subscription Id UrRI allocated by the AMF as received by the UDM in the HTTP "Location" header of the Namf\_EventExposure\_Subscribe response. The UDM shall make use of the Nudr\_DataRepository Update service operation (see 3GPP TS 29.504 [9]) to store the amfEeSubscription Id in the UDR. |
| epsInterworkingInfo | EpsInterworkingInfo | C | 0..1 | This IE shall be included if the AMF has determined per APN/DNN which PGW-C+SMF is selected for EPS interworking with N26 and the AMF supports EPS interworking of non-3GPP access. For each APN/DNN, only one PGW-C+SMF shall be selected by the AMF for EPS interworking. |
| ueSrvccCapability | boolean | O | 0..1 | This IE indicates whether the UE supports 5G SRVCC:  - true: 5G SRVCC is supported by the UE and AMF;  - false, or absence of this attribute: 5G SRVCC is not supported. |
| registrationTime | DateTime | C | 0..1 | Time of Amf3GppAccessRegistration. Shall be present when used on Nudr. |
| vgmlcAddress | VgmlcAddress | O | 0..1 | Address of the VGMLC |
| contextInfo | ContextInfo | C | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with the 3GppAccessRegistration.  Shall be absent on Nudm and may be present on Nudr |
| noEeSubscriptionInd | boolean | O | 0..1 | This IE shall be absent on Nudr and may be present on Nudm. This indication is used by UDM to restore any possible ongoing subscription lost, as specified in clause 5.3.2.2.2.  When present, this IE shall indicate whether AMF does not have event exposure subscriptions in UE Context:  - true: No Event Exposure subscription existing in UE Context in AMF.  - false: Event Exposure subscription(s) exist in UE Context in AMF. |
| supi | Supi | C | 0..1 | This IE may be included by the AMF in registration requests and should be included by UDM in GET responses when the corresponding GET request provided a GPSI UE identity. |
| NOTE 1: The urrpIndicator attribute shall only be exposed over the Nudr SBI, and it shall not be included by the AMF.  NOTE 2: Regardless of the Dual Registration Flag, the SGSN, if any, is required to be cancelled (see 3GPP TS 23.502 [3] clause 4.11.5.2) | | | | |

##### 6.2.6.2.3 Type: AmfNon3GppAccessRegistration

Table 6.2.6.2.3-1: Definition of type AmfNon3GppAccessRegistration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| amfInstanceId | NfInstanceId | M | 1 | The identity the AMF uses to register in the NRF. |
| deregCallbackUri | Uri | M | 1 | A URI provided by the AMF to receive (implicitly subscribed) notifications on deregistration.  The deregistration callback URI shall have unique information within AMF set to identify the UE to be deregistered. | |
| guami | Guami | M | 1 | This IE shall contain the serving AMF's GUAMI. | |
| ratType | RatType | M | 1 | This IE shall indicate the current RAT type of the UE. | |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.2.8 These are the features supported by the AMF. |
| purgeFlag | PurgeFlag | O | 0..1 | This flag indicates whether or not the AMF has deregistered. It shall not be included in the Registration service operation. |
| pei | Pei | O | 0..1 | Permanent Equipment Identifier  Absence of PEI indicates that the PEI is not available at the AMF. In this case the UDM/UDR shall not delete the PEI value stored from a previous registration. |
| imsVoPs | ImsVoPs | M | 1 | Indicates per UE if "IMS Voice over PS Sessions" is supported, or not supported.  The value NON\_HOMOGENEOUS\_OR\_UNKNOWN is not applicable. |
| amfServiceNameDereg | ServiceName | O | 0..1 | When present, this IE shall contain the name of the AMF service to which the Deregistration Notification is to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]). |
| pcscfRestorationCallbackUri | Uri | O | 0..1 | A URI provided by the AMF to receive (implicitly subscribed) notifications on the need for P-CSCF Restoration. |
| amfServiceNamePcscfRest | ServiceName | O | 0..1 | When present, this IE shall contain the name of the AMF service to which P-CSCF Restoration Notifications are to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]). This IE may be included if pcscfRestorationCallbackUri is present. |
| backupAmfInfo | array(BackupAmfInfo) | C | 1..N | This IE shall be included if the NF service consumer is an AMF and the AMF supports the AMF management without UDSF for the first interaction with UDM.  The UDM uses this attribute to do an NRF query in order to invoke later services in a backup AMF, e.g. Namf\_EventExposure. |
| urrpIndicator | boolean | O | 0..1 | This IE indicates whether "UE\_REACHABILITY\_FOR\_SMS" event for this user has been subscribed or not:  - true: the event has been subscribed  - false, or absence of this attribute: the event for this user is currently not subscribed |
| amfEeSubscriptionId | Uri | C | 0..1 | Shall be present if urrpIndicator is true and the UDM has subscribed to Reachability-Report event for "UE Reachable for DL Traffic" at the AMFto receive One-Time UE Activity notification. It contains the subscription Id URI allocated by the AMF as received by the UDM in the HTTP "Location" header of the Namf\_EventExposure\_Subscribe response. The UDM shall make use of the Nudr\_DataRepository Update service operation (see 3GPP TS 29.504 [9]) to store the amfEeSubscription Id in the UDR. |
| registrationTime | DateTime | C | 0..1 | Time of AmfNon3GppAccessRegistration. Shall be present when used on Nudr. |
| vgmlcAddress | VgmlcAddress | O | 0..1 | Address of the VGMLC |
| contextInfo | ContextInfo | C | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with AmfNon3GppRegistration.  Shall be absent on Nudm and may be present on Nudr. |
| noEeSubscriptionInd | boolean | O | 0..1 | This IE shall be absent on Nudr and may be present on Nudm. This indication is used by UDM to restore any possible ongoing subscription lost, as specified in clause 5.3.2.2.3.  When present, this IE shall indicate whether AMF does not have event exposure subscriptions in UE Context:  - true: No Event Exposure subscription existing in UE Context in AMF.  - false: Event Exposure subscription(s) exist in UE Context in AMF. |
| supi | Supi | C | 0..1 | This IE may be included by the AMF in registration requests and should be included by UDM in GET responses when the corresponding GET request provided a GPSI UE identity. |
| NOTE: The urrpIndicator attribute shall only be exposed over the Nudr SBI, and it shall not be included by the AMF. | | | | |

##### 6.2.6.2.4 Type: SmfRegistration

Table 6.2.6.2.4-1: Definition of type SmfRegistration

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| smfInstanceId | | NfInstanceId | | M | | 1 | | NF Instance Id of the SMF | |
| smfSetId | | NfSetId | | C | | 0..1 | | This IE shall be present if the SMF belongs to a SMF SET.  If present, it indicates the NF Set ID of SMF Set. | |
| supportedFeatures | | SupportedFeatures | | O | | 0..1 | | See clause 6.2.8 These are the features supported by the SMF. | |
| pduSessionId | | PduSessionId | | M | | 1 | | PDU Session ID | |
| singleNssai | | Snssai | | M | | 1 | | A single Network Slice Selection Assistance Information | |
| dnn | | Dnn | | C | | 0..1 | | Data Network Name; shall be present if emergencyServices is false or absent.  When present, this IE shall contain the Network Identifier only. | |
| emergencyServices | | boolean | | C | | 0..1 | | Indication of Emergency Services; absence indicates false. | |
| pcscfRestorationCallbackUri | | Uri | | O | | 0..1 | | a URI provided by the SMF to receive (implicitly subscribed) notifications on the need for P-CSCF Restoration | |
| plmnId | | PlmnId | | M | | 1 | | Serving node PLMN identity. | |
| pgwFqdn | | string | | C | | 0..1 | | FQDN of the PGW in the "PGW-C+SMF", to be included for interworking with EPS. | |
| epdgInd | | boolean | | O | | 0..1 | | Indicate whether access is from ePDG.  true: access from ePDG.  false or absent: not access from ePDG | |
| deregCallbackUri | | Uri | | O | | 0..1 | | A URI provided by the SMF to receive (implicitly subscribed) notifications on deregistration.  The deregistration callback URI shall have unique information within SMF set to identify the UE to be deregistered. | |
| registrationReason | | RegistrationReason | | O | | 0..1 | | Indicates registration reason. | |
| registrationTime | | DateTime | | C | | 0..1 | | Time of SmfRegistration. Shall be present when used on Nudr. | |
| contextInfo | | ContextInfo | | C | | 0..1 | | This IE if present may contain e.g. the headers received by the UDM along with the SmfRegistration.  Shall be absent on Nudm and may be present on Nudr. | |

##### 6.2.6.2.5 Type: DeregistrationData

Table 6.2.6.2.5-1: Definition of type DeregistrationData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| deregReason | DeregistrationReason | M | 1 | String; see clause 6.2.6.3.3 |
| accessType | AccessType | C | 0..1 | Access type where the UE is deregistered. Shall be present in Deregistration Notifications sent to the AMF. |
| pduSessionId | PduSessionId | C | 0..1 | It shall be present if the deregistration of SMF happens.  If present, indicates PDU Session ID for which old SMF is deregistered. |
| newSmfInstanceId | NfInstanceId | O | 0..1 | NF Instance Id of the new SMF to which the SMF context is transferred. |

##### 6.2.6.2.6 Type: SmsfRegistration

Table 6.2.6.2.6-1: Definition of type SmsfRegistration

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| smsfInstanceId | | NfInstanceId | | M | | 1 | | NF Instance Id of the SMSF | |
| smsfSetId | | NfSetId | | C | | 0..1 | | This IE shall be present if the SMSF belongs to an SMSF SET.  If present, it indicates the NF Set ID of SMSF Set. | |
| supportedFeatures | | SupportedFeatures | | O | | 0..1 | | See clause 6.2.8 These are the features supported by the SMSF. | |
| plmnId | | PlmnId | | M | | 1 | | Serving node PLMN identity | |
| smsfMAPAddress | | E164Number | | C | | 0..1 | | International E.164 number of the SMSF; shall be present if the SMSF supports MAP (see 3GPP TS 29.002 [21]) | |
| smsfDiameterAddress | | NetworkNodeDiameterAddress | | C | | 0..1 | | shall be present if the SMSF supports Diameter (see 3GPP TS  29.338 [22]) | |
| registrationTime | | DateTime | | C | | 0..1 | | Time of SmsfRegistration. Shall be present when used on Nudr. | |
| contextInfo | | ContextInfo | | C | | 0..1 | | This IE if present may contain e.g. the headers received by the UDM along with the SmsfRegistration.  Shall be absent on Nudm and may be present on Nudr.. | |

##### 6.2.6.2.7 Type: Amf3GppAccessRegistrationModification

This type is derived from the type Amf3GppAccessRegistration by deleting all attributes that are not subject to modification by means of the HTTP PATCH method.

Table 6.2.6.2.7-1: Definition of type Amf3GppAccessRegistrationModification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| guami | Guami | M | 1 | Guami of the AMF requesting the modification. If the MCC, MNC, AMF Region ID and AMF Set ID within the guami do not match the stored value, the modification request shall be rejected. |
| purgeFlag | PurgeFlag | O | 0..1 | This flag indicates whether or not the AMF has deregistered. It shall be included in the Deregistration service operation with a value of "TRUE". |
| pei | Pei | O | 0..1 | Permanent Equipment Identifier. |
| imsVoPs | ImsVoPs | O | 0..1 | Indicates per UE if "IMS Voice over PS Sessions" is homogeneously supported in all TAs in the serving AMF, or homogeneously not supported, or if support is non-homogeneous/unknown |
| backupAmfInfo | array(BackupAmfInfo) | C | 0..N | This IE shall be included if the NF service consumer is an AMF and the AMF supports the AMF management without UDSF for the Modification of the BackupAmfInfo.  The UDM uses this attribute to do an NRF query in order to invoke later services in a backup AMF, e.g. Namf\_EventExposure |
| epsInterworkingInfo | EpsInterworkingInfo | C | 0..1 | This IE shall be included if the AMF has determined per APN/DNN which PGW-C+SMF is selected for EPS interworking with N26 and the AMF supports EPS interworking of non-3GPP access. This IE shall also be included to update the PGW-C+SMF information if the AMF selects another PGW-C+SMF for EPS interworking with N26 for the same DNN. For each APN/DNN, only one PGW-C+SMF shall be selected by the AMF for EPS interworking. |
| ueSrvccCapability | boolean | O | 0..1 | This IE indicates whether the UE supports 5G SRVCC:  - true: 5G SRVCC is supported by the UE and AMF;  - false: 5G SRVCC is not supported. |
| Note: Absence of optional attributes indicates: no modification. Attributes of this type are not marked "nullable: true" in the OpenAPI file as deletion of these attributes is not applicable. | | | | |

##### 6.2.6.2.8 Type: AmfNon3GppAccessRegistrationModification

This type is derived from the type AmfNon3GppAccessRegistration by deleting all attributes that are not subject to modification by means of the HTTP PATCH method.

Table 6.2.6.2.8-1: Definition of type AmfNon3GppAccessRegistrationModification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| guami | Guami | M | 1 | Guami of the AMF requesting the modification. If the MCC, MNC, AMF Region ID and AMF Set ID within the guami do not match the stored value, the modification request shall be rejected. |
| purgeFlag | PurgeFlag | O | 0..1 | This flag indicates whether or not the AMF has deregistered. It shall be included in the Deregistration service operation with a value of "TRUE". |
| pei | Pei | O | 0..1 | Permanent Equipment Identifier |
| imsVoPs | ImsVoPs | O | 0..1 | If present indicates per UE that support of "IMS Voice over PS Sessions" has been modified to supported or not supported".  The value NON\_HOMOGENEOUS\_OR\_UNKNOWN is not applicable. |
| backupAmfInfo | array(BackupAmfInfo) | C | 0..N | This IE shall be included if the NF service consumer is an AMF and the AMF supports the AMF management without UDSF for the Modification of the BackupAmfInfo.  The UDM uses this attribute to do an NRF query in order to invoke later services in a backup AMF, e.g. Namf\_EventExposure |
| Note: Absence of optional attributes indicates: no modification. Attributes of this type are not marked "nullable: true" in the OpenAPI file as deletion of these attributes is not applicable. | | | | |

##### 6.2.6.2.9 Type: PcscfRestorationNotification

Table 6.2.6.2.9-1: Definition of type PcscfRestorationNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| supi | Supi | M | 1 | A SUPI that is served by the failed P-CSCF |

##### 6.2.6.2.10 Type: NetworkNodeDiameterAddress

Table 6.2.6.2.10-1: Definition of type NetworkNodeDiameterAddress

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| name | DiameterIdentity | M | 1 |  |
| realm | DiameterIdentity | M | 1 |  |

##### 6.2.6.2.11 Type: EpsIwkPgw

Table 6.2.6.2.11-1: Definition of type EpsIwkPgw

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| pgwFqdn | string | M | 1 | The PGW FQDN of the "PGW-C+SMF" |
| smfInstanceId | NfInstanceId | M | 1 | The SMF Instance Id of the "PGW-C+SMF" |

##### 6.2.6.2.12 Type: TriggerRequest

Table 6.2.6.2.12-1: Definition of type TriggerRequest

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| supi | Supi | M | 1 |  |

##### 6.2.6.2.13 Type: AmfDeregInfo

Table 6.2.6.2.13-1: Definition of type AmfDeregInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| deregReason | DeregistrationReason | M | 1 | String; see clause 6.2.6.3.3 |

##### 6.2.6.2.14 Type: EpsInterworkingInfo

Table 6.2.6.2.14-1: Definition of type EpsInterworkingInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| epsIwkPgws | map(EpsIwkPgw) | O | 0..N | A map (list of key-value pairs where dnn serves as key) of EpsIwkPgws.  An empty map is used in Amf3GppAccessRegistrationModification to delete the epsInterworkingInfo. |

##### 6.2.6.2.15 Type: LocationInfo

Table 6.2.6.2.15-1: Definition of type LocationInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| supi | Supi | O | 0..1 | Subscription Permanent Identifier (NOTE 1) |
| gpsi | Gpsi | O | 0..1 | Generic Public Subscription Identifier (NOTE 1) |
| registrationLocationInfoList | array(RegistrationLocationInfo) | M | 1..2 | Serving AMF, optional VGMLC and access type related informations used by (H)GMLC to send Location Request (NOTE 2) |
| supportedFeatures | SupportedFeatures | O | 0..1 | supported features of the UDM |
| NOTE 1: One of both shall be included to identify the target UE.  NOTE 2: At least, one of 3GPP and Non-3GPP access types shall be included to describe the location related information of the target UE for the access type. | | | | |

##### 6.2.6.2.16 Type: RegistrationLocationInfo

Table 6.2.6.2.16-1: Definition of type RegistrationLocationInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| amfInstanceId | NfInstanceId | M | 1 | The NF instance identity of the serving AMF. |
| guami | Guami | O | 0..1 | The GUAMI served by the serving AMF. |
| plmnId | PlmnId | C | 0..1 | Serving node PLMN identity is included if the target UE is in roaming case for the serving AMF. (NOTE) |
| vgmlcAddress | VgmlcAddress | C | 0..1 | The address(es) of VGMLC. (NOTE) |
| accessTypeList | array(AccessType) | M | 1..2 | Access type(s) where the UE is registered |
| NOTE: The two IEs are only be included if the target UE is registered in VPLMN via the serving AMF. | | | | |

##### 6.2.6.2.17 Type: VgmlcAddress

Table 6.2.6.2.17-1: Definition of type VgmlcAddress

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| vgmlcAddressIpv4 | Ipv4Addr | O | 0..1 | When present, indicates VGMLC IPv4 address. |
| vgmlcAddressIpv6 | Ipv6Addr | O | 0..1 | When present, indicates VGMLC IPv6 address. |
| vgmlcFqdn | Fqdn | O | 0,,1 | When present, indicates FQDN of the VGMLC IPv6 address. |
| NOTE: At least, one of VGMLC addresses should be included. | | | | |

##### 6.2.6.2.18 Type: PeiUpdateInfo

Table 6.2.6.2.18-1: Definition of type AmfDeregInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| pei | Pei | M | 1 |  |

##### 6.2.6.2.19 Type: RegistrationDataSets

Table 6.2.6.2.19-1: Definition of type RegistrationDataSets

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| amf3Gpp | Amf3GppAccessRegistration | O | 1 | AMF 3GPP Access Registration |
| amfNon3Gpp | AmfNon3GppAccessRegistration | O | 1 | AMF Non 3GPP Access Registration |
| smfRegistration | SmfRegistrationInfo | O | 0..1 | SMF Registration Information |
| smsf3Gpp | SmsfRegistration | O | 0..1 | SMSF 3GPP Access Registration |
| smsfNon3Gpp | SmsfRegistration | O | 0..1 | SMSF Non 3GPP Access Registration |

##### 6.2.6.2.20 Type: IpSmGwRegistration

Table 6.2.6.2.20-1: Definition of type IpSmGwRegistration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| ipSmGwMapAddress | E164Number | C | 0..1 | International E.164 number of the IP-SM-GW; it shall be present if the IP-SM-GW supports MAP (see 3GPP TS 29.002 [21]) |
| ipSmGwDiameterAddress | NetworkNodeDiameterAddress | C | 0..1 | Diameter Identity of the IP-SM-GW; it shall be present if the IP-SM-GW supports Diameter (see 3GPP TS 29.328 [52]) |
| unriIndicator | boolean | O | 0..1 | UE-Not-Reachable-for-IP (UNRI) flag as defined in 3GPP TS 23.040 [53]. This IE indicates whether the address list of MWD contains one or more entries because an attempt to deliver a short message to a UE via an IP-SM-GW has failed with a cause of Absent Subscriber:  - true: the MWD contains one or more list elements due to an SMS delivery failure  - false, or absence of this attribute: the MWD does not contain any list element |
| NOTE 1: At least one of the properties, ipSmGwMapAddress or ipSmGwDiameterAddress, shall be present.  NOTE 2: The unriIndicator attribute shall only be exposed over the Nudr SBI. | | | | |

##### 6.2.6.2.20A Type: SmfRegistrationInfo

Table 6.2.6.2.20A-1: Definition of type SmfRegistrationInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| smfRegistrationList | array(SmfRegistration) | M | 1..N | List of SmfRegistration. |

#### 6.2.6.3 Simple data types and enumerations

##### 6.2.6.3.1 Introduction

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

##### 6.2.6.3.2 Simple data types

The simple data types defined in table 6.2.6.3.2-1 shall be supported.

Table 6.2.6.3.2-1: Simple data types

|  |  |  |
| --- | --- | --- |
| Type Name | Type Definition | Description |
| PurgeFlag | boolean | This flag indicates whether or not the NF has deregistered. |
| E164Number | string | see ITU-T Recommendation E.164 [23] pattern: ^[0-9]{1,15}$ |
| DualRegistrationFlag | boolean | Dual Registration Flag |

##### 6.2.6.3.3 Enumeration: DeregistrationReason

The enumeration DeregistrationReason represents the reason for the Deregistration Notification. It shall comply with the provisions defined in table 6.2.6.3.3-1.

Table 6.2.6.3.3-1: Enumeration DeregistrationReason

|  |  |
| --- | --- |
| Enumeration value | Description |
| "UE\_INITIAL\_REGISTRATION" | When sent by the HSS; indicates that the deregistration towards the UDM is due to an initial attach in EPS.  When sent by the UDM; indicates that the deregistration in the old AMF is due to a new AMF serving the UE during an initial registration  See 3GPP TS 23.502 [3] and 3GPP TS 23.632 [32]. |
| "UE\_REGISTRATION\_AREA\_CHANGE" | see 3GPP TS 23.502 [3] |
| "SUBSCRIPTION\_WITHDRAWN" | see 3GPP TS 23.502 [3] |
| "5GS\_TO\_EPS\_MOBILITY" | see 3GPP TS 23.502 [3] and 3GPP TS 23.632 [32]. |
| "5GS\_TO\_EPS\_MOBILITY\_UE\_INITIAL\_REGISTRATION" | This value shall only be sent by the UDM. It indicates that the deregistration in AMF is due to an initial attach in EPS, See 3GPP TS 23.502 [3] and 3GPP TS 23.632 [32]. |
| "REREGISTRATION\_REQUIRED" | see 3GPP TS 23.502 [3] |
| "SMF\_CONTEXT\_TRANSFERRED" | see 3GPP TS 23.502 [3] |

##### 6.2.6.3.4 Enumeration: ImsVoPs

The enumeration ImsVoPs represents information indicating homogeneity of IMS Voice over PS Sessions support for the UE. It shall comply with the provisions defined in table 6.2.6.3.4-1.

Table 6.2.6.3.4-1: Enumeration ImsVoPs

|  |  |
| --- | --- |
| Enumeration value | Description |
| "HOMOGENEOUS\_SUPPORT" | "IMS Voice over PS Sessions" is homogeneously supported in all TAs in the serving AMF. |
| "HOMOGENEOUS\_NON\_SUPPORT" | "IMS Voice over PS Sessions" is homogeneously not supported in all TAs in the serving AMF. |
| "NON\_HOMOGENEOUS\_OR\_UNKNOWN" | "IMS Voice over PS Sessions" is not homogeneously supported in all TAs in the serving AMF, or its support is unknown. |

##### 6.2.6.3.5 Enumeration: RegistrationReason

The enumeration RegistrationCause represents the reason for the NF Registration. It shall comply with the provisions defined in table 6.2.6.3.5-1.

Table 6.2.6.3.5-1: Enumeration RegistrationReason

|  |  |
| --- | --- |
| Enumeration value | Description |
| "SMF\_CONTEXT\_TRANSFERRED" | SMF transferred |

##### 6.2.6.3.6 Enumeration: RegistrationDataSetName

Table 6.2.6.3.6-1: Enumeration RegistrationDataSetName

|  |  |
| --- | --- |
| Enumeration value | Description |
| "AMF\_3GPP" | AMF 3GPP Access Registration |
| "AMF\_NON\_3GPP" | AMF Non 3GPP Access Registration |
| "SMF\_PDU\_SESSIONS" | SMF PDU Session Registration |
| "SMSF\_3GPP" | SMSF 3GPP Access Registration |
| "SMSF\_NON\_3GPP" | SMSF Non 3GPP Access Registration |

Note: The current naming conventions for Enumerations (uppercase with underscore), when their intended usage is for query parameters is not consistent with the naming conventions for URI components (lowercase with hyphen).

### 6.2.7 Error Handling

#### 6.2.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

The Cause codes mapping performed by AMF between the following HTTP responses returned by the UDM services to the AMF and the 5GMM related values is specified in clause 4.4.2 of 3GPP TS 29.524 [44].

#### 6.2.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

#### 6.2.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nudm\_UEContextManagement service. The following application errors listed in Table 6.2.7.3-1 are specific for the Nudm\_UEContextManagement service.

Table 6.2.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| NF\_CONSUMER\_REDIRECT\_ONE\_TXN | 307 Temporary Redirect | The request has been asked to be redirected to a specified target for one transaction. |
| CONTEXT\_NOT\_FOUND | 308 Permanent Redirect | The request has been asked to be redirected to a specified target. |
| UNKNOWN\_5GS\_SUBSCRIPTION | 403 Forbidden | No 5GS subscription is associated with the user. |
| NO\_PS\_SUBSCRIPTION | 403 Forbidden | No PS (5GS, EPS, GPRS) subscription is associated with the user. |
| ROAMING\_NOT\_ALLOWED | 403 Forbidden | The subscriber is not allowed to roam within that PLMN |
| USER\_NOT\_FOUND | 404 Not Found | The user does not exist in the HPLMN |
| CONTEXT\_NOT\_FOUND | 404 Not Found | It is used when no corresponding context exists. |
| ACCESS\_NOT\_ALLOWED | 403 Forbidden | Access type not allowed for the user. |
| RAT\_NOT\_ALLOWED | 403 Forbidden | RAT is not allowed for the user |
| DNN\_NOT\_ALLOWED | 403 Forbidden | DNN not authorized for the user |
| REAUTHENTICATION\_REQUIRED | 403 Forbidden | Due to operator policies the user needs to be re-authenticated, e.g. last valid authentication is considered obsolete |
| INVALID\_GUAMI | 403 Forbidden | The AMF is not allowed to modify the registration information stored in the UDM, as it is not the registered AMF. |
| SERVICE\_NOT\_PROVISIONED | 403 Forbidden | The request is related to a service that is not provisioned for the user in the 5GS subscription data (e.g. SMS teleservice not provisioned). |
| SERVICE\_NOT\_ALLOWED | 403 Forbidden | The request is related to a service that is not allowed for the user in the 5GS subscription data (e.g. SMS is barred). |
| TEMPORARY\_REJECT\_REGISTRATION\_ONGOING | 409 Conflict | The request cannot be processed due to an ongoing registration procedure. |
| TEMPORARY\_REJECT\_HANDOVER\_ONGOING | 409 Conflict | The request cannot be processed due to an ongoing N2 handover procedure. |
| UNPROCESSABLE\_REQUEST | 422 Unprocessable Entity | The request cannot be processed due to semantic errors when trying to process a patch method |

### 6.2.8 Feature Negotiation

The optional features in table 6.2.8-1 are defined for the Nudm\_UECM API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.2.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | SharedData | When receiving a Nudm\_UECM\_Registration service operation request for a UE that shares subscription data with other UEs, and the request does not indicate support of this feature by the service consumer, the UDM may – based on operator policy – decide to reject the registration. |
| 2 | PatchReport | If some of the modifications included in the PATCH request are not successfully implemented, the UDM reports the result of PATCH request execution to the consumer. See clause 5.2.7.2 of 3GPP TS 29.500 [4]. |

### 6.2.9 Security

As indicated in 3GPP TS 33.501 [6] and 3GPP TS 29.500 [4], the access to the Nudm\_UECM API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [18]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [19]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nudm\_UECM API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [19], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nudm\_UECM service.

The Nudm\_UECM API defines a single scope "nudm-uecm" for OAuth2 authorization (as specified in 3GPP TS 33.501 [6]) for the entire API, and it does not define any additional scopes at resource or operation level.

## 6.3 Nudm\_UEAuthentication Service API

### 6.3.1 API URI

URIs of this API shall have the following root:

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

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

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The <apiName>shall be "nudm-ueau".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.3.3.

### 6.3.2 Usage of HTTP

#### 6.3.2.1 General

HTTP/2, as defined in IETF RFC 7540 [13], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

HTTP messages and bodies for the Nudm\_UEAU service shall comply with the OpenAPI [14] specification contained in Annex A4.

#### 6.3.2.2 HTTP standard headers

##### 6.3.2.2.1 General

The usage of HTTP standard headers shall be supported as specified in clause 5.2.2 of 3GPP TS 29.500 [4].

##### 6.3.2.2.2 Content type

The following content types shall be supported:

JSON, as defined in IETF RFC 8259 [15], signalled by the content type "application/json".

The Problem Details JSON Object (IETF RFC 7807 [16] signalled by the content type "application/problem+json"

#### 6.3.2.3 HTTP custom headers

##### 6.3.2.3.1 General

The usage of HTTP custom headers shall be supported as specified in clause 5.2.3 of 3GPP TS 29.500 [4].

### 6.3.3 Resources

#### 6.3.3.1 Overview

Figure 6.3.3.1-1 describes the resources supported by the Nudm\_UEAU API.



Figure 6.3.3.1-1: Resource URI structure of the nudm\_ueau API

Table 6.3.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.3.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name (Archetype) | Resource URI | HTTP method or custom operation | Description |
| SecurityInformation (Custom operation) | /{supiOrSuci}/security-information/generate-auth-data | generate-auth-data (POST) | If the variable {supiOrSuci} takes the value of a SUCI, the UDM calculates the corresponding SUPI. The UDM calculates a fresh authentication vector based on the received information and the stored security information for the SUPI if 5G-AKA or EAP-AKA' is selected. Otherwise, UDM provides corresponding authentication information. |
| SecurityInformationForRg | /{supiOrSuci}/security-information-rg | GET | If the variable {supiOrSuci} takes the value of a SUCI, the UDM calculates the corresponding SUPI. The UDM decides, based on the received information and the stored authentication profile of the SUPI, that authentication by the home network is not required for the FN-RG. |
| AuthEvents (Collection) | /{supi}/auth-events | POST | Create an Authentication Event |
| Individual AuthEvent (Document) | /{supi}/auth-events/{authEventId} | PUT | Update an Authentication Event |
| HssSecurityInformation  (Custom operation) | /{supi}/hss-security-information/{hssAuthType}/generate-av | generate-av (POST) | The UDM generates the authentication vector(s) of the requested type based on stored security information for the SUPI. |

#### 6.3.3.2 Resource: SecurityInformation (Custom operation)

##### 6.3.3.2.1 Description

This resource represents the information that is needed together with the serving network name and the access type to calculate a fresh authentication vector. See 3GPP TS 33.501 [6].

##### 6.3.3.2.2 Resource Definition

Resource URI: {apiRoot}/nudm-ueau/v1/{supiOrSuci}/security-information

This resource shall support the resource URI variables defined in table 6.3.3.2.2-1.

Table 6.3.3.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.3.1 |
| supiOrSuci | string | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2), or Subscription Concealed Identifier (see 3GPP TS 23.003 [8]).  Pattern: See pattern of type SupiOrSuci in 3GPP TS 29.571 [7]  (See NOTE 1, NOTE 2). |
| NOTE 1: The format for SUCI, when the corresponding SUPI is NAI-based, contains a realm that may include a "minus" character ("-"), which is also used as field separator. Given that the NAI and its realm shall conform to IETF RFC 7542 [29], the regular expression defined here allows for non-ambiguous matching of the different fields of the SUCI, even when the realm contains the "minus" character.  NOTE 2: When the SUCI corresponds to a SUPI of type IMSI, and the Null protection scheme is used, the MSIN of the IMSI (which is formatted by the UE and sent over the NAS protocol as Binary Coded Decimal, BCD) shall be formatted in the SUCI as an UTF-8 string containing all decimal digits of the MSIN; see Annex C for SUCI encoding examples. | | |

##### 6.3.3.2.3 Resource Standard Methods

No Standard Methods are supported for this resource.

##### 6.3.3.2.4 Resource Custom Operations

6.3.3.2.4.1 Overview

Table 6.3.3.2.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation Name | Custom operation URI | Mapped HTTP method | Description |
| generate-auth-data | /generate-auth-data | POST | Select the authentication method and calculate a fresh AV if 5G-AKA or EAP-AKA' is selected or provides corresponding authentication information. |

6.3.3.2.4.2 Operation: generate-auth-data

6.3.3.2.4.2.1 Description

This custom operation is used by the NF service consumer (AUSF) to request authentication information data for the SUPI/SUCI from the UDM. If SUCI is provided, the UDM calculates the SUPI from the SUCI (see 3GPP TS 33.501 [6]). The UDM calculates an authentication vector taking into account the information received from the NF service consumer (AUSF) and the current representation of this resource if 5G AKA or EAP-AKA' is selected. For details see 3GPP TS 33.501 [6].

6.3.3.2.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.3.3.2.4.2.2-1 and the response data structure and response codes specified in table 6.3.3.2.4.2.2-2.

Table 6.3.3.2.4.2.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AuthenticationInfoRequest | M | 1 | Contains the serving network name and Resynchronization Information |

Table 6.3.3.2.4.2.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| AuthenticationInfoResult | M | 1 | 200 OK | Upon success, a response body containing the selected authentication method and an authentication vector if 5G AKA or EAP-AKA' has been selected shall be returned |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - AUTHENTICATION\_REJECTED  - INVALID\_HN\_PUBLIC\_KEY\_IDENTIFIER  - INVALID\_SCHEME\_OUTPUT |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate one of the following application errors:  - UNSUPPORTED\_PROTECTION\_SCHEME  This response shall not be cached. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.3.3.3 Resource: AuthEvents (Collection)

##### 6.3.3.3.1 Description

This resource represents the collection of UE authentication events.

##### 6.3.3.3.2 Resource Definition

Resource URI: {apiRoot}/nudm-ueau/v1/{supi}/auth-events

This resource shall support the resource URI variables defined in table 6.3.3.3.2-1.

Table 6.3.3.3.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.3.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.3.3.3.3 Resource Standard Methods

6.3.3.3.3.1 POST

This method shall support the URI query parameters specified in table 6.3.3.3.3.1-1.

Table 6.3.3.3.3.1-1: URI query parameters supported by the POST method on this resource

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

This method shall support the request data structures specified in table 6.3.3.3.3.1-2 and the response data structures and response codes specified in table 6.3.3.3.3.1-3.

Table 6.3.3.3.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AuthEvent | M | 1 | The UE Authentication Event |

Table 6.3.3.3.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| AuthEvent | O | 0..1 | 201 Created | Upon success, a response body containing a representation of the created Authentication Event may be returned.  The HTTP response shall include a "Location" HTTP header that contains the resource URI of the created resource. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

Table 6.3.3.3.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-ueau/v1/{supi}/auth-events/{authEventId} |

#### 6.3.3.4 Resource: SecurityInformationForRg

##### 6.3.3.4.1 Description

This resource represents the security information of FN-RG, see 3GPP TS 33.501 [6].

##### 6.3.3.4.2 Resource Definition

Resource URI: {apiRoot}/nudm-ueau/v1/{supiOrSuci}/security-information-rg

This resource shall support the resource URI variables defined in table 6.3.3.4.2-1.

Table 6.3.3.4.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.3.1 |
| supiOrSuci | string | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2), or Subscription Concealed Identifier (see 3GPP TS 23.003 [8]).  Pattern: "^(suci-(0-[0-9]{3}-[0-9]{2,3}|[1-7]-.+)-[0-9]{1,4}-(0-0-.+|[a-fA-F1-9]-([1-9]|[1-9][0-9]|1[0-9]{2}|2[0-4][0-9]|25[0-5])-[a-fA-F0-9]+)|.+)$"  (See NOTE 1, NOTE 2). |
| NOTE 1: The format for SUCI, when the corresponding SUPI is NAI-based, contains a realm that may include a "minus" character ("-"), which is also used as field separator. Given that the NAI and its realm shall conform to IETF RFC 7542 [29], the regular expression defined here allows for non-ambiguous matching of the different fields of the SUCI, even when the realm contains the "minus" character.  NOTE 2: When the SUCI corresponds to a SUPI of type IMSI, and the Null protection scheme is used, the MSIN of the IMSI (which is formatted by the UE and sent over the NAS protocol as Binary Coded Decimal, BCD) shall be formatted in the SUCI as an UTF-8 string containing all decimal digits of the MSIN; see Annex C for SUCI encoding examples. | | |

##### 6.3.3.4.3 Resource Standard Methods

6.3.3.4.3.1 GET

This method shall support the URI query parameters specified in table 6.3.3.4.3.1-1.

Table 6.3.3.4.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| authenticated-ind | AuthenticatedInd | M | 1 | Indicates whether authenticated by the W-AGF or not: |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |
| plmn-id | PlmnId | O | 0..1 | PLMN identity of the PLMN serving the UE |

If "plmn-id" is included, UDM shall return the authentication data of FN-RG in the PLMN identified by "plmn-id".

If "plmn-id" is not included, UDM shall return the authentication data of FN-RG for HPLMN.

This method shall support the request data structures specified in table 6.3.3.4.3.1-2 and the response data structures and response codes specified in table 6.3.3.4.3.1-3.

Table 6.3.3.4.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.3.3.4.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| RgAuthCtx | M | 1 | 200 OK | Upon success, a response body containing the authentication indication. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate the following application error:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - AUTHENTICATION\_REJECTED  - INVALID\_SCHEME\_OUTPUT |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.3.3.5 Resource: HssSecurityInformation (Custom operation)

##### 6.3.3.5.1 Description

This resource represents the information that is needed together with the serving network id and requested authentication method to calculate authentication vector(s) for PS/EPS or IMS domain. See 3GPP TS 23.632 [32].

##### 6.3.3.5.2 Resource Definition

Resource URI: {apiRoot}/nudm-ueau/v1/{supi}/hss-security-information/{hssAuthType}

This resource shall support the resource URI variables defined in table 6.3.3.5.2-1.

Table 6.3.3.5.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.3.1 |
| supi | Supi | Represents the mobile subscription identity (see 3GPP TS 23.003 [8]). On this resource, only the IMSI format of SUPI is used. |
| hssAuthType |  | Represents the type of AVs requested by the HSS.  It is defined as an enumeration of type "HssAuthTypeInUri". |

##### 6.3.3.5.3 Resource Standard Methods

No Standard Methods are supported for this resource.

##### 6.3.3.5.4 Resource Custom Operations

6.3.3.5.4.1 Overview

Table 6.3.3.5.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation Name | Custom operation URI | Mapped HTTP method | CaDescription |
| generate-av | /generate-av | POST | Calculate the authentication vector(s) according to the requested information (authentication method, serving network id, resync info) |

6.3.3.5.4.2 Operation: generate-av

6.3.3.5.4.2.1 Description

This custom operation is used by the NF service consumer (HSS) to request calculation of authentication vector(s) for the provided SUPI and the requested authentication method.

6.3.3.5.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.3.3.5.4.2.2-1 and the response data structure and response codes specified in table 6.3.3.5.4.2.2-2.

Table 6.3.3.5.4.2.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| HssAuthenticationInfoRequest | M | 1 | Contains the authentication method, number of requested vectors, serving network id and resynchronization information |

Table 6.3.3.5.4.2.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| HssAuthenticationInfoResult | M | 1 | 200 OK | Upon success, a response body containing authentication vector(s) shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate the following application error:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - AUTHENTICATION\_REJECTED |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate the following application error:  - UNSUPPORTED\_AUTHENTICATION\_METHOD  This response shall not be cached. |
| NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.3.3.6 Resource: Individual AuthEvent

##### 6.3.3.6.1 Resource Definition

Resource URI: {apiRoot}/nudm-ueau/v1/{supi}/auth-events/{authEventId}

This resource shall support the resource URI variables defined in table 6.3.3.6.1-1.

Table 6.3.3.6.1-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.3.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |
| authEventId | string | Represents the authEvent Id per UE per serving network assigned by the UDM during ResultConfirmation service operation. |

##### 6.3.3.6.2 Resource Standard Methods

6.3.3.6.2.1 PUT

This method shall support the URI query parameters specified in table 6.3.3.6.2.1-1.

Table 6.3.3.6.2.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.3.3.6.2.1-2 and the response data structures and response codes specified in table 6.3.3.6.2.1-3.

Table 6.3.3.6.2.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AuthEvent | M | 1 | The UE Authentication Event |

Table 6.3.3.6.2.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Data type | | P | | Cardinality | | Response  codes | | Description | |
| n/a | |  | |  | | 204 No Content | | Upon success, an empty response body shall be returned. | |
| ProblemDetails | | O | 0..1 | 404 Not Found | | If the resource corresponding to the authEventId does not exist, a response code of 404 Not Found shall be returned.  The "cause" attribute may be set to:  - DATA\_NOT\_FOUND | |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | | | | | | |

### 6.3.4 Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nudm\_UEAuthentication Service.

### 6.3.5 Notifications

In this release of this specification, no notifications are defined for the Nudm\_UEAuthentication Service.

### 6.3.6 Data Model

#### 6.3.6.1 General

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

Table 6.3.6.1-1 specifies the data types defined for the Nudm\_UEAU service API.

Table 6.3.6.1-1: Nudm\_UEAU specific Data Types

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Data type | | Clause defined | | Description | |
| AuthenticationInfoRequest | | 6.3.6.2.2 | | Contains Serving Network Name and Resynchronization Information | |
| AuthenticationInfoResult | | 6.3.6.2.3 | | Contains an Authentication Vector (AV) | |
| AvEapAkaPrime | | 6.3.6.2.4 | | Contains RAND, XRES, AUTN, CK', and IK' | |
| Av5GHeAka | | 6.3.6.2.5 | | Contains RAND, XRES\*, AUTN, KAUSF | |
| ResynchronizationInfo | | 6.3.6.2.6 | | Contains RAND and AUTS | |
| AuthEvent | | 6.3.6.2.7 | | Authentication Event | |
| AuthenticationVector | | 6.3.6.2.8 | |  | |
| RgAuthCtx | | 6.3.6.2.9 | | Contains the UE id (i.e. SUPI) and the authentication indication. | |
| HssAuthenticationInfoRequest | | 6.3.6.2.10 | | Contains authentication method, serving network id, number of requested vectors and resynchronization information | |
| HssAuthenticationInfoResult | | 6.3.6.2.11 | | Contains the authentication vectors for EPS/IMS domain | |
| HssAuthenticationVectors | | 6.3.6.2.12 | |  | |
| AvEpsAka | | 6.3.6.2.13 | | Contains RAND, XRES, AUTN, KASME | |
| AvImsGbaEapAka | | 6.3.6.2.14 | | Contains RAND, XRES, AUTN, CK, and IK | |
| Autn | | 6.3.6.3.2 | |  | |
| Auts | | 6.3.6.3.2 | |  | |
| CkPrime | | 6.3.6.3.2 | |  | |
| IkPrime | | 6.3.6.3.2 | |  | |
| Kausf | | 6.3.6.3.2 | |  | |
| Rand | | 6.3.6.3.2 | |  | |
| ServingNetworkName | | 6.3.6.3.2 | |  | |
| Success | | 6.3.6.3.2 | |  | |
| Xres | | 6.3.6.3.2 | |  | |
| XresStar | | 6.3.6.3.2 | |  | |
| AuthenticatedInd | | 6.3.6.3.2 | |  | |
| ConfidentialityKey | | 6.3.6.3.2 | |  | |
| IntegrityKey | | 6.3.6.3.2 | |  | |
| Kasme | | 6.3.6.3.2 | |  | |
| NumOfRequestedVectors | | 6.3.6.3.2 | |  | |
| Autn | | 6.3.6.3.2 | |  | |
| AuthType | | 6.3.6.3.3 | |  | |
| AvType | | 6.3.6.3.4 | |  | |
| HssAuthType | | 6.3.6.3.5 | |  | |
| HssAvType | | 6.3.6.3.6 | |  | |
| HssAuthTypeInUri | | 6.3.6.3.7 | |  | |
| AccessNetworkId | | 6.3.6.3.8 | |  | |

Table 6.3.6.1-2 specifies data types re-used by the Nudm\_UEAU service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudm\_UEAU service API.

Table 6.3.6.1-2: Nudm\_UEAU re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| ProblemDetails | 3GPP TS 29.571 [7] | Common data type used in response bodies |
| NfInstanceId | 3GPP TS 29.571 [7] | Network Function Instance Identifier |
| NfSetId | 3GPP TS 29.571 [7] | Network Function Set Identifier |
| DateTime | 3GPP TS 29.571 [7] |  |
| SupportedFeatures | 3GPP TS 29.571 [7] | see 3GPP TS 29.500 [4] clause 6.6 |
| Supi | 3GPP TS 29.571 [7] |  |
| CagId | 3GPP TS 29.571 [7] |  |

#### 6.3.6.2 Structured data types

##### 6.3.6.2.1 Introduction

This clause defines the structures to be used in POST request / response bodies.

##### 6.3.6.2.2 Type: AuthenticationInfoRequest

Table 6.3.6.2.2-1: Definition of type AuthenticationInfoRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | P | Cardinality | Description |
| servingNetworkName | | ServingNetworkName | M | 1 | See 3GPP TS 33.501 [6] clause 6.1.1.4 |
| resynchronizationInfo | | ResynchronizationInfo | O | 0..1 | Contains RAND and AUTS; see 3GPP TS 33.501 [6] clause 7.5 |
| supportedFeatures | | SupportedFeatures | O | 0..1 | See clause 6.3.8 |
| ausfInstanceId | | NfInstanceId | M | 1 | NF Instance Id of the AUSF |
| cellCagInfo | | array(CagId) | O | 1..N | CAG List of the CAG cell.  If the cellCagInfo is absent, the UDM shall not assume the UE is accessing from the PLMN. |
| n5gcInd | | boolean | O | 0..1 | N5GC device Indicator indicates whether the user uses a N5GC device:  See 3GPP TS 33.501 [6]  true: N5GC device  false (default): used device is 5G capable  See NOTE |
| NOTE: The attribute n5gcInd is used for EAP-TLS, which is described in the informative annex O of 3GPP TS 33.501 [6] and is not mandatory to support. | | | | | |

##### 6.3.6.2.3 Type: AuthenticationInfoResult

Table 6.3.6.2.3-1: Definition of type AuthenticationInfoResult

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| authType | AuthType | M | 1 | Indicates the authentication method |
| authenticationVector | AuthenticationVector | C | 0..1 | contains an authentication vector if 5G AKA or EAP-AKA's is selected |
| supi | Supi | C | 0..1 | SUPI shall be present if the request contained the SUCI within the request URI |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.3.8 |

##### 6.3.6.2.4 Type: AvEapAkaPrime

Table 6.3.6.2.4-1: Definition of type AvEapAkaPrime

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| avType | AvType | M | 1 | Type of authentication vector |
| rand | Rand | M | 1 |  |
| xres | Xres | M | 1 |  |
| autn | Autn | M | 1 |  |
| ckPrime | CkPrime | M | 1 |  |
| ikPrime | IkPrime | M | 1 |  |

##### 6.3.6.2.5 Type: Av5GHeAka

Table 6.3.6.2.5-1: Definition of type Av5GHeAka

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| avType | AvType | M | 1 | Type of authentication vector |
| rand | Rand | M | 1 |  |
| xresStar | XresStar | M | 1 |  |
| autn | Autn | M | 1 |  |
| kausf | Kausf | M | 1 |  |

##### 6.3.6.2.6 Type: ResynchronizationInfo

Table 6.3.6.2.6-1: Definition of type ResynchronizationInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| rand | Rand | M | 1 |  |
| auts | Auts | M | 1 |  |

##### 6.3.6.2.7 Type: AuthEvent

Table 6.3.6.2.7-1: Definition of type AuthEvent

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| nfInstanceId | NfInstanceId | M | 1 | Identifier of the NF instance where the authentication occurred (e.g. AUSF) |
| success | Success | M | 1 | true indicates success; false indicates no success.  Set to false in case of authentication result removal. |
| timeStamp | DateTime | M | 1 | time stamp of the authentication |
| authType | AuthType | M | 1 | string Authentication Type |
| servingNetworkName | ServingNetworkName | M | 1 | See 3GPP TS 33.501 [6] clause 6.1.1.4 |
| authRemovalInd | Boolean | O | 0..1 | When present, it shall indicate the authentication result in the UDM shall be removed.  This IE shall be set as follows:  - true: authentication result in the UDM shall be removed;  - false (default): authentication result in the UDM shall not be removed. |
| nfSetId | NfSetId | O | 0..1 | If present, it indicates the NF Set ID where the authentication occurred (e.g. AUSF Set) |

##### 6.3.6.2.8 Type: AuthenticationVector

Table 6.3.6.2.8-1: Definition of type AuthenticationVector as a list of alternatives

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| AvEapAkaPrime | 1 |  |
| Av5GHeAka | 1 |  |

##### 6.3.6.2.9 Type: RgAuthCtx

Table 6.3.6.2.9-1: Definition of type RgAuthCtx

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| authInd | boolean | M | 0..1 | When present, this IE shall be set as follows:  - true: authentication is not required;  - false (default): authentication is required. |
| supi | Supi | C | 0..1 | SUPI shall be present if the request contained the SUCI within the request URI |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.3.8 |

##### 6.3.6.2.10 Type: HssAuthenticationInfoRequest

Table 6.3.6.2.10-1: Definition of type HssAuthenticationInfoRequest

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| hssAuthType | | HssAuthType | | M | | 1 | | Indicates the authentication method. | |
| numOfRequestedVectors | | NumOfRequestedVectors | | M | | 1 | | Maximum 5 vectors are allowed per service request. | |
| requestingNodeType | | NodeType | | C | | 0..1 | | Indicates the requesting node type. Should be included when known by the HSS. | |
| servingNetworkId | | PlmnId | | C | | 0..1 | | Shall be present if the authentication method is EPS\_AKA. | |
| resynchronizationInfo | | ResynchronizationInfo | | O | | 0..1 | | Contains RAND and AUTS. | |
| anId | | AccessNetworkId | | O | | 0..1 | | Contains the Access Network ID used in the derivation of authentication vectors in EAP-AKA'. | |
| supportedFeatures | | SupportedFeatures | | O | | 0..1 | | See clause 6.3.8 | |
| NOTE: For GBA authentication type, the number of requested vectors shall be set to 1; for other authentication types, the number of generated vectors by UDM, may be less than the number of requested vectors. | | | | | | | | | |

##### 6.3.6.2.11 Type: HssAuthenticationInfoResult

Table 6.3.6.2.11-1: Definition of type HssAuthenticationInfoResult

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| hssAuthenticationVectors | HssAuthenticationVectors | M | 1 |  |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.3.8 |

##### 6.3.6.2.12 Type: HssAuthenticationVectors

Table 6.3.6.2.12-1: Definition of type HssAuthenticationVectors as a list of alternatives

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| array(AvEpsAka) | 1..5 |  |
| array(AvImsGbaEapAka) | 1..5 | This data type is also used for UMTS AKA. |
| array(AvEapAkaPrime) | 1..5 |  |

##### 6.3.6.2.13 Type: AvEpsAka

Table 6.3.6.2.13-1: Definition of type AvEpsAka

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| avType | HssAvType | M | 1 |  |
| rand | Rand | M | 1 |  |
| xres | Xres | M | 1 |  |
| autn | Autn | M | 1 |  |
| kasme | Kasme | M | 1 |  |

##### 6.3.6.2.14 Type: AvImsGbaEapAka

Table 6.3.6.2.14-1: Definition of type AvImsGbaEapAka

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| avType | HssAvType | M | 1 |  |
| rand | Rand | M | 1 |  |
| xres | Xres | M | 1 |  |
| autn | Autn | M | 1 |  |
| ck | ConfidentialityKey | M | 1 |  |
| ik | IntegrityKey | M | 1 |  |

#### 6.3.6.3 Simple data types and enumerations

##### 6.3.6.3.1 Introduction

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

##### 6.3.6.3.2 Simple data types

The simple data types defined in table 6.3.6.3.2-1 shall be supported.

Table 6.3.6.3.2-1: Simple data types

|  |  |  |
| --- | --- | --- |
| Type Name | Type Definition | Description |
| Autn | string | pattern: "^[A-Fa-f0-9]{32}$" |
| Auts | string | pattern: "^[A-Fa-f0-9]{28}$" |
| CkPrime | string | pattern: "^[A-Fa-f0-9]{32}$" |
| IkPrime | string | pattern: "^[A-Fa-f0-9]{32}$" |
| Kausf | string | pattern: "^[A-Fa-f0-9]{64}$" |
| Rand | string | pattern: "^[A-Fa-f0-9]{32}$" |
| ServingNetworkName | string | See 3GPP TS 33.501 [6] clause 6.1.1.4 pattern: "^5G:mnc[0-9]{3}[.]mcc[0-9]{3}[.]3gppnetwork[.]org(:[A-F0-9]{11})?$" |
| Success | boolean | true indicates success, false indicates no success |
| Xres | string | pattern: "^[A-Fa-f0-9]{8,32}$" |
| XresStar | string | pattern: "^[A-Fa-f0-9]{32}$" |
| AuthenticatedInd | boolean | Indicates whether authenticated by the W-AGF or not:  - true: authenticated by the W-AGF;  - false: unauthenticated by the W-AGF. |
| ConfidentialityKey | string | pattern: "^[A-Fa-f0-9]{32}$" |
| IntegrityKey | string | pattern: "^[A-Fa-f0-9]{32}$" |
| Kasme | string | pattern: "^[A-Fa-f0-9]{64}$" |
| NumOfRequestedVectors | integer | minimum: 1  maximum: 5 |

##### 6.3.6.3.3 Enumeration: AuthType

Table 6.3.6.3.3-1: Enumeration AuthType

|  |  |
| --- | --- |
| Enumeration value | Description |
| "EAP\_AKA\_PRIME" | EAP-AKA' |
| "5G\_AKA" | 5G AKA |
| "EAP\_TLS" | EAP-TLS. See NOTE |
| NOTE: EAP-TLS is described in the Informative Annex B and Annex O of 3GPP TS 33.501 [6] and is not mandatory to support. | |

##### 6.3.6.3.4 Enumeration: AvType

Table 6.3.6.3.4-1: Enumeration AvType

|  |  |
| --- | --- |
| Enumeration value | Description |
| "5G\_HE\_AKA" |  |
| "EAP\_AKA\_PRIME" |  |

##### 6.3.6.3.5 Enumeration: HssAuthType

Table 6.3.6.3.5-1: Enumeration HssAuthType

|  |  |
| --- | --- |
| Enumeration value | Description |
| "EPS\_AKA" |  |
| "EAP\_AKA" |  |
| "EAP\_AKA\_PRIME" | EAP-AKA' |
| "IMS\_AKA" |  |
| "GBA\_AKA" |  |
| "UMTS\_AKA" |  |

##### 6.3.6.3.6 Enumeration: HssAvType

Table 6.3.6.3.6-1: Enumeration HssAvType

|  |  |
| --- | --- |
| Enumeration value | Description |
| "EPS\_AKA" |  |
| "EAP\_AKA" |  |
| "IMS\_AKA" |  |
| "GBA\_AKA" |  |
| "UMTS\_AKA" |  |

##### 6.3.6.3.7 Enumeration: HssAuthTypeInUri

Table 6.3.6.3.7-1: Enumeration HssAuthTypeInUri

|  |  |
| --- | --- |
| Enumeration value | Description |
| "eps-aka" | EPS-AKA authentication method |
| "eap-aka" | EAP-AKA authentication method |
| "eap-aka-prime" | EAP-AKA' authentication method |
| "ims-aka" | IMS-AKA authentication method |
| "gba-aka" | GBA-AKA authentication method |

NOTE: This enumeration is used as a variable part of resource URIs, and therefore it follows the naming convention used in URIs (lower case with hyphens); see 3GPP TS 29.501 [5], clause 5.1.

##### 6.3.6.3.8 Enumeration: AccessNetworkId

This data type contains the values for the Access Network Identities defined by 3GPP in the context of non-3GPP access to EPC, used in the generation of EAP-AKA' authentication vectors. The possible values are originally defined in 3GPP TS 24.302 [49].

Table 6.3.6.3.8-1: Enumeration AccessNetworkId

|  |  |
| --- | --- |
| Enumeration value | Description |
| "HRPD" | Access Network: HRPD |
| "WIMAX" | Access Network: WiMAX |
| "WLAN" | Access Network: Wireless LAN |
| "ETHERNET" | Access Network: Ethernet |

##### 6.3.6.3.9 Enumeration: NodeType

Table 6.3.6.3.9-1: Enumeration NodeType

|  |  |
| --- | --- |
| Enumeration value | Description |
| "AUSF" | This value is not applicable to the HSS. |
| "VLR" |  |
| "SGSN" |  |
| "S\_CSCF" |  |
| "BSF" |  |
| "GAN\_AAA\_SERVER" |  |
| "WLAN\_AAA\_SERVER" |  |
| "MME" |  |

### 6.3.7 Error Handling

#### 6.3.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

#### 6.3.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

#### 6.3.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nudm\_UEAuthentication service. The following application errors listed in Table 6.3.7.3-1 are specific for the Nudm\_UEAuthentication service.

Table 6.3.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| AUTHENTICATION\_REJECTED | 403 Forbidden | The user is cannot be authenticated with this authentication method e.g. only SIM data available |
| USER\_NOT\_FOUND | 404 Not Found | The user does not exist in the HPLMN |
| UNSUPPORTED\_PROTECTION\_SCHEME | 501 Not implemented | The received protection scheme is not supported by HPLMN |
| UNSUPPORTED\_AUTHENTICATION\_METHOD | 501 Not implemented | The requested authenti-cation method is not supported |
| INVALID\_HN\_PUBLIC\_KEY\_IDENTIFIER | 403 Forbidden | Invalid HN public key identifier received |
| INVALID\_SCHEME\_OUTPUT | 403 Forbidden | SUCI cannot be decrypted with received data |
| DATA\_NOT\_FOUND | 404 Not Found | Resource corresponding to the authEventId does not exist |

### 6.3.8 Feature Negotiation

The optional features in table 6.3.8-1 are defined for the Nudm\_UEAU API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.3.8-1: Supported Features

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

### 6.3.9 Security

As indicated in 3GPP TS 33.501 [6] and 3GPP TS 29.500 [4], the access to the Nudm\_UEAU API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [18]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [19]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nudm\_UEAU API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [19], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nudm\_UEAU service.

The Nudm\_UEAU API defines a single scope "nudm-ueau" for OAuth2 authorization (as specified in 3GPP TS 33.501 [6]) for the entire API, and it does not define any additional scopes at resource or operation level.

## 6.4 Nudm\_EventExposure Service API

### 6.4.1 API URI

URIs of this API shall have the following root:

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

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

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The <apiName>shall be "nudm-ee".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.4.3.

### 6.4.2 Usage of HTTP

#### 6.4.2.1 General

HTTP/2, as defined in IETF RFC 7540 [13], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

HTTP messages and bodies for the Nudm\_EE service shall comply with the OpenAPI [14] specification contained in Annex A5.

#### 6.4.2.2 HTTP standard headers

##### 6.4.2.2.1 General

The usage of HTTP standard headers shall be supported as specified in clause 5.2.2 of 3GPP TS 29.500 [4].

##### 6.4.2.2.2 Content type

The following content types shall be supported:

JSON, as defined in IETF RFC 8259 [15], signalled by the content type "application/json".

The Problem Details JSON Object (IETF RFC 7807 [16] signalled by the content type "application/problem+json"

JSON Patch (IETF RFC 6902 [41]). The use of the JSON Patch format in a HTTP request body shall be signalled by the content type "application/json-patch+json".

#### 6.4.2.3 HTTP custom headers

##### 6.4.2.3.1 General

The usage of HTTP custom headers shall be supported as specified in clause 5.2.3 of 3GPP TS 29.500 [4].

### 6.4.3 Resources

#### 6.4.3.1 Overview



Figure 6.4.3.1-1: Resource URI structure of the Nudm\_EE API

Table 6.4.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.4.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name (Archetype) | Resource URI | HTTP method or custom operation | Description |
| EeSubscriptions (Collection) | /{ueIdentity}/ee-subscriptions | POST | Create a subscription |
| Individual subscription (Document) | /{ueIdentity}/ee-subscriptions/{subscriptionId} | PATCH | Update the subscription identified by {subscriptionId} |
| DELETE | Delete the subscription identified by {subscriptionId}, i.e. unsubscribe |

#### 6.4.3.2 Resource: EeSubscriptions (Collection)

##### 6.4.3.2.1 Description

This resource is used to represent subscriptions to notifications.

##### 6.4.3.2.2 Resource Definition

Resource URI: {apiRoot}/nudm-ee/v1/{ueIdentity}/ee-subscriptions

This resource shall support the resource URI variables defined in table 6.4.3.2.2-1.

Table 6.4.3.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.4.1 |
| ueIdentity | string | Represents a single UE or a group of UEs or any UE.  - If representing a single UE, this parameter shall contain the Generic Public Subscription Identifier (see 3GPP TS 23.501 [2] clause 5.9.8)  pattern: "^(msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|.+)$"  - If representing a group of UEs, this parameter shall contain the External GroupId.  pattern: "^extgroupid-[^@]+@[^@]+$"  - If representing any UE, this parameter shall contain "anyUE".  pattern: "^anyUE$" |

##### 6.4.3.2.3 Resource Standard Methods

6.4.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.4.3.2.3.1-1.

Table 6.4.3.2.3.1-1: URI query parameters supported by the POST method on this resource

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

This method shall support the request data structures specified in table 6.4.3.2.3.1-2 and the response data structures and response codes specified in table 6.4.3.2.3.1-3.

Table 6.4.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| EeSubscription | M | 1 | The subscription that is to be created |

Table 6.4.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| CreatedEeSubscription | M | 1 | 201 Created | Upon success, a response body containing a representation of the created Individual subscription resource shall be returned.  The HTTP response shall include a "Location" HTTP header that contains the resource URI of the created resource. When stateless UDM is deployed, the stateless UDM may use an FQDN identifying the UDM group to which the UDM belongs as the host part of the resource URI. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - MONITORING\_NOT\_ALLOWED  - AF\_NOT\_ALLOWED  - MTC\_PROVIDER\_NOT\_ALLOWED |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate one of the following application errors:  - UNSUPPORTED\_MONITORING\_EVENT\_TYPE  - UNSUPPORTED\_MONITORING\_REPORT\_OPTIONS  This response shall not be cached. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

NOTE: In the scenario of stateless UDM deployment, it is assumed that stateless UDMs are organized into several UDM groups, and for each UDM group an FQDN can be allocated.

#### 6.4.3.3 Resource: Individual subscription (Document)

##### 6.4.3.3.1 Resource Definition

Resource URI: {apiRoot}/nudm-ee/v1/{ueIdentity}/ee-subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 6.4.3.3.1-1.

Table 6.4.3.3.1-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| ueIdentity | string | Represents a single UE or a group of UEs or any UE.  - If representing a single UE, this parameter shall contain the Generic Public Subscription Identifier (see 3GPP TS 23.501 [2] clause 5.9.8)  pattern: "^(msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|.+)$"  - If representing a group of UEs, this parameter shall contain the External GroupId.  pattern: "^extgroupid-[^@]+@[^@]+$"  - If representing any UE, this parameter shall contain "anyUE".  pattern: "^anyUE$" |
| subscriptionId | string | The subscriptionId identifies an individual subscription to notifications. |

##### 6.4.3.3.2 Resource Standard Methods

6.4.3.3.2.1 DELETE

This method shall support the URI query parameters specified in table 6.4.3.3.2.1-1.

Table 6.4.3.3.1.1-1: URI query parameters supported by the DELETE method on this resource

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

This method shall support the request data structures specified in table 6.4.3.3.2.1-2 and the response data structures and response codes specified in table 6.4.3.3.2.1-3.

Table 6.4.3.3.2.1-2: Data structures supported by the Delete Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  | The request body shall be empty. |

Table 6.4.3.3.2.1-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - SUBSCRIPTION\_NOT\_FOUND, see 3GPP TS 29.500 [4] table 5.2.7.2-1. |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

6.4.3.3.2.2 PATCH

This method shall support the URI query parameters specified in table 6.4.3.3.2.2-1.

Table 6.4.3.3.2.2-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.4.3.3.2.2-2 and the response data structures and response codes specified in table 6.4.3.3.2.2-3.

Table 6.4.3.3.2.2-2: Data structures supported by the PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| array(PatchItem) | M | 1..N | Items describe the modifications to the Event Subscription |

Table 6.4.3.3.2.2-3: Data structures supported by the PATCH Response Body on this resource

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Data type | | P | Cardinality | Response  codes | | Description | |
| n/a | |  |  | 204 No Content | | Upon success, an empty response body shall be returned. (NOTE 2) | |
| PatchResult | | M | | 1 | | 200 OK | | Upon success, the execution report is returned. (NOTE 2) | |
| ProblemDetails | | O | 0..1 | 404 Not Found | | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND  - SUBSCRIPTION\_NOT\_FOUND, see 3GPP TS 29.500 [4] table 5.2.7.2-1. | |
| O | 0..1 | 403 Forbidden | | One or more attributes are not allowed to be modified.  The "cause" attribute may be used to indicate one of the following application errors:  - MODIFICATION\_NOT\_ALLOWED, see 3GPP TS 29.500 [4] table 5.2.7.2-1. | |
| NOTE 1: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported.  NOTE 2: If all the modification instructions in the PATCH request have been implemented, the UDM shall respond with 204 No Content response; if some of the modification instructions in the PATCH request have been discarded, and the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature number, the UDM shall respond with PatchResult. | | | | | | | |

### 6.4.4 Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nudm\_EventExposure Service.

### 6.4.5 Notifications

#### 6.4.5.1 General

This clause will specify the use of notifications and corresponding protocol details if required for the specific service. When notifications are supported by the API, it will include a reference to the general description of notifications support over the 5G SBIs specified in TS 29.500 / TS 29.501.

Table 6.4.5.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Resource URI | HTTP method or custom operation | Description  (service operation) |
| Event Occurrence Notification | {callbackReference} | POST |  |

#### 6.4.5.2 Event Occurrence Notification

The POST method shall be used for Event Occurrence Notifications and the URI shall be as provided during the subscription procedure.

Resource URI: {callbackReference}

Support of URI query parameters is specified in table 6.4.5.2-1.

Table 6.4.5.2-1: URI query parameters supported by the POST method

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

Support of request data structures is specified in table 6.4.5.2-2 and of response data structures and response codes is specified in table 6.4.5.2-3.

Table 6.4.5.2-2: Data structures supported by the POST Request Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| array(MonitoringReport) | M | 1..N | A list of MonitoringReports each of which contains information regarding the occurred event |

Table 6.4.5.2-3: Data structures supported by the POST Response Body

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - CONTEXT\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

### 6.4.6 Data Model

#### 6.4.6.1 General

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

Table 6.4.6.1-1 specifies the data types defined for the Nudm\_EE service API.

Table 6.4.6.1-1: Nudm\_EE specific Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| EeSubscription | 6.4.6.2.2 | A subscription to Notifications |
| MonitoringConfiguration | 6.4.6.2.3 | Monitoring Configuration |
| MonitoringReport | 6.4.6.2.4 | Monitoring Report |
| Report | 6.4.6.2.5 |  |
| ReportingOptions | 6.4.6.2.6 |  |
| ChangeOfSupiPeiAssociationReport | 6.4.6.2.7 |  |
| RoamingStatusReport | 6.4.6.2.8 |  |
| CreatedEeSubscription | 6.4.6.2.9 |  |
| LocationReportingConfiguration | 6.4.6.2.10 |  |
| CnTypeChangeReport | 6.4.6.2.11 |  |
| ReachabilityForSmsReport | 6.4.6.2.12 |  |
| DatalinkReportingConfiguration | 6.4.6.2.13 | Reporting configuration for events related to data link |
| CmInfoReport | 6.4.6.2.14 | Reporting UE's Connection Management State information per access type |
| LossConnectivityCfg | 6.4.6.2.15 | Configuration for loss of connectivity event |
| PduSessionStatusCfg | 6.4.6.2.16 | Reporting configuration for events related to PDU session Status |
| LossConnectivityReport | 6.4.6.2.17 | Report of "LOSS\_OF\_CONNECTIVITY" event |
| LocationReport | 6.4.6.2.18 | Report of "LOCATION\_REPORTING" event |
| PdnConnectivityStatReport | 6.4.6.2.19 | Report of "PDN\_CONNECTIVITY\_STATUS" event |
| MaxNumOfReports | 6.4.6.3.2 | Maximum number of reports |
| ReferenceId | 6.4.6.3.2 | Reference Identity |
| EventType | 6.4.6.3.3 | Event type of UDM Event Exposure service |
| LocationAccuracy | 6.4.6.3.4 | Location Accuracy definition |
| CnType | 6.4.6.3.5 | Core Network Type |
| AssociationType | 6.4.6.3.6 |  |
| EventReportMode | 6.4.6.3.7 |  |
| ReachabilityForSmsConfiguration | 6.4.6.3.8 |  |
| PdnConnectivityStatus | 6.4.6.3.9 | PDN Connectivity Status |

Table 6.4.6.1-2 specifies data types re-used by the Nudm\_EE service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudm\_EE service API.

Table 6.4.6.1-2: Nudm\_EE re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| Uri | 3GPP TS 29.571 [7] | Uniform Resource Identifier |
| SupportedFeatures | 3GPP TS 29.571 [7] | see 3GPP TS 29.500 [4] clause 6.6 |
| DateTime | 3GPP TS 29.571 [7] |  |
| Pei | 3GPP TS 29.571 [7] |  |
| PlmnId | 3GPP TS 29.571 [7] |  |
| Gpsi | 3GPP TS 29.571 [7] |  |
| AccessType | 3GPP TS 29.571 [7] |  |
| PatchResult | 3GPP TS 29.571 [7] |  |
| DddTrafficDescriptor | 3GPP TS 29.571 [7] |  |
| SamplingRatio | 3GPP TS 29.571 [7] |  |
| DurationSec | 3GPP TS 29.571 [7] |  |
| DlDataDeliveryStatus | 3GPP TS 29.571 [7] | Downlink data delivery status |
| Dnn | 3GPP TS 29.571 [7] | Data Network Name with Network Identifier only. |
| Snssai | 3GPP TS 29.571 [7] | Single NSSAI |
| DiameterIdentity | 3GPP TS 29.571 [7] | Diameter Identify |
| CmInfo | 3GPP TS 29.518 [36] | Describe the Connection Management state information for an access type |
| MtcProviderInformation | 3GPP TS 29.571 [7] | MTC Provider Information |
| LossOfConnectivityReason | 3GPP TS 29.518 [36] | Describes the reason of connectivity loss |
| UserLocation | 3GPP TS 29.571 [7] | User Location |
| PduSessionId | 3GPP TS 29.571 [7] | PDU Session Id |
| Ipv4Addr | 3GPP TS 29.571 [7] | IPv4 Address |
| Ipv6Addr | 3GPP TS 29.571 [7] | IPv6 Address |
| Ipv6Prefix | 3GPP TS 29.571 [7] | IPv6 Prefix |
| PduSessionType | 3GPP TS 29.571 [7] | PDU session type. |

#### 6.4.6.2 Structured data types

##### 6.4.6.2.1 Introduction

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

##### 6.4.6.2.2 Type: EeSubscription

Table 6.4.6.2.2-1: Definition of type EeSubscription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| callbackReference | Uri | M | 1 | URI provided by the NF service consumer to receive notifications |
| monitoringConfigurations | map(MonitoringConfiguration) | M | 1..N | A map (list of key-value pairs where referenceId converted from integer to string serves as key; see clause 6.4.6.3.2) of MonitoringConfigurations;  see clause 6.4.6.2.3 |
| reportingOptions | ReportingOptions | O | 0..1 | This IE may be included if the NF service consumer wants to describe how the reports of the event to be generated. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.4.8 These are the features supported by the NF subscribing at the UDM. |
| subscriptionId | string | C | 0..1 | This attribute shall be present if the EeSubscription is sent in a GET response message on Nudr. It identifies the individual EeSubscription stored in the UDR and may be used by the UDM to delete an EeSubscription. |
| contextInfo | ContextInfo | C | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with the EeSubscription.  Shall be absent on Nudm and may be present on Nudr. |
| epcAppliedInd | boolean | O | 0..1 | This IE indicates whether the subscription applies also to EPC or not.  true: the subscription applies also to EPC.  false or absent: the subscription doesn't apply to EPC. |
| scefDiamHost | DiameterIdentity | C | 0..1 | This IE shall be included if parameter epcAppliedInd is set to true and at least one of the notification to subscription applied to EPC will be reported directly from the MME to the SCEF (e.g. event LOCATION\_REPORTING).  When present, it contains the Diameter Identify (FQDN) of the SCEF to which the monitered reports may be sent in EPC. |
| scefDiamRealm | DiameterIdentity | C | 0..1 | This IE shall be included if parameter epcAppliedInd is set to true and at least one of the notification to subscription applied to EPC will be reported directly from the MME to the SCEF (e.g. event LOCATION\_REPORTING).  When present, It contains the Diameter realm of the SCEF to which the monitered reports may be sent in EPC. |
| notifyCorrelationId | string | C | 0..1 | This attribute identifies the notification correlation ID shall be present by NF consumer in subscription. The value of this IE shall be unique per subscription for a given NF service consumer. |

##### 6.4.6.2.3 Type: MonitoringConfiguration

Table 6.4.6.2.3-1: Definition of type MonitoringConfiguration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| eventType | EventType | M | 1 | String; see clause 6.4.6.3.3 |
| immediateFlag | boolean | O | 0..1 | Indicates if an immediate event report in the subscription response indicating current value / status of the event is required or not. If the flag is not present, then immediate reporting shall not be done.  If the event requested for immediate reporting is detected by the UDM, the UDM may include the current status of the event if available in the service operation response.  If the event requested for immediate reporting is detected by a remote NF (e.g. AMF) and directly notified to the NF consumer, the current status of the event shall not be included in the service operation response (the remote NF shall notify the current status of the event via event notification directly). |
| locationReportingConfiguration | LocationReportingConfiguration | C | 0..1 | shall be present if eventType is "LOCATION\_REPORTING" |
| associationType | AssociationType | O | 0..1 | If the eventType indicates CHANGE\_OF\_SUPI\_PEI\_ASSOCIATION, this parameter may be included to identify whether the IMSI-IMEI or IMSI-IMEISV association shall be detected.  If the flag is not present, then a value of IMEISV shall be used |
| datalinkReportCfg | DatalinkReportingConfiguration | C | 0..1 | shall be present if eventType is "DL\_DATA\_DELIVERY\_STATUS"  "AVAILABILITY\_AFTER\_DDN\_FAILURE". |
| lossConnectivityCfg | LossConnectivityCfg | O | 0..1 | May be present if eventType is "LOSS\_OF\_CONNECTIVITY".  (NOTE 1) |
| maximumLatency | DurationSec | O | 0..1 | May be present if eventType is "UE\_REACHABILITY\_FOR\_DATA"  When present, it indicates the configured Maximum Latency.  (NOTE 1) |
| maximumResponseTime | DurationSec | O | 0..1 | May be present if eventType is "UE\_REACHABILITY\_FOR\_DATA"  When present, it indicates the configured Maximum Response Time.  (NOTE 1) |
| suggestedPacketNumDl | integer | O | 0..1 | May be present if eventType is "UE\_REACHABILITY\_FOR\_DATA"  When present, it indicates the configured Suggested number of downlink packets.  (NOTE 1) |
| pduSessionStatusCfg | PduSessionStatusCfg | O | 0..1 | may be present if eventType is "PDN\_CONNECTIVITY\_STATUS" |
| reachabilityForSmsCfg | ReachabilityForSmsConfiguration | O | 0..1 | REACHABILITY\_FOR\_SMS\_OVER\_NAS (default) or  REACHABILITY\_FOR\_SMS\_OVER\_IP |
| mtcProviderInformation | MtcProviderInformation | O | 0..1 | Indicates MTC provider information for Monitoring Configuration authorization.  (NOTE 2) |
| afId | string | O | 0..1 | The string identifying the originating AF, which is carried in {scsAsId} URI variable in resource URIs on T8/N33 interface (see clause 5 of 3GPP TS 29.122 [45]) or in {afId} URI variable in resource URIs on N33 interface (see clause 5 of 3GPP TS 29.522 [54]).  (NOTE 2) |
| idleStatusInd | boolean | O | 0..1 | Idle Status Indication request.  May be present if eventType is UE\_REACHABILITY\_FOR\_DATA or AVAILABILITY\_AFTER\_DDN\_FAILURE  true: Idle status indication is requested  false (default): Idle status indication is not requested |
| NOTE 1: Parameters maximumLatency, maximumResponseTime, suggestedPacketNumDl and lossConnectivityCfg are not recommendated to be used for the AFs that support to set them by Parameter Provision service operation via NEF.  NOTE 2: Only applicable when eventType is "UE\_REACHABILITY\_FOR\_DATA" or "LOSS\_OF\_CONNECTIVITY". | | | | |

##### 6.4.6.2.4 Type: MonitoringReport

Table 6.4.6.2.4-1: Definition of type MonitoringReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| referenceId | ReferenceId | M | 1 | Shall contain the Reference ID which was provided as the key of the associated monitoring configuration in subscription request. The consumer can use this IE to uniquely associate the report with the corresponding event that was requested to be monitored. |
| eventType | EventType | M | 1 | String; see clause 6.4.6.3.3  only the following values are allowed:  "UE\_REACHABILITY\_FOR\_SMS" "UE\_REACHABILITY\_FOR\_DATA" "CHANGE\_OF\_SUPI\_PEI\_ASSOCIATION" "ROAMING\_STATUS"  "CN\_TYPE\_CHANGE"  "UE\_CONNECTION\_MANAGEMENT\_STATE"  "LOSS\_OF\_CONNECTIVITY"  "LOCATION\_REPORTING"  "PDN\_CONNECTIVITY\_STATUS"  (NOTE) |
| report | Report | C | 0..1 | Shall be present if eventType is "CHANGE\_OF\_SUPI\_PEI\_ASSOCIATION" or "ROAMING\_STATUS"  "CN\_TYPE\_CHANGE"  "UE\_CONNECTION\_MANAGEMENT\_STATE"  "LOSS\_OF\_CONNECTIVITY"  "LOCATION\_REPORTING"  "PDN\_CONNECTIVITY\_STATUS" |
| reachabilityForSmsReport | ReachabilityForSmsReport | C | 0..1 | Should be present if eventType is "UE\_REACHABILITY\_FOR\_SMS" and reachabilityForSmsCfg was absent from the MonitoringConfiguration or indicated REACHABILITY\_FOR\_SMS\_OVER\_NAS |
| gpsi | Gpsi | C | 0..1 | shall be present if the report is associated to exposure subscriptions for a group of UEs or any UE. |
| timeStamp | DateTime | M | 1 | Point in time at which the event occurred |
| NOTE: "UE\_REACHABILITY\_FOR\_DATA", "UE\_CONNECTION\_MANAGEMENT\_STATE", "LOSS\_OF\_CONNECTIVITY", "LOCATION\_REPORTING" and "PDN\_CONNECTIVITY\_STATUS" event types shall only be included in an immediate report, when NF consumer has indicated support of "IERSR" feature (see clause 6.4.8) and the immediate report has been received from HSS or AMF in subscription creation response. | | | | |

##### 6.4.6.2.5 Type: Report

Table 6.4.6.2.5-1: Definition of type Report as a list of mutually exclusive alternatives

|  |  |  |
| --- | --- | --- |
| Data type | Cardinality | Description |
| ChangeOfSupiPeiAssociationReport | 1 |  |
| RoamingStatusReport | 1 |  |
| CnTypeChangeReport | 1 | Report new CN type after switching |
| CmInfoReport | 1 | Report the UE's CM state |
| LossConnectivityReport | 1 | Report of "LOSS\_OF\_CONNECTIVITY" event |
| LocationReport | 1 | "LOCATION\_REPORTING" |
| PdnConnectivityStatReport | 1 | "PDN\_CONNECTIVITY\_STATUS" |

##### 6.4.6.2.6 Type: ReportingOptions

Table 6.4.6.2.6-1: Definition of type ReportingOptions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| reportMode | EventReportMode | O | 0..1 | Indicates the mode of report (e.g, periodic reporting along with periodicity, reporting based on event detection). See clause 4.15.1 of 3GPP TS23.502 [3]. |
| maxNumOfReports | MaxNumOfReports | C | 0..1 | Maximum number of reports. If the event subscription is for a group of UEs, this parameter shall be applied to each individual member UE of the group.  (NOTE 2) |
| expiry | DateTime | C | 0..1 | This IE shall be included in an event subscription response, if, based on operator policy, the UDM needs to include an expiry time, and may be included in an event subscription request. When present, this IE shall represent the time at which monitoring shall cease and the subscription becomes invalid. If the maxNumOfReports included in an event subscription response is 1 and if an event report is included in the subscription response then the value of the expiry included in the response shall be an immediate timestamp.  (NOTE 2) |
| samplingRatio | SamplingRatio | O | 0..1 | Indicates the percentage of sampling among impacted UEs, this parameter is used for group-based monitoring configuration. See clause 4.15.1 of 3GPP TS23.502 [3].  (NOTE 1) |
| guardTime | DurationSec | O | 0..1 | Indicates the time for which the Monitoring Event Reporting(s) detected by the UEs in a group can be aggregated before sending them to the consumer NF, this parameter is used for group-based monitoring configuration. See clause 4.15.1 of 3GPP TS23.502 [3]. |
| reportPeriod | DurationSec | C | 0..1 | Indicates the interval time between which the event notification is reported, shall be present if reportMode is "PERIODIC". |
| NOTE 1: Parameter only applicable to certain event IDs reporting metrics (e.g. Number of UEs present in a geographical area) used and used e.g. by the NWDAF for data collection.  NOTE 2 If parameter "maxNumOfReports" and "expiry" are included at the same time, the subscription will expire as soon as one of the conditions is met. If the ReportMode is set to "PERIODIC", at least one of the "maxNumOfReports" and "expiry" attributes shall be included. | | | | |

##### 6.4.6.2.7 Type: ChangeOfSupiPeiAssociationReport

Table 6.4.6.2.7-1: Definition of type ChangeOfSupiPeiAssociationReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| newPei | Pei | M | 1 | the new PEI |

##### 6.4.6.2.8 Type: RoamingStatusReport

Table 6.4.6.2.8-1: Definition of type RoamingStatusReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| roaming | boolean | M | 1 | True: The new serving PLMN is different from the HPLMN; False: The new serving PLMN is the HPLMN |
| newServingPlmn | PlmnId | M | 1 | the new Serving PLMN |

##### 6.4.6.2.9 Type: CreatedEeSubscription

Table 6.4.6.2.9-1: Definition of type CreatedEeSubscription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| eeSubscription | EeSubscription | M | 1 | This IE shall contain the representation of the created event subscription. |
| numberOfUes | Uinteger | C | 0..1 | This IE shall be included if the event subscription is for a group of UEs. When present, this IE shall represent the number of UEs in the group. |
| eventReports | array(MonitoringReport) | O | 1..N | This IE when present, shall contain the status of events that are requested for immediate reporting as well, if those events are available at the time of subscription.  If an event requested for immediate reporting is detected by another NF (e.g. AMF or HSS) and both the UDM and the NF consumer (e.g. NEF) support the "IERSR" feature, this UDM shall require the other NF to include the immediate reporting in subscription creation response and the UDM shall include the immediate event reports received from other NF in this IE; otherwise, the UDM shall require the other NF to directly notified to the NF consumer, thus the status of the event shall not be included in this IE. |
| epcStatusInd | boolean | C | 0..1 | This IE indicates whether the subscription was also successful in EPC domain or not.  true: the subscription was also successful in EPC domain.  false: the subscription was not successful in EPC domain.  This IE shall be included if epcAppliedInd is true in the subscription request. |

##### 6.4.6.2.10 Type: LocationReportingConfiguration

Table 6.4.6.2.10-1: Definition of type LocationReportingConfiguration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| currentLocation | boolean | M | 1 | When true: Indicates that current location is requested.  When false: Indicates that last known location is requested. |
| oneTime | boolean | C | 0..1 | When true: Indicates that a single report is requested.  When false or absent: Indicates that continuous reporting is requested.  Shall not be absent or set to false when currentLocation is false. |
| accuracy | LocationAccuracy | C | 0..1 | Indicates whether Cell-level or TA-level accuracy is requested for 3GPP access. (NOTE 1) |
| n3gppAccuracy | LocationAccuracy | C | 0..1 | Indicates whether N3IWF or UE IP or UE PORT level accuracy is requested for non-3GPP access. (NOTE 1) |
| NOTE 1: At least one of accuracy and n3gppAccuracy shall be present if continuous reporting is required | | | | |

##### 6.4.6.2.11 Type: CnTypeChangeReport

Table 6.4.6.2.11-1: Definition of type CnTypeChangeReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| oldCnType | CnType | O | 0..1 | the old CN type |
| newCnType | CnType | M | 1 | the new CN type |

##### 6.4.6.2.12 Type: ReachabilityForSmsReport

Table 6.4.6.2.12-1: Definition of type ReachabilityForSmsReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| smsfAccessType | AccessType | M | 1 |  |
| maxAvailabilityTime | DateTime | O | 0..1 | Indicates the time (in UTC) until which the UE is expected to be reachable.  This information may be used by the SMS Service Center to prioritize the retransmission of pending Mobile Terminated Short Message to UEs using a power saving mechanism (eDRX, PSM etc.). |

##### 6.4.6.2.13 Type: DatalinkReportingConfiguration

Table 6.4.6.2.13-1: Definition of type DatalinkReportingConfiguration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| dddTrafficDes | array(DddTrafficDescriptor) | C | 1..N | This IE shall be present for event type "DL\_DATA\_DELIVERY\_STATUS"  "AVAILABILITY\_AFTER\_DDN\_FAILURE".  When present, this IE shall indicate the traffic descriptors of the downlink data. |
| dnn | Dnn | O | 0..1 | When present, this IE shall contain the Network Identifier only and indicate the DNN of the PDU session serving the data link. |
| slice | Snssai | O | 0..1 | When present, this IE shall indicate the slice information of the PDU session serving the data link. |
| dddStatusList | array(DlDataDeliveryStatus) | O | 1..N | This IE shall be present for event type "DL\_DATA\_DELIVERY\_STATUS".  When present, this IE shall indicate the subscribed statuses (discarded, transmitted, buffered) for the event. If omitted all stati are subscribed. |

##### 6.4.6.2.14 Type: CmInfoReport

Table 6.4.6.2.11-1: Definition of type CmInfoReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| oldCmInfoList | array(CmInfo) | O | 1..2 | the old CM State information |
| newCmInfoList | array(CmInfo) | M | 1..2 | the new CM State information |

##### 6.4.6.2.15 Type: LossConnectivityCfg

Table 6.4.6.2.15-1: Definition of type LossConnectivityCfg

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| maxDetectionTime | DurationSec | O | 0..1 | When present, it indicates the configured Maximum Detection Time |

##### 6.4.6.2.16 Type: PduSessionStatusCfg

Table 6.4.6.2.16-1: Definition of type PduSessionStatusCfg

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| dnn | Dnn | O | 0..1 | When present, it indicates the DNN for which the event is monitored. |

##### 6.4.6.2.17 Type: LossConnectivityReport

Table 6.4.6.2.17-1: Definition of type LossConnectivityReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| lossOfConnectReason | LossOfConnectivityReason | M | 1 | Describes the reason for loss of connectivity. |

##### 6.4.6.2.18 Type: LocationReport

Table 6.4.6.2.18-1: Definition of type LocationReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| location | UserLocation | M | 1 | This IE shall include all available UE locations. |

##### 6.4.6.2.19 Type: PdnConnectivityStatReport

Table 6.4.6.2.19-1: Definition of type PdnConnectivityStatReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| pdnConnStat | PdnConnectivityStatus | M | 1 | PDN Connectivity Status |
| dnn | Dnn | O | 0..1 | DNN/APN of the PDN connectivity |
| pduSeId | PduSessionId | O | 0..1 | PDU session ID. |
| ipv4Addr | Ipv4Addr | O | 0..1 | IPv4 address. |
| ipv6Prefixes | array(Ipv6Prefix) | O | 1..N | IPv6 prefixes. |
| ipv6Addrs | array(Ipv6Addr) | O | 1..N | IPv6 addresses. |
| pduSessType | PduSessionType | O | 0..1 | PDU session type. |

#### 6.4.6.3 Simple data types and enumerations

##### 6.4.6.3.1 Introduction

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

##### 6.4.6.3.2 Simple data types

The simple data types defined in table 6.4.6.3.2-1 shall be supported.

Table 6.4.6.3.2-1: Simple data types

|  |  |  |
| --- | --- | --- |
| Type Name | Type Definition | Description |
| MaxNumOfReports | integer | Maximum number of reports.  Minimum: 1 |
| ReferenceId | integer | ReferenceId is used as key in a map of MonitoringConfigurations; see clause 6.4.6.2.2.  The numeric value should not be higher than 2^64-1 (i.e. it should be possible to convey it in an unsigned 64 integer Information Element, used in other protocols), if interworking with the Event Exposure framework in EPC is required. |

##### 6.4.6.3.3 Enumeration: EventType

Table 6.4.6.3.3-1: Enumeration EventType

|  |  |
| --- | --- |
| Enumeration value | Description |
| "LOSS\_OF\_CONNECTIVITY" | Loss of connectivity |
| "UE\_REACHABILITY\_FOR\_DATA" | UE reachability for data, implements the "UE Reachability" monitoring event as specified in clause 4.15.3.1 in 3GPP TS 23.502 [3].  When this event is subscribed by an NF service consumer, the UDM subscribes to "ReachabilityReport" event for "UE Reachability for DL Traffic" on the AMF without URRP-AMF.  When this event is subscribed by an NF service consumer, the UDM shall request the AMF to directly send notification to NF. |
| "UE\_REACHABILITY\_FOR\_SMS" | UE reachability for SMS, implements the "UE Reachability for SMS Delivery" event as specified in clause 4.15.3.1 of 3GPP TS 23.502 [3].  This Event is reported when an SMSF is being registered in UDM for the UE, or when a UE Activity notification is received from AMF and there is an SMSF already registered for the UE.  This event only supports One-Time reporting. |
| "LOCATION\_REPORTING" | Location Reporting |
| "CHANGE\_OF\_SUPI\_PEI\_ASSOCIATION" | Change of SUPI-PEI association |
| "ROAMING\_STATUS" | Roaming Status |
| "COMMUNICATION\_FAILURE" | Communication Failure |
| "AVAILABILITY\_AFTER\_DDN\_FAILURE" | Availability after DDN failure |
| "CN\_TYPE\_CHANGE" | CN type change |
| "DL\_DATA\_DELIVERY\_STATUS" | Downlink Data Delivery Status |
| "PDN\_CONNECTIVITY\_STATUS" | PDU Session Status |
| "UE\_CONNECTION\_MANAGEMENT\_STATE" | UE state of Connection Management |

##### 6.4.6.3.4 Enumeration: LocationAccuracy

Table 6.4.6.3.4-1: Enumeration LocationAccuracy

|  |  |
| --- | --- |
| Enumeration value | Description |
| "CELL\_LEVEL" | change of cell shall be reported for 3GPP access |
| "TA\_LEVEL" | change of TA shall be reported for 3GPP access |
| "N3IWF\_LEVEL" | Change of N3IWF node shall be reported for non-3GPP access |
| "UE\_IP" | change of UE IP address (used to reach the N3IWF) shall be reported for non-3GPP access |
| "UE\_PORT" | Change of UE source port shall be reported for non-3GPP access |

##### 6.4.6.3.5 Enumeration: CnType

Table 6.4.6.3.5-1: Enumeration CnType

|  |  |
| --- | --- |
| Enumeration value | Description |
| "SINGLE\_4G" | Single registration in 4G |
| "SINGLE\_5G" | Single registration in 5G |
| "DUAL\_4G5G" | Dual registration in 4G and 5G |

##### 6.4.6.3.6 Enumeration: AssociationType

Table 6.4.6.3.6-1: Enumeration AssociationType

|  |  |
| --- | --- |
| Enumeration value | Description |
| "IMEI\_CHANGE" | The event shall be reported if the association between IMSI and IMEI has changed; if only the Software Version (SV) has changed, no event shall be reported. |
| "IMEISV\_CHANGE" | The event shall be reported if the association between IMSI and IMEI, or SV, or both, has changed (this includes the case where only the SV has changed). |

##### 6.4.6.3.7 Enumeration: EventReportMode

Table 6.4.6.3.7-1: Enumeration EventReportMode

|  |  |
| --- | --- |
| Enumeration value | Description |
| "PERIODIC" | The notification is periodically sent. |
| "ON\_EVENT\_DETECTION" | The notification is sent based on event detection. |

##### 6.4.6.3.8 Enumeration: ReachabilityForSmsConfiguration

Table 6.4.6.3.8-1: Enumeration ReachabilityForSmsConfiguration

|  |  |
| --- | --- |
| Enumeration value | Description |
| "REACHABILITY\_FOR\_SMS\_OVER\_NAS" | Indicates that the Monitoring Configuration with Event Type UE\_REACHABILITY\_FOR\_SMS requests a notification when the UE is reachable for SMS via a registered SMSF (default) |
| "REACHABILITY\_FOR\_SMS\_OVER\_IP" | Indicates that the Monitoring Configuration with Event Type UE\_REACHABILITY\_FOR\_SMS requests a notification when the UE is reachable for SMS over IP, i.e. regardless of an SMSF being registered. |

##### 6.4.6.3.9 Enumeration: PdnConnectivityStatus

Table 6.4.6.3.9-1: PdnConnectivityStatus

|  |  |
| --- | --- |
| Enumeration value | Description |
| "ESTABLISHED" | PDN Connection established. |
| "RELEASED" | PDN Connection released. |

### 6.4.7 Error Handling

#### 6.4.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

#### 6.4.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

#### 6.4.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nudm\_EventExposure service. The following application errors listed in Table 6.4.7.3-1 are specific for the Nudm\_EventExposure service.

Table 6.4.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| MONITORING\_NOT\_ALLOWED | 403 Forbidden | The subscriber does not have the necessary subscription for monitoring with the requested Event Type. |
| AF\_NOT\_ALLOWED | 403 Forbidden | This AF is not allowed to perform monitoring configuration. |
| MTC\_PROVIDER\_NOT\_ALLOWED | 403 Forbidden | MTC Provider not authorized to perform monitoring configuration. |
| USER\_NOT\_FOUND | 404 Not Found | The user does not exist |
| CONTEXT\_NOT\_FOUND | 404 Not Found | It is used when no corresponding context exists. |
| UNSUPPORTED\_MONITORING\_EVENT\_TYPE | 501 Not Implemented | The monitoring configuration contains unsupported event type. |
| UNSUPPORTED\_MONITORING\_REPORT\_OPTIONS | 501 Not Implemented | The monitoring configuration contains unsupported report options. |

### 6.4.8 Feature Negotiation

The optional features in table 6.4.8-1 are defined for the Nudm\_EE API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.4.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | PatchReport | If some of the modifications included in the PATCH request are not successfully implemented, the UDM reports the result of PATCH request execution to the consumer. See clause 5.2.7.2 of 3GPP TS 29.500 [4]. |
| X | IERSR | Immediate Event Report in Subscription Creation Response for events detected by another NF  The UDM and the NF consumer (e.g. NEF) supporting this feature shall be able to handle the immediate event reports in the Subscription Creation Response for events with direct reporting by another NF (e.g. AMF, HSS), as specified in clause 5.5.2.2. |

### 6.4.9 Security

As indicated in 3GPP TS 33.501 [6] and 3GPP TS 29.500 [4], the access to the Nudm\_EE API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [18]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [19]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nudm\_EE API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [19], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nudm\_EE service.

The Nudm\_EE API defines a single scope "nudm-ee" for OAuth2 authorization (as specified in 3GPP TS 33.501 [6]) for the entire API, and it does not define any additional scopes at resource or operation level.

## 6.5 Nudm\_ParameterProvision Service API

### 6.5.1 API URI

URIs of this API shall have the following root:

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

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

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The <apiName>shall be "nudm-pp".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.5.3.

### 6.5.2 Usage of HTTP

#### 6.5.2.1 General

HTTP/2, as defined in IETF RFC 7540 [13], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

HTTP messages and bodies for the Nudm\_PP service shall comply with the OpenAPI [14] specification contained in Annex A6.

#### 6.5.2.2 HTTP standard headers

##### 6.5.2.2.1 General

The usage of HTTP standard headers shall be supported as specified in clause 5.2.2 of 3GPP TS 29.500 [4].

##### 6.5.2.2.2 Content type

The following content types shall be supported:

JSON, as defined in IETF RFC 8259 [15], signalled by the content type "application/json".

The Problem Details JSON Object (IETF RFC 7807 [16] signalled by the content type "application/problem+json"

JSON Merge Patch, as defined in IETF RFC 7396 [17], signalled by the content type "application/merge-patch+json"

#### 6.5.2.3 HTTP custom headers

##### 6.5.2.3.1 General

The usage of HTTP custom headers shall be supported as specified in clause 5.2.3 of 3GPP TS 29.500 [4].

### 6.5.3 Resources

#### 6.5.3.1 Overview



Figure 6.5.3.1-1: Resource URI structure of the Nudm\_PP API

Table 6.5.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.5.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method or custom operation | Description |
| PpData | /{ueId}/pp-data | PATCH | Modify the UE's modifiable subscription data  Send updated SoR Information for a UE to the UDM |
| 5GVnGroupConfiguration | /5g-vn-groups/{extGroupId} | PUT | Create a 5G VN Group |
| DELETE | Delete a 5G VN Group |
| PATCH | Modify a 5G VN Group |

#### 6.5.3.2 Resource: PpData

##### 6.5.3.2.1 Description

This resource is used to represent Parameter Provisioning Data.

##### 6.5.3.2.2 Resource Definition

Resource URI: {apiRoot}/nudm-pp/v1/{ueId}/pp-data

This resource shall support the resource URI variables defined in table 6.5.3.2.2-1.

Table 6.5.3.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.5.1 |
| ueId | string | Represents a single UE or a group of UEs.  - If representing a single UE, this parameter shall contain the Generic Public Subscription Identifier (see 3GPP TS 23.501 [2] clause 5.9.8) or SUPI.  pattern: See pattern of data type VarUeId in 3GPP TS 29.571 [7]  - If representing a group of UEs, this parameter shall contain the External GroupId.  pattern: "^extgroupid-[^@]+@[^@]+$" |

##### 6.5.3.2.3 Resource Standard Methods

6.5.3.2.3.1 PATCH

This method shall support the URI query parameters specified in table 6.5.3.2.3.1-1.

Table 6.5.3.2.3.1-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.5.3.2.3.1-2 and the response data structures and response codes specified in table 6.5.3.2.3.1-3.

Table 6.5.3.2.3.1-2: Data structures supported by the PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| PpData | M | 1 | Contains the data to be provisioned or the updated SoR Information to be conveyed to a UE. |

Table 6.5.3.2.3.1-3: Data structures supported by the PATCH Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. (NOTE 2) |
| PatchResult | M | 1 | 200 OK | Upon success, the execution report is returned. (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - MODIFICATION\_NOT\_ALLOWED  - DETACHED\_USER  - AF\_NOT\_ALLOWED  - MTC\_PROVIDER\_NOT\_ALLOWED |
| NOTE 1: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported.  NOTE 2: If all the modification instructions in the PATCH request have been implemented, the UDM shall respond with 204 No Content response; if some of the modification instructions in the PATCH request have been discarded, and the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature number, the UDM shall respond with PatchResult. | | | | |

#### 6.5.3.3 Resource: 5GVnGroupConfiguration

##### 6.5.3.3.1 Description

This resource is used to represent 5G VN Group Configuration.

##### 6.5.3.3.2 Resource Definition

Resource URI: {apiRoot}/nudm-pp/<apiVersion>/5g-vn-groups/{extGroupId}

This resource shall support the resource URI variables defined in table 6.5.3.3.2-1.

Table 6.5.3.3.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.5.1 |
| extGroupId | ExtGroupId | Represents the external Identifier of the 5G VN group  pattern: "^extgroupid-[^@]+@[^@]+$" |

##### 6.5.3.3.3 Resource Standard Methods

6.5.3.3.3.1 PUT

This method shall support the URI query parameters specified in table 6.5.3.3.3.1-1.

Table 6.5.3.3.3.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 6.5.3.3.3.1-2 and the response data structures and response codes specified in table 6.5.3.3.3.1-3.

Table 6.5.3.3.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| 5GVnGroupConfiguration | M | 1 | Contains the configuration of the 5G VN Group |

Table 6.5.3.3.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 201 Created | Upon success, an empty response shall be returned. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - CREATION\_NOT\_ALLOWED  - AF\_NOT\_ALLOWED  - MTC\_PROVIDER\_NOT\_ALLOWED |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

6.5.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 6.5.3.3.3.1-1.

Table 6.5.3.3.3.2-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| mtc-provider-info | MtcProviderInformation | O | 0..1 | The mtc-provider-info contains the MTC Provider information that originates 5G-VN-Group deletion, it is used by the UDM to check whether the MTC Provider is allowed to perform this operation for the UE if the MTC provider authorization is required. |
| af-id | string | O | 0..1 | The af-Id contains the AF ID that originates 5G-VN-Group deletion, it is used by the UDM to check whether the AF is allowed to perform this operation for the UE if the AF authorization is required.  It is formatted as described in the definition of type MonitoringConfiguration. |

This method shall support the request data structures specified in table 6.5.3.3.3.1-2 and the response data structures and response codes specified in table 6.5.3.3.3.1-3.

Table 6.5.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

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

Table 6.5.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - GROUP\_IDENTIFIER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - AF\_NOT\_ALLOWED  - MTC\_PROVIDER\_NOT\_ALLOWED |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

6.5.3.3.3.3 PATCH

This method shall support the URI query parameters specified in table 6.5.3.3.3.3-1.

Table 6.5.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.5.3.3.3.3-2 and the response data structures and response codes specified in table 6.5.3.3.3.3-3.

Table 6.5.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| 5GVnGroupConfiguration | M | 1 | Contains the modification instruction |

Table 6.5.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. (NOTE 2) |
| PatchResult | M | 1 | 200 OK | Upon success, the execution report is returned. (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - GROUP\_IDENTIFIER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - MODIFICATION\_NOT\_ALLOWED  - AF\_NOT\_ALLOWED  - MTC\_PROVIDER\_NOT\_ALLOWED |
| NOTE 1: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported.  NOTE 2: If all the modification instructions in the PATCH request have been implemented, the UDM shall respond with 204 No Content response; if some of the modification instructions in the PATCH request have been discarded, and the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature number, the UDR shall respond with PatchResult. | | | | |

6.5.3.3.3.4 GET

This method shall support the URI query parameters specified in table 6.5.3.3.3.4-1.

Table 6.5.3.3.3.4-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| N/A |  |  |  |  |

This method shall support the response data structures and response codes specified in table 6.5.3.3.3.4-2.

Table 6.5.3.3.3.4-2: Data structures supported by the GET Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| N/A |  |  |  |

Table 6.5.3.3.3.4-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| 5GVnGroupConfiguration |  |  | 200 OK |  |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - GROUP\_IDENTIFIER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - AF\_NOT\_ALLOWED |

### 6.5.4 Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nudm\_ParameterProvision Service.

### 6.5.5 Notifications

In this release of this specification, no notifications are defined for the Nudm\_ParameterProvision Service.

### 6.5.6 Data Model

#### 6.5.6.1 General

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

Table 6.5.6.1-1 specifies the data types defined for the Nudm\_PP service API.

Table 6.5.6.1-1: Nudm\_PP specific Data Types

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Data type | | Clause defined | | Description | |
| PpData | | 6.5.6.2.2 | | Parameter Provision Data | |
| CommunicationCharacteristics | | 6.5.6.2.3 | | Communication Characteristics | |
| PpSubsRegTimer | | 6.5.6.2.4 | |  | |
| PpActiveTime | | 6.5.6.2.5 | |  | |
| 5GVnGroupConfiguration | | 6.5.6.2.6 | |  | |
| 5GVnGroupData | | 6.5.6.2.7 | |  | |
| ExpectedUeBehaviour | | 6.5.6.2.8 | | Expected UE Behaviour Parameters | |
| LocationArea | | 6.5.6.2.10 | | Location Area | |
| NetworkAreaInfo | | 6.5.6.2.11 | | Network Area Information | |
| EcRestriction | | 6.5.6.2.12 | |  | |
| PlmnEcInfo | | 6.5.6.2.13 | |  | |
| PpDlPacketCountExt | | 6.5.6.2.14 | |  | |
| PpMaximumResponseTime | | 6.5.6.2.15 | |  | |
| PpMaximumLatency | | 6.5.6.2.16 | |  | |
| LcsPrivacy | | 6.5.6.2.17 | |  | |
| ReferenceId | | 6.5.6.3.2 | |  | |
| PpDlPacketCount | | 6.5.6.3.2 | |  | |

Table 6.5.6.1-2 specifies data types re-used by the Nudm\_PP service API from other APIs, including a reference and when needed, a short description of their use within the Nudm\_PP service API.

Table 6.5.6.1-2: Nudm\_PP re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| DurationSec | 3GPP TS 29.571 [7] | Time value in seconds |
| DurationSecRm | 3GPP TS 29.571 [7] | Time value in seconds; nullable |
| SupportedFeatures | 3GPP TS 29.571 [7] |  |
| NfInstanceId | 3GPP TS 29.571 [7] |  |
| ProblemDetails | 3GPP TS 29.571 [7] |  |
| Gpsi | 3GPP TS 29.571 [7] |  |
| PatchResult | 3GPP TS 29.571 [7] |  |
| DateTime | 3GPP TS 29.571 [7] |  |
| Ecgi | 3GPP TS 29.571 [7] | an EUTRA cell identifier |
| Ncgi | 3GPP TS 29.571 [7] | an NR cell identifier |
| GlobalRanNodeId | 3GPP TS 29.571 [7] | an identity of the NG-RAN node |
| Tai | 3GPP TS 29.571 [7] | a tracking area identity |
| GeographicArea | 3GPP TS 29.572 [34] | Identifies the geographical information of the user(s). |
| CivicAddress | 3GPP TS 29.572 [34] | Identifies the civic address information of the user(s). |
| PduSessionType | 3GPP TS 29.571 [7] |  |
| AppDescriptor | 6.1.6.2.40 |  |
| AcsInfoRm | 3GPP TS 29.571 [7] |  |
| StnSrRm | 3GPP TS 29.571 [7] | Session Transfer Number for SRVCC |
| Supi | 3GPP TS 29.571 [7] |  |
| Lpi | 6.1.6.2.43 |  |
| MtcProviderInformation | 3GPP TS 29.571 [7] | MTC Provider Information |
| StationaryIndicationRm | 3GPP TS 29.571 [7] |  |
| ScheduledCommunicationTimeRm | 3GPP TS 29.571 [7] |  |
| ScheduledCommunicationTypeRm | 3GPP TS 29.571 [7] |  |
| TrafficProfileRm | 3GPP TS 29.571 [7] |  |
| BatteryIndicationRm | 3GPP TS 29.571 [7] |  |

#### 6.5.6.2 Structured data types

##### 6.5.6.2.1 Introduction

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

##### 6.5.6.2.2 Type: PpData

Table 6.5.6.2.2-1: Definition of type PpData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | P | Cardinality | Description |
| supportedFeatures | | SupportedFeatures | O | 0..1 |  |
| communicationCharacteristics | | CommunicationCharacteristics | O | 0..1 | communication characteristics |
| expectedUeBehaviour | | ExpectedUeBehaviour | O | 0..1 | Expected UE Behaviour Parameters |
| ecRestriction | | EcRestriction | O | 0..1 | Enhanced Coverage Restriction Parameters |
| acsInfo | | AcsInfoRm | O | 0..1 | Identifies the ACS Information (see TS 23.316 [37] clause 9.6.3); nullable. |
| stnSr | | StnSrRm | O | 0..1 | Session Transfer Number for SRVCC |
| lcsPrivacy | | LcsPrivacy | O | 0..1 | LCS Privacy Parameters (see clause 5.4.3 of 3GPP TS 23.273 [38]) |
| sorInfo | | SorInfo | O | 0..1 | Steering of Roaming information to be conveyed to a UE  See NOTE°1 and NOTE°2. |
| NOTE°1: If the UDM is not able to immediately (after conducting integrity protection with the AUSF) convey the received Steering of Roaming information to the concerned UE for any reason (e.g. no AMF registered for the UE), it shall discard it.  NOTE°2: The behaviour of the UDM at reception of Steering of Roaming information within PpData is specified in Annex C.3 of 3GPP°TS°23.122°[20]. | | | | | |

##### 6.5.6.2.3 Type: CommunicationCharacteristics

Table 6.5.6.2.3-1: Definition of type CommunicationCharacteristics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| ppSubsRegTimer | PpSubsRegTimer | O | 0..1 | AF provisionedSubscribed periodic registration timer,nullable (NOTE 2) |
| ppActiveTime | PpActiveTime | O | 0..1 | AF provisioned active time; nullable (NOTE 2) |
| ppDlPacketCount | PpDlPacketCount | O | 0..1 | AF provisioned DL Buffering Suggested Packet Count; nullable |
| ppDlPacketCountExt | PpDlPacketCountExt | C | 0..1 | AF provisioned DL Buffering Suggested Packet Count Extension; nullable.  Shall be absent if ppDlPacketCount is absent, and shall be null if ppDlPacketCount is null. |
| ppMaximumResponseTime | PpMaximumResponseTime | O | 0..1 | AF provisioned Maximum Response Time; nullable |
| ppMaximumLatency | PpMaximumLatency | O | 0..1 | AF provisioned Maximum Latency; nullable |
| NOTE 1: If ppDlPacketCountExt is absent and ppDlPacketCount (whether the value is null or not) is present in a modification request, it shall result in deletion of ppDlPacketCountExt.  NOTE 2: These IEs are deprecated. An NF service consumer (i.e. AF) supporting this release shall use ppMaximumResponseTime IE to influence the Subscribed Active Time of the UE; use ppMaximumLatency IE to influence the Subscribed Periodic Registration Timer of the UE. | | | | |

##### 6.5.6.2.4 Type: PpSubsRegTimer

Table 6.5.6.2.4-1: Definition of type PpSubsRegTimer

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| subsRegTimer | | DurationSec | | M | | 1 | | value in seconds | |
| afInstanceId | | string | | M | | 1 | | The string identifying the originating AF (NOTE) | |
| referenceId | | ReferenceId | | M | | 1 | | Transaction Reference ID | |
| validityTime | | DateTime | | O | | 0..1 | | Identifies the point of time up to which the subsRegTimer parameter expires and it shall be deleted. If absent, it indicates that there is no expiration time for these expected UE parameters.  If this IE is in request body, it indicates the expected validity time by consumer.  If this IE is in response body, it indicates the confirmed validity time by UDM. | |
| mtcProviderInformation | | MtcProviderInformation | | O | | 0..1 | | Indicates MTC provider information for Parameter Provisioning authorization. | |
| NOTE: When the service operation is originated by external AF via T8/N33 interface, information carried in {scsAsId} URI variable in resource URIs on T8/N33 interface (see clause 5 of 3GPP TS 29.122 [45]) or in {afId} URI variable in resource URIs on N33 interface (see clause 5 of 3GPP TS 29.522 [54]) can be used as the value for this IE. | | | | | | | | | |

##### 6.5.6.2.5 Type: PpActiveTime

Table 6.5.6.2.5-1: Definition of type PpActiveTime

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| activeTime | | DurationSec | | M | | 1 | | value in seconds | |
| afInstanceId | | string | | M | | 1 | | The string identifying the originating AF (NOTE). | |
| referenceId | | ReferenceId | | M | | 1 | | Transaction Reference ID | |
| validityTime | | DateTime | | O | | 0..1 | | Identifies the point of time up to which the activeTime parameter expires and it shall be deleted. If absent, it indicates that there is no expiration time for these expected UE parameters.  If this IE is in request body, it indicates the expected validity time by consumer.  If this IE is in response body, it indicates the confirmed validity time by UDM. | |
| mtcProviderInformation | | MtcProviderInformation | | O | | 0..1 | | Indicates MTC provider information for Parameter Provisioning authorization. | |
| NOTE: When the service operation is originated by external AF via T8/N33 interface, information carried in {scsAsId} URI variable in resource URIs on T8/N33 interface (see clause 5 of 3GPP TS 29.122 [45]) or in {afId} URI variable in resource URIs on N33 interface (see clause 5 of 3GPP TS 29.522 [54]) can be used as the value for this IE. | | | | | | | | | |

##### 6.5.6.2.6 Type: 5GVnGroupConfiguration

Table 6.5.6.2.6-1: Definition of type 5GVnGroupConfiguration

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | | |
| 5gVnGroupData | | 5GVnGroupData | | C | | 0..1 | | Data of the 5G VN Group; may be absent in modification requests; shall be present otherwise | | |
| members | | array(Gpsi) | | C | | 1..N | | List of group members; may be absent in modification requests; shall be present in creation requests | | |
| referenceId | | ReferenceId | | C | | 1 | | Transaction Reference ID; shall be absent in modification requests; shall be present otherwise. | | |
| afInstanceId | | string | | C | | 1 | | The string identifying the originating AF (NOTE) | | |
| internalGroupIdentifier | | GroupId | | C | | 0..1 | | Allocated by the UDR; shall be present in successful PUT and GET responses on Nudr; otherwise shall be absent. | | |
| mtcProviderInformation | | | MtcProviderInformation | | O | | 0..1 | | Indicates MTC provider information for 5G VN Group Configuration authorization. | |
| NOTE: When the service operation is originated by external AF via T8/N33 interface, information carried in {scsAsId} URI variable in resource URIs on T8/N33 interface (see clause 5 of 3GPP TS 29.122 [45]) or in {afId} URI variable in resource URIs on N33 interface (see clause 5 of 3GPP TS 29.522 [54]) can be used as the value for this IE. | | | | | | | | | | |

##### 6.5.6.2.7 Type: 5GVnGroupData

Table 6.5.6.2.7-1: Definition of type 5GVnGroupData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| dnn | Dnn | M | 1 | DNN of the 5G VN group, shall contain the Network Identifier only. |
| sNssai | Snssai | M | 1 | S-NSSAI of the 5G VN group's communication session |
| pduSessionTypes | array(PduSessionType) | O | 1..N | List of PDU Session Types allowed for 5G VN group's communication session |
| appDescriptors | array(AppDescriptor) | O | 1..N | List of Application Descriptors allowed for 5G VN group's communication session |
| secondaryAuth | boolean | O | 0..1 | Indicates whether secondary authentication and authorization is needed.  true: secondary authentication and authorization is needed.  false: secondary authentication and authorization is not needed.  If absent, it indicates that secondary authentication is not required by the NEF, but it still may be required by local policies at the SMF. |
| dnAaaAddress | IpAddress | O | 0..1 | The address information of DN-AAA server, used for secondary authentication and authorization. |

##### 6.5.6.2.8 Type: ExpectedUeBehaviour

Table 6.5.6.2.8-1: Definition of type ExpectedUeBehaviour

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| afInstanceId | string | M | 1 | The string identifying the originating AF (NOTE 5) |
| referenceId | ReferenceId | M | 1 | Identifies transaction reference ID genetrated by NEF. |
| stationaryIndication | StationaryIndicationRm | O | 0..1 | Identifies whether the UE is stationary or mobile(see TS 23.502 [3] clause 4.15.6.3); nullable. |
| communicationDurationTime | DurationSecRm | O | 0..1 | Indicates for how long the UE will normally stay in CM-Connected for data transmission(see TS 23.502 [3] clause 4.15.6.3); nullable. |
| periodicTime | DurationSecRm | O | 0..1 | Identifies interval time of periodic communication (see TS 23.502 [3] clause 4.15.6.3); nullable. |
| scheduledCommunicationTime | ScheduledCommunicationTimeRm | O | 0..1 | Identifies time and day of the week when the UE is available for communication(see TS 23.502 [3] clause 4.15.6.3); nullable. |
| scheduledCommunicationType | ScheduledCommunicationTypeRm | O | 0..1 | Indicates that the Scheduled Communication Type (see TS 23.502 [3] clause 4.15.6.3); nullable.  (Note 4) |
| expectedUmts | array(LocationArea) | O | 1..N | Identifies the UE's expected geographical movement. The attribute is only applicable in 5G(see TS 23.502 [3] clause 4.15.6.3); nullable.  (NOTE 3) |
| trafficProfile | TrafficProfileRm | O | 0..1 | Identifies the type of data transmission: single packet transmission (UL or DL), dual packet transmission (UL with subsequent DL or DL with subsequent UL), multiple packets transmission; nullable |
| batteryIndication | BatteryIndicationRm | O | 0..1 | Indicates the power consumption type(s) of the UE (see TS 23.502 [3] clause 4.15.6.3); nullable. |
| validityTime | DateTime | O | 0..1 | If present, identifies when the expected UE behaviour parameters expire and shall be deleted locally if it expire(see TS 23.502 [3] clause 4.15.6.3).  If this IE is in request body, it indicates the expected validity time by consumer.  If this IE is in response body, it indicates the confirmed validity time by UDM.  (NOTE 2) |
| mtcProviderInformation | MtcProviderInformation | O | 0..1 | Indicates MTC provider information for UE Parameter Configuration authorization. |
| NOTE 1: At least one of optional parameters (expect for validityTime) above shall be present.  NOTE 2: If this attribute is omitted, no expiry for the expected UE behaviour parameters applies.  NOTE 3: The first instance of the attribute represents the start of the location, and the last one represents the stop of the location.  NOTE 4: The parameter "scheduledCommunicationType" shall be used together with the parameter "scheduledCommunicationTime".  NOTE 5: When the service operation is originated by external AF via T8/N33 interface, information carried in {scsAsId} URI variable in resource URIs on T8/N33 interface (see clause 5 of 3GPP TS 29.122 [45]) or in {afId} URI variable in resource URIs on N33 interface (see clause 5 of 3GPP TS 29.522 [54]) can be used as the value for this IE. | | | | |

##### 6.5.6.2.9 Void

##### 6.5.6.2.10 Type: LocationArea

Table 6.5.6.2.10-1: Definition of type LocationArea

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

##### 6.5.6.2.11 Type: NetworkAreaInfo

Table 6.5.6.2.11-1: Definition of type NetworkAreaInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| ecgis | array(Ecgi) | O | 0..N | This IE contains a list of E‑UTRA cell identities. |
| ncgis | array(Ncgi) | O | 0..N | This IE contains a list of NR cell identities. |
| gRanNodeIds | array(GlobalRanNodeId) | O | 0..N | This IE contains a list of the NG‑RAN nodes.  The "n3IwfId" attribute within the "GlobalRanNodeId" data type shall not be supplied. |
| tais | array(Tai) | O | 0..N | This IE contains a list of tracking area identities. |
| NOTE: The NetworkAreaInfo data type allows any combination of defined properties. | | | | |

##### 6.5.6.2.12 Type: EcRestriction

Table 6.5.6.2.12-1: Definition of type EcRestriction

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| afInstanceId | string | M | 1 | The string identifying the originating AF (NOTE) |
| referenceId | ReferenceId | M | 1 | Transaction Reference ID |
| plmnEcInfos | array(PlmnEcInfo) | O | 1..N | It may indicate a complete list of serving PLMNs where Enhanced Coverage shall be allowed and the detailed enhanced coverage restriction configuration under per the PLMN. |
| mtcProviderInformation | MtcProviderInformation | O | 0..1 | Indicates MTC provider information for Enhanced Coverage Configuration authorization. |
| NOTE: When the service operation is originated by external AF via T8/N33 interface, information carried in scsAsId attribute in ECRControl structured data type (see clause 5.12.2.1.2 of 3GPP TS 29.122 [45]) can be used as the value for this IE. If the scsAsId value is not received in T8, the afInstanceId attribute shall contain an empty string value (""). | | | | |

##### 6.5.6.2.13 Type: PlmnEcInfo

Table 6.5.6.2.13-1: Definition of type PlmnEcInfo

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| plmnId | | PlmnId | | M | | 1 | | Indicates PLMN where Enhanced Coverage shall be restricted. | |
| ecRestrictionDataWb | | EcRestrictionDataWb | | O | | 0..1 | | If present, it shall contain Enhanced Coverage Restriction Data for WB-N1 mode.  If absent, it shall indicate that Enhanced Coverage is not restricted for WB-N1 mode. | |
| ecRestrictionDataNb | | boolean | | O | | 0..1 | | If present, this IE shall indicate whether Enhanced Coverage for NB-N1 mode is restricted or not.  true: Enhanced Coverage for NB-N1 mode is restricted.  false or absent: Enhanced Coverage for NB-N1 mode is allowed. | |
| NOTE: At least one of the properties "ecRestrictionDataWb" and "ecRestrictionDataNb" shall be included. | | | | | | | | | |

##### 6.5.6.2.14 Type: PpDlPacketCountExt

Table 6.5.6.2.14-1: Definition of type PpDlPacketCountExt

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| afInstanceId | | string | | M | | 1 | | The string identifying the originating AF (NOTE) | |
| referenceId | | ReferenceId | | M | | 1 | | Transaction Reference ID | |
| validityTime | | DateTime | | O | | 0..1 | | Identifies the point of time up to which the value of parameter ppDlPacketCount expires and it shall be deleted. If absent, it indicates that there is no expiration time for these expected UE parameters.  If this IE is in request body, it indicates the expected validity time by consumer.  If this IE is in response body, it indicates the confirmed validity time by UDM. | |
| mtcProviderInformation | | MtcProviderInformation | | O | | 0..1 | | Indicates MTC provider information for Parameter Provisioning authorization. | |
| NOTE: When the service operation is originated by external AF via T8/N33 interface, information carried in {scsAsId} URI variable in resource URIs on T8/N33 interface (see clause 5 of 3GPP TS 29.122 [45]) or in {afId} URI variable in resource URIs on N33 interface (see clause 5 of 3GPP TS 29.522 [54]) can be used as the value for this IE. | | | | | | | | | |

##### 6.5.6.2.15 Type: PpMaximumResponseTime

Table 6.5.6.2.15-1: Definition of type PpMaximumResponseTime

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | | |
| maximumResponseTime | | DurationSec | | M | | 1 | | This IE shall contain value of Maximum Response Time in seconds.  Maximum Response Time identifies the time for which the UE stays reachable to allow the AF to reliably deliver the required downlink data, see clause 4.15.6.3a of 3GPP TS 23.502 [3]. | | |
| afInstanceId | | string | | M | | 1 | | The string identifying the originating AF (NOTE) | | |
| referenceId | | ReferenceId | | M | | 1 | | Transaction Reference ID | | |
| validityTime | | DateTime | | O | | 0..1 | | Identifies the point of time up to which the value of maximumResponseTime expires and it shall be deleted. If absent, it indicates that there is no expiration time.  If this IE is in request body, it indicates the expected validity time by consumer.  If this IE is in response body, it indicates the confirmed validity time by UDM. | | |
| mtcProviderInformation | | | MtcProviderInformation | | O | | 0..1 | | Indicates MTC provider information for Parameter Provisioning authorization. | |
| NOTE: When the service operation is originated by external AF via T8/N33 interface, information carried in {scsAsId} URI variable in resource URIs on T8/N33 interface (see clause 5 of 3GPP TS 29.122 [45]) or in {afId} URI variable in resource URIs on N33 interface (see clause 5 of 3GPP TS 29.522 [54]) can be used as the value for this IE. | | | | | | | | | | |

##### 6.5.6.2.16 Type: PpMaximumLatency

Table 6.5.6.2.16-1: Definition of type PpMaximumLatency

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | |
| maximumLatency | DurationSec | M | 1 | This IE shall contain value of Maximum Latency in seconds.  Maximum Latency identifies maximum delay acceptable for downlink data transfers, see clause 4.15.6.3a of 3GPP TS 23.502 [3]. | |
| afInstanceId | string | M | 1 | The string identifying the originating AF (NOTE). | |
| referenceId | ReferenceId | M | 1 | Transaction Reference ID | |
| validityTime | DateTime | O | 0..1 | Identifies the point of time up to which the value of maximumLatency expires and it shall be deleted. If absent, it indicates that there is no expiration time.  If this IE is in request body, it indicates the expected validity time by consumer.  If this IE is in response body, it indicates the confirmed validity time by UDM. | |
| mtcProviderInformation | MtcProviderInformation | O | 0..1 | Indicates MTC provider information for Parameter Provisioning authorization. | |
| NOTE: When the service operation is originated by external AF via T8/N33 interface, information carried in {scsAsId} URI variable in resource URIs on T8/N33 interface (see clause 5 of 3GPP TS 29.122 [45]) or in {afId} URI variable in resource URIs on N33 interface (see clause 5 of 3GPP TS 29.522 [54]) can be used as the value for this IE. | | | | | |

##### 6.5.6.2.17 Type: LcsPrivacy

Table 6.5.6.2.17-1: Definition of type LcsPrivacy

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | | Data type | | P | | Cardinality | | Description | |
| afInstanceId | | string | | C | | 0..1 | | When present, indicates NF Instance Id of the originating AF/NF.  (NOTE) | |
| referenceId | | ReferenceId | | C | | 0..1 | | This IE shall be present if LCS privacy parameters are provisioned by an AF.  When present, indicates Transaction Reference ID  (NOTE) | |
| lpi | | Lpi | | O | | 0..1 | | If present, indicates the Location Privacy Indication | |
| mtcProviderInformation | | MtcProviderInformation | | O | | 0..1 | | Indicates MTC provider information for LCS privacy parameter configuration authorization. | |
| NOTE: If LCS privacy parameters are provisioned by UE, parameters afInstanceId and referenceId shall be not included, and if LCS privacy parameters are provisioned by AF, parameters afInstanceId and referenceId shall be included. The string identifying the originating AF, which is carried in {scsAsId} URI variable in resource URIs on T8/N33 interface (see clause 5 of 3GPP TS 29.122 [45]) or in {afId} URI variable in resource URIs on N33 interface (see clause 5 of 3GPP TS 29.522 [54]). | | | | | | | | | |

#### 6.5.6.3 Simple data types and enumerations

##### 6.5.6.3.1 Introduction

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

##### 6.5.6.3.2 Simple data types

The simple data types defined in table 6.5.6.3.2-1 shall be supported.

Table 6.5.6.3.2-1: Simple data types

|  |  |  |
| --- | --- | --- |
| Type Name | Type Definition | Description |
| ReferenceId | integer | The numeric value should not be higher than 2^64-1 (i.e. it should be possible to convey it in an unsigned 64 integer Information Element, used in other protocols), if interworking with the Event Exposure framework in EPC is required. |
| PpDlPacketCount | integer | nullable |

##### 6.5.6.3.3 Void

##### 6.5.6.3.4 Void

### 6.5.7 Error Handling

#### 6.5.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

#### 6.5.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

#### 6.5.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nudm\_ParameterProvision service. The following application errors listed in Table 6.5.7.3-1 are specific for the Nudm\_ParameterProvision service.

The application errors defined for the Nudm\_UECM service are listed in Table 6.5.7.3-1.

Table 6.5.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| MODIFICATION\_NOT\_ALLOWED | 403 Forbidden | The subscriber does not have the necessary subscription for external parameter provisioning. |
| USER\_NOT\_FOUND | 404 Not Found | The User does not exist. |
| CREATION\_NOT\_ALLOWED | 403 Forbidden | Creation of a 5G VN Group is not allowed. |
| DETACHED\_USER | 403 Forbidden | The user is detached in the Network. |
| GROUP\_IDENTIFIER\_NOT\_FOUND | 404 Not Found | The group does not exist |
| AF\_NOT\_ALLOWED | 403 Forbidden | This AF is not allowed to perform external provisioning or 5G VN Group creation. |
| MTC\_PROVIDER\_NOT\_ALLOWED | 403 Forbidden | MTC Provider not authorized to perform external provisioning or 5G VN Group creation. |

### 6.5.8 Feature Negotiation

The optional features in table 6.5.8-1 are defined for the Nudm\_PP API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.5.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | PatchReport | If some of the modifications included in the PATCH request are not successfully implemented, the UDM reports the result of PATCH request execution to the consumer. See clause 5.2.7.2 of 3GPP TS 29.500 [4]. |

### 6.5.9 Security

As indicated in 3GPP TS 33.501 [6] and 3GPP TS 29.500 [4], the access to the Nudm\_PP API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [18]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [19]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nudm\_PP API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [19], clause 5.8.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nudm\_PP service.

The Nudm\_PP API defines a single scope "nudm-pp" for OAuth2 authorization (as specified in 3GPP TS 33.501 [6]) for the entire API, and it does not define any additional scopes at resource or operation level.

## 6.6 Nudm\_NIDDAuthorization Service API

### 6.6.1 API URI

The Nudm\_NIDDAuthorization service shall use the Nudm\_NIDDAU API.

The API URI of the Nudm\_NIDDAU API shall be:

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

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

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The <apiName>shall be "nudm-niddau".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.6.3.

### 6.6.2 Usage of HTTP

#### 6.6.2.1 General

HTTP/2, as defined in IETF RFC 7540 [13], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

HTTP messages and bodies for the Nudm\_NIDDAuthorization service shall comply with the OpenAPI [14] specification contained in Annex A.7.

#### 6.6.2.2 HTTP standard headers

##### 6.6.2.2.1 General

The usage of HTTP standard headers shall be supported as specified in clause 5.2.2 of 3GPP TS 29.500 [4].

##### 6.6.2.2.2 Content type

The following content types shall be supported:

JSON, as defined in IETF RFC 8259 [15], signalled by the content type "application/json".

The Problem Details JSON Object (IETF RFC 7807 [16] signalled by the content type "application/problem+json"

#### 6.6.2.3 HTTP custom headers

##### 6.6.2.3.1 General

The usage of HTTP custom headers shall be supported as specified in clause 5.2.3 of 3GPP TS 29.500 [4].

### 6.6.3 Resources

#### 6.6.3.1 Overview

Figure 6.6.3.1-1 describes the resources supported by the Nudm\_NIDDAU API.



Figure 6.6.3.1-1: Resource URI structure of the nudm-niddau API

Table 6.6.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.6.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name (Archetype) | Resource URI | HTTP method or custom operation | Description |
| ueIdentity (Document) | /{ueIdentity}/authorize | authorize (POST) | Authorize the NIDD configuration request. |

#### 6.6.3.2 Resource: ueIdentity (Document)

##### 6.6.3.2.1 Description

This resource represents the UE's subscribed NIDD authorization information for a GPSI or External Group Identifier.

##### 6.6.3.2.2 Resource Definition

Resource URI: {apiRoot}/nudm-niddau/<apiVersion>/{ueIdentity}

This resource shall support the resource URI variables defined in table 6.6.3.2.2-1.

Table 6.6.3.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.6.1 |
| ueIdentity | string | Represents the GPSI or External Group Identifier (see 3GPP TS 23.501 [2] clause 7.2.5)  pattern: "^ (msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|extgroupid-[^@]+@[^@]+|.+)$" |

##### 6.6.3.2.3 Resource Standard Methods

No Standard Methods are supported for this resource.

##### 6.6.3.2.4 Resource Custom Operations

6.6.3.2.4.1 Overview

Table 6.6.3.2.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation Name | Custom operation URI | Mapped HTTP method | Description |
| authorize | /authorize | POST | Authorize the NIDD configuration request. |

6.6.3.2.4.2 Operation: authorize

6.6.3.2.4.2.1 Description

This custom operation is used by the NF service consumer (NEF) to request UDM to authorize the NIDD configuration request for the GPSI/External Group Identifier.

6.6.3.2.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.6.3.2.4.2.2-1 and the response data structure and response codes specified in table 6.6.3.2.4.2.2-2.

Table 6.6.3.2.4.2.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AuthorizationInfo | M | 1 | Contains NSSAI, DNN, MTC Provider Information, callback URI. |

Table 6.6.3.2.4.2.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| AuthorizationData | M | 1 | 200 OK | Upon success, a response body containing the SUPI(s) and GPSI shall be returned. |
| ProblemDetails | O | 1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - USER\_NOT\_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - DNN\_NOT\_ALLOWED  - MTC\_PROVIDER\_NOT\_ALLOWED  - AF\_INSTANCE\_NOT\_ALLOWED |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

### 6.6.4 Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nudm\_SubscriberDataManagement Service.

### 6.6.5 Notifications

#### 6.6.5.1 General

This clause will specify the use of notifications and corresponding protocol details if required for the specific service. When notifications are supported by the API, it will include a reference to the general description of notifications support over the 5G SBIs specified in 3GPP TS 29.500 [4] / 3GPP TS 29.501 [5].

#### 6.6.5.2 Nidd Authorization Data Update Notification

The POST method shall be used for Nidd Authorization Data Update Notifications and the Call-back URI shall be provided during the NIDD Authorization Data Retrieval procedure. UDM should continuously generate NIDD authorization Data Update Notifications to service consumer (NEF) for UE for the event until validity time related to the UE expires, and if validity time expires, it indicates unsubscription to notification for the UE.

Resource URI: {callbackReference}

Support of URI query parameters is specified in table 6.6.5.2-1.

Table 6.6.5.2-1: URI query parameters supported by the POST method

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

Support of request data structures is specified in table 6.6.5.2-2 and of response data structures and response codes is specified in table 6.6.5.2-3.

Table 6.1.5.2-2: Data structures supported by the POST Request Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| NiddAuthUpdateNotification | M | 1 |  |

Table 6.6.5.2-3: Data structures supported by the POST Response Body

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Upon success, an empty response body shall be returned. |
| NOTE: In addition common data structures as listed in table 6.6.7-1 are supported. | | | | |

### 6.6.6 Data Model

#### 6.6.6.1 General

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

Table 6.6.6.1-1 specifies the structured data types defined for the Nudm\_NIDDAU service API. For simple data types defined for the Nudm\_NIDDAU service API see table 6.6.6.3.2-1.

Table 6.6.6.1-1: Nudm\_NIDDAU specific Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| AuthorizationData | 6.6.6.2.2 |  |
| UserIdentifier | 6.6.6.2.3 |  |
| NiddAuthUpdateInfo | 6.6.6.2.4 |  |
| NiddAuthUpdateNotification | 6.6.6.2.5 |  |
| AuthorizationInfo | 6.6.6.2.6 |  |
| NiddCause | 6.6.6.3.3 |  |

Table 6.6.6.1-2 specifies data types re-used by the Nudm\_NIDDAU service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudm\_NIDDAU service API.

Table 6.6.6.1-2: Nudm\_NIDDAU re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| Nssai | 6.1.6.2.2 | Network Slice Selection Assistance Information |
| Gpsi | 3GPP TS 29.571 [7] | Generic Public Subscription Identifier |
| Supi | 3GPP TS 29.571 [7] |  |
| Dnn | 3GPP TS 29.571 [7] | Data Network Name with Network Identifier only. |
| MtcProviderInformation | 3GPP TS 29.571 [7] |  |
| DateTime | 3GPP TS 29.571 [7] |  |
| Snssai | 3GPP TS 29.571 [7] |  |
| Uri | 3GPP TS 29.571 [7] |  |
| NefId | 3GPP TS 29.510 [19] | NEF ID |

#### 6.6.6.2 Structured data types

##### 6.6.6.2.1 Introduction

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

##### 6.6.6.2.2 Type: AuthorizationData

Table 6.6.6.2.2-1: Definition of type AuthorizationData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| authorizationData | array(UserIdentifier) | M | 1..N | May contain a single value or list of (SUPI and GPSI). Contains unique items. |
| validityTime | DateTime | O | 0..1 | Indicates the granted validity time of the authorisation result.  If absent, it indicates the authorisation result is valid permanently |

##### 6.6.6.2.3 Type: UserIdentifier

Table 6.6.6.2.3-1: Definition of type UserIdentifier

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| supi | Supi | M | 1 |  |
| gpsi | Gpsi | O | 0..1 |  |
| validityTime | DateTime | O | 0..1 | Indicates the granted validity time of the authorisation result for this user.  If absent, the value of the validity time in the AuthorizationData is used for this user if it is present in AuthorizationData.  If present, this value has higher priority than the value in the AuthorizationData. |

##### 6.6.6.2.4 Type: NiddAuthUpdateInfo

Table 6.6.6.2.4-1: Definition of type NiddAuthUpdateInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| authorizationData | AuthorizationData | M | 1 | This IE shall include the Authorization data. |
| invalidityInd | boolean | O | 0..1 | Indicates whether the authorized NIDD authoration data is still valid or not.  true: the authorized NIDD authoration data is not valid.  false or absent: the authorized NIDD authoration data is valid. |
| snssai | Snssai | O | 0..1 | Indicates Single Network Slice Selection Assistance Information for NIDD authorization.  When absent it indicates authorization for all subscribed S-NSSAIs. |
| dnn | Dnn | O | 0..1 | Indicates DNN for NIDD authorization, shall contain the Network Identifier only.  When absent it indicates authorization for all subscribed DNNs. |
| niddCause | NiddCause | O | 0..1 | NIDD Cause |

##### 6.6.6.2.5 Type: NiddAuthUpdateNotification

Table 6.6.6.2.5-1: Definition of type NiddAuthUpdateNotification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| niddAuthUpdateInfoList | array(NiddAuthUpdateInfo) | M | 1..N | List of NiddAuthUpdateInfo. |

##### 6.6.6.2.6 Type: AuthorizationInfo

Table 6.6.6.2.6-1: Definition of type AuthorizationInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| snssai | Snssai | M | 1 | Indicates Single Network Slice Selection Assistance Information for NIDD authorization. |
| dnn | Dnn | M | 1 | Indicates DNN for NIDD authorization, shall contain the Network Identifier only. |
| mtcProviderInformation | MtcProviderInformation | M | 1 | Indicates MTC provider information for NIDD authorization. |
| authUpdateCallbackUri | Uri | M | 1 | A URI provided by NEF to receive (implicitly subscribed) notifications on authorization data update.  The authUpdateCallbackUri URI shall have unique information within NEF to identify the authorized result. |
| afId | string | O | 0..1 | When present, indicates the string identifying the originating AF, which is carried in {scsAsId} URI variable in resource URIs on T8/N33 interface (see clause 5 of 3GPP TS 29.122 [45]) or in {afId} URI variable in resource URIs on N33 interface (see clause 5 of 3GPP TS 29.522 [54]).. |
| nefId | NefId | O | 0..1 | When present, this IE shall contain the ID of the requesting NEF.  The UDM shall update the NIDD NEF ID for the DNN and Slice in corresponding subscription data after successful NIDD authorization, as specified in clause 4.25.3 of 3GPP TS 23.502 [3]. |
| validityTime | DateTime | O | 0..1 | Indicates the granted validity time of the authorisation result.  If absent, it indicates the authorisation result is valid permanently |

#### 6.6.6.3 Simple data types and enumerations

##### 6.6.6.3.1 Introduction

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

##### 6.6.6.3.2 Simple data types

The simple data types defined in table 6.6.6.3.2-1 shall be supported.

Table 6.6.6.3.2-1: Simple data types

|  |  |  |
| --- | --- | --- |
| Type Name | Type Definition | Description |
|  |  |  |

##### 6.6.6.3.3 Enumeration: NiddCause

Table 6.6.6.3.3-1: Enumeration NiddCause

|  |  |
| --- | --- |
| Enumeration value | Description |
| "SUBSCRIPTION\_WITHDRAWAL" | Subscription Withdrawal |
| "DNN\_REMOVED" | DNN used for NIDD service is removed from the UE subscription |

### 6.6.7 Error Handling

#### 6.6.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

#### 6.6.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

#### 6.6.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nudm\_NIDD Authorization service. The following application errors listed in Table 6.6.7.3-1 are specific for the Nudm\_NIDD Authorization service.

Table 6.6.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| UNKNOWN\_5GS\_SUBSCRIPTION | 403 Forbidden | No 5GS subscription is associated with the user. |
| USER\_NOT\_FOUND | 404 Not Found | The user does not exist in the HPLMN |
| DNN\_NOT\_ALLOWED | 403 Forbidden | DNN not authorized for the user |
| MTC\_PROVIDER\_NOT\_ALLOWED | 403 Forbidden | MTC Provider not authorized |
| AF\_INSTANCE\_NOT\_ALLOWED | 403 Forbidden | This AF instance is not authorized |

### 6.6.8 Feature Negotiation

The optional features in table 6.6.8-1 are defined for the Nudm\_NIDDAU API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.6.8-1: Supported Features

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

### 6.6.9 Security

As indicated in 3GPP TS 33.501 [6] and 3GPP TS 29.500 [4], the access to the Nudm\_NIDDAU API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [18]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [19]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nudm\_NIDDAU API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [19], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nudm\_NIDDAU service.

The Nudm\_NIDDAU API defines a single scope "nudm-niddau" for OAuth2 authorization (as specified in 3GPP TS 33.501 [6]) for the entire API, and it does not define any additional scopes at resource or operation level.

## 6.7 Nudm\_MT Service API

### 6.7.1 API URI

URIs of this API shall have the following root:

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

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

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The <apiName>shall be "nudm-mt".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.7.3.

### 6.7.2 Usage of HTTP

#### 6.7.2.1 General

HTTP/2, as defined in IETF RFC 7540 [13], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

HTTP messages and bodies for the Nudm\_MT service shall comply with the OpenAPI [14] specification contained in Annex A4.

#### 6.7.2.2 HTTP standard headers

##### 6.7.2.2.1 General

The usage of HTTP standard headers shall be supported as specified in clause 5.2.2 of 3GPP TS 29.500 [4].

##### 6.7.2.2.2 Content type

The following content types shall be supported:

JSON, as defined in IETF RFC 8259 [15], signalled by the content type "application/json".

The Problem Details JSON Object (IETF RFC 7807 [16] signalled by the content type "application/problem+json"

#### 6.7.2.3 HTTP custom headers

##### 6.7.2.3.1 General

The usage of HTTP custom headers shall be supported as specified in clause 5.2.3 of 3GPP TS 29.500 [4].

### 6.7.3 Resources

#### 6.7.3.1 Overview



Figure 6.7.3.1-1: Resource URI structure of the nudm-mt API

Table 6.7.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.7.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name (Archetype) | Resource URI | HTTP method or custom operation | Description |
| UeInfo (Document) | /{supi} | GET | Retrieve UE's TADS Info and/or User State and/or 5GSRVCCInfo |
| LocationInfo  (Custom Operation) | /{supi}/loc-info/provide-loc-info | provide-loc-info  (POST) | Request UE's location |

#### 6.7.3.2 Resource: UeInfo

##### 6.7.3.2.1 Description

This resource represents the 5GC TADS Info and/or User State and/or 5GSRVCCInfo for a SUPI. It is queried by the HSS (see 3GPP TS 23.632 [32] clause 5.4.1.

##### 6.7.3.2.2 Resource Definition

Resource URI: {apiRoot}/nudm-mt/<apiVersion>/{supi}

This resource shall support the resource URI variables defined in table 6.7.3.2.2-1.

Table 6.7.3.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.7.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

##### 6.7.3.2.3 Resource Standard Methods

6.7.3.2.3.1 GET

This method shall support the URI query parameters specified in table 6.7.3.2.3.1-1.

Table 6.7.3.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | | Data type | | P | | Cardinality | | Description | |
| fields | array(string) | | M | | 1..N | | The " fields " query parameter contains the pointers of the attribute(s) to be retrieved. See attribute names of type UeInfo. | |
| supported-features | | SupportedFeatures | | O | | 0..1 | | see 3GPP TS 29.500 [4] clause 6.6 | |

This method shall support the request data structures specified in table 6.7.3.2.3.1-2 and the response data structures and response codes specified in table 6.7.3.2.3.1-3.

Table 6.7.3.2.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.7.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| UeInfo | M | 1 | 200 OK | Upon success, a response body containing the UeInfo shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to convey the following application errors:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

#### 6.7.3.3 Resource: LocationInfo

##### 6.7.3.3.1 Description

This resource represents the UE's location information in 5GC. See 3GPP TS 23.632 [32] clause 5.4.3.

##### 6.7.3.3.2 Resource Definition

Resource URI: {apiRoot}/nudm-mt/<apiVersion>/{supi}/loc-info

This resource shall support the resource URI variables defined in table 6.7.3.3.2-1.

Table 6.7.3.3.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.7.1 |
| supi | Supi | Represents the Subscription Permanent Identifier (see 3GPP TS 23.501 [2] clause 5.9.2)  pattern: "(imsi-[0-9]{5,15}|nai-.+|.+)" |

##### 6.7.3.3.3 Resource Standard Methods

No Standard Methods are supported for this resource.

##### 6.7.3.3.4 Resource Custom Operations

6.7.3.3.4.1 Overview

Table 6.7.3.3.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation Name | Custom operation URI | Mapped HTTP method | Description |
| provide-loc-info | /provide-loc-info | POST | Request UE location information in 5GC. |

6.7.3.3.4.2 Operation: provide-loc-info

6.7.3.3.4.2.1 Description

This custom operation is used by the NF service consumer (HSS) to request the UE location information in 5GC.

6.7.3.3.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.7.3.3.4.2.2-1 and the response data structure and response codes specified in table 6.7.3.3.4.2.2-2.

Table 6.7.3.3.4.2.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| LocationInfoRequest | M | 1 | Contains the requested information: current location, local time zone, RAT type, or serving node identity only |

Table 6.7.3.3.4.2.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| LocationInfoResult | M | 1 | 200 OK | Upon success, a response body containing requested information shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate the following application error:  - USER\_NOT\_FOUND  - DATA\_NOT\_FOUND |
| NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

### 6.7.4 Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nudm\_MT Service.

### 6.7.5 Notifications

In this release of this specification, no notifications are defined for the Nudm\_MT Service.

### 6.7.6 Data Model

#### 6.7.6.1 General

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

Table 6.7.6.1-1 specifies the structured data types defined for the Nudm\_MT service API. For simple data types defined for the Nudm\_MT service API see table 6.7.6.3.2-1.

Table 6.7.6.1-1: Nudm\_MT specific Data Types

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Data type | | Clause defined | | Description | |
| UeInfo | | 6.7.6.2.2 | |  | |
| LocationInfoRequest | | 6.7.6.2.3 | |  | |
| LocationInfoResult | | 6.7.6.2.4 | |  | |
| 5GSrvccInfo | | 6.7.6.2.5 | |  | |

Table 6.7.6.1-2 specifies data types re-used by the Nudm\_MT service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudm\_MT service API.

Table 6.7.6.1-2: Nudm\_MT re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| UeContextInfo | 3GPP TS 29.518 [36] |  |
| Supi | 3GPP TS 29.571 [7] |  |
| 5GsUserState | 3GPP TS 29.518 [36] |  |
| NfInstanceId | 3GPP TS 29.571 [7] | Network Function Instance Identifier |
| PlmnId | 3GPP TS 29.571 [7] | PLMN Identity |
| Ecgi | 3GPP TS 29.571 [7] | EUTRAN cell identity |
| Ncgi | 3GPP TS 29.571 [7] | NR cell identity |
| Tai | 3GPP TS 29.571 [7] | Tracking area identity |
| GeographicArea | 3GPP TS 29.572 [34] | Estimate of the location of the UE |
| AgeOfLocationEstimate | 3GPP TS 29.572 [34] | Age Of Location Estimate |
| RatType | 3GPP TS 29.571 [7] | RAT type |
| TimeZone | 3GPP TS 29.571 [7] | Time Zone |
| SupportedFeatures | 3GPP TS 29.571 [7] |  |
| ProblemDetails | 3GPP TS 29.571 [7] |  |
| StnSr | 3GPP TS 29.571 [7] | Session Transfer Number for 5G-SRVCC |
| CMsisdn | 3GPP TS 29.571 [7] | Correlation MSISDN |

#### 6.7.6.2 Structured data types

##### 6.7.6.2.1 Introduction

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

##### 6.7.6.2.2 Type: UeInfo

Table 6.7.6.2.2-1: Definition of type UeInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| tadsInfo | UeContextInfo | O | 0..1 | See 3GPP TS 29.518 [36] |
| userState | 5GsUserState | O | 0..1 | See 3GPP TS 29.518 [36] |
| 5gSrvccInfo | 5GSrvccInfo | O | 0..1 |  |

##### 6.7.6.2.3 Type: LocationInfoRequest

Table 6.7.6.2.3-1: Definition of type LocationInfoRequest

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| req5gsLoc | boolean | C | 0..1 | This IE shall be present and set to "true", if 5GS location information is requested.  When present, the IE shall be set as following:  - true: the location of the UE is requested  - false (default): the location of the UE is not requested |
| reqCurrentLoc | boolean | C | 0..1 | This IE may be present if location information is requested.  When present, the IE shall be set as following:  - true: the current location of the UE is requested  - false (default): the current location of the UE is not requested |
| reqRatType | boolean | C | 0..1 | This IE shall be present and set to "true", if the RAT Type of the UE is requested.  When present, the IE shall be set as following:  - true: the RAT type of the UE is requested  - false (default): the RAT type of the UE is not requested |
| reqTimeZone | boolean | C | 0..1 | This IE shall be present and set to "true", if the local timezone of the UE is requested.  When present, the IE shall be set as following:  - true: the local timezone of the UE is requested  - false (default): the local timezone of the UE is not requested. |
| reqServingNode | boolean | C | 0..1 | This IE shall be present and set to "true", if only serving node(s) address/identity is requested as location information.  When present, the IE shall be set as following:  - true: only serving node(s) identity is requested  - false(default) |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.7.8 |

##### 6.7.6.2.4 Type: LocationInfoResult

Table 6.7.6.2.4-1: Definition of type LocationInfoResult

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| vPlmnId | PlmnId | M | 1 | Visiting PLMN Identity |
| amfInstanceId | NfInstanceId | O | 0..1 | NF instance ID of the serving AMF for 3GPP access |
| smsfInstanceId | NfInstanceId | O | 0..1 | NF instance ID of the serving SMSF |
| ecgi | Ecgi | O | 0..1 | E-UTRA Cell Identity |
| ncgi | Ncgi | O | 0..1 | NR Cell Identity |
| tai | Tai | O | 0..1 | Tracking Area Identity |
| currentLoc | boolean | O | 0..1 | When present, this IE shall be set as following:  - true: the current location of the UE is returned  - false: the last known location of the UE is returned. |
| geoInfo | GeographicArea | O | 0..1 | If present, this IE shall contain the geographical information of the UE. |
| locationAge | AgeOfLocationEstimate | O | 0..1 | If present, this IE shall contain the age of the location information. |
| ratType | RatType | O | 0..1 | If present, this IE shall contain the current RAT type of the UE. |
| timezone | TimeZone | O | 0..1 | If present, this IE shall contain the local time zone of the UE. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.7.8 |
| NOTE: Either the "ecgi" attribute or the "ncgi" attribute may be included. | | | | |

##### 6.7.6.2.5 Type: 5GSrvccInfo

Table 6.7.6.2.5-1: Definition of type 5GSrvccInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| ue5GSrvccCapability | boolean | M | 1 | This IE indicates whether the UE supports 5G SRVCC:  - true: 5G SRVCC is supported by the UE  - false: 5G SRVCC is not supported. |
| stnSr | StnSr | O | 0..1 | Session Transfer Number for 5G-SRVCC |
| cMsisdn | CMsisdn | O | 0..1 | Correlation MSISDN of the UE. |

#### 6.7.6.3 Simple data types and enumerations

In this release of this specification, no simple data types and enumerations are defined for the Nudm\_MT Service.

### 6.7.7 Error Handling

#### 6.7.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

#### 6.7.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

#### 6.7.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nudm\_MT service. The following application errors listed in Table 6.7.7.3-1 are specific for the Nudm\_ MT service.

Table 6.7.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| USER\_NOT\_FOUND | 404 Not Found | The user does not exist |
| DATA\_NOT\_FOUND | 404 Not Found | The requested UE data is not found/does not exist. |

### 6.7.8 Feature Negotiation

The optional features in table 6.7.8-1 are defined for the Nudm\_MT API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.7.8-1: Supported Features

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

### 6.7.9 Security

As indicated in 3GPP TS 33.501 [6] and 3GPP TS 29.500 [4], the access to the Nudm\_MT API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [18]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [19]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Nudm\_MT API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [19], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nudm\_MT service.

The Nudm\_MT API defines a single scope "nudm-mt" for OAuth2 authorization (as specified in 3GPP TS 33.501 [6]) for the entire API, and it does not define any additional scopes at resource or operation level.

Annex A (normative):  
OpenAPI specification

# A.1 General

This Annex specifies the formal definition of the Nudm Service API(s). It consists of OpenAPI 3.0.0 specifications, in YAML format.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE: 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 3GPP TS 29.501 [5] clause 5.3.1 and 3GPP TR 21.900 [30] clause 5B).

# A.2 Nudm\_SDM API

openapi: 3.0.0

info:

version: '2.1.7'

title: 'Nudm\_SDM'

description: |

Nudm Subscriber Data Management Service.

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externalDocs:

description: 3GPP TS 29.503 Unified Data Management Services, version 16.11.0

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.503/'

servers:

- url: '{apiRoot}/nudm-sdm/v2'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause clause 4.4 of 3GPP TS 29.501.

security:

- oAuth2ClientCredentials:

- nudm-sdm

- {}

paths:

/{supi}:

get:

summary: retrieve multiple data sets

operationId: GetDataSets

tags:

- Retrieval of multiple data sets

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: dataset-names

in: query

style: form

explode: false

description: List of dataset names

required: true

schema:

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

- name: plmn-id

in: query

description: serving PLMN ID

content:

application/json:

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/nssai:

get:

summary: retrieve a UE's subscribed NSSAI

operationId: GetNSSAI

tags:

- Slice Selection Subscription Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: plmn-id

in: query

description: serving PLMN ID

content:

application/json:

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/ue-context-in-amf-data:

get:

summary: retrieve a UE's UE Context In AMF Data

operationId: GetUeCtxInAmfData

tags:

- UE Context In AMF Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/am-data:

get:

summary: retrieve a UE's Access and Mobility Subscription Data

operationId: GetAmData

tags:

- Access and Mobility Subscription Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: plmn-id

in: query

description: serving PLMN ID

content:

application/json:

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/am-data/ecr-data:

get:

summary: retrieve a UE's subscribed Enhanced Coverage Restriction Data

operationId: GetEcrData

tags:

- Enhanced Coverage Restriction Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/smf-select-data:

get:

summary: retrieve a UE's SMF Selection Subscription Data

operationId: GetSmfSelData

tags:

- SMF Selection Subscription Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: plmn-id

in: query

description: serving PLMN ID

content:

application/json:

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/ue-context-in-smf-data:

get:

summary: retrieve a UE's UE Context In SMF Data

operationId: GetUeCtxInSmfData

tags:

- UE Context In SMF Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/ue-context-in-smsf-data:

get:

summary: retrieve a UE's UE Context In SMSF Data

operationId: GetUeCtxInSmsfData

tags:

- UE Context In SMSF Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/trace-data:

get:

summary: retrieve a UE's Trace Configuration Data

operationId: GetTraceConfigData

tags:

- Trace Configuration Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: plmn-id

in: query

description: serving PLMN ID

content:

application/json:

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/sm-data:

get:

summary: retrieve a UE's Session Management Subscription Data

operationId: GetSmData

tags:

- Session Management Subscription Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: single-nssai

in: query

content:

application/json:

schema:

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

- name: dnn

in: query

schema:

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

- name: plmn-id

in: query

content:

application/json:

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

type: array

items:

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

minItems: 1

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/sms-data:

get:

summary: retrieve a UE's SMS Subscription Data

operationId: GetSmsData

tags:

- SMS Subscription Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: plmn-id

in: query

content:

application/json:

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/sms-mng-data:

get:

summary: retrieve a UE's SMS Management Subscription Data

operationId: GetSmsMngtData

tags:

- SMS Management Subscription Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: plmn-id

in: query

content:

application/json:

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/lcs-privacy-data:

get:

summary: retrieve a UE's LCS Privacy Subscription Data

operationId: GetLcsPrivacyData

tags:

- LCS Privacy Data Retrieval

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/lcs-mo-data:

get:

summary: retrieve a UE's LCS Mobile Originated Subscription Data

operationId: GetLcsMoData

tags:

- LCS Mobile Originated Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/lcs-bca-data:

get:

summary: retrieve a UE's LCS Broadcast Assistance Data Types Subscription Data

operationId: GetLcsBcaData

tags:

- LCS Broadcast Assistance Data Types Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: plmn-id

in: query

content:

application/json:

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/v2x-data:

get:

summary: retrieve a UE's V2X Subscription Data

operationId: GetV2xData

tags:

- V2X Subscription Data Retrieval

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

$ref: '#/components/schemas/V2xSubscriptionData'

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/sdm-subscriptions:

post:

summary: subscribe to notifications

operationId: Subscribe

tags:

- Subscription Creation

parameters:

- name: ueId

in: path

description: Identity of the user

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'201':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-sdm/<apiVersion>/{supi}/sdm-subscriptions/{subscriptionId}'

required: true

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

callbacks:

datachangeNotification:

'{request.body#/callbackReference}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: Successful Notification response

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/sdm-subscriptions/{subscriptionId}:

delete:

summary: unsubscribe from notifications

operationId: Unsubscribe

tags:

- Subscription Deletion

parameters:

- name: ueId

in: path

description: Identity of the user

required: true

schema:

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

- name: subscriptionId

in: path

description: Id of the SDM Subscription

required: true

schema:

type: string

responses:

'204':

description: Successful response

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

patch:

summary: modify the subscription

operationId: Modify

tags:

- Subscription Modification

parameters:

- name: ueId

in: path

description: Identity of the user

required: true

schema:

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

- name: subscriptionId

in: path

description: Id of the SDM Subscription

required: true

schema:

type: string

- name: supported-features

in: query

description: Features required to be supported by the target NF

schema:

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

requestBody:

content:

application/merge-patch+json:

schema:

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

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

oneOf:

- $ref: '#/components/schemas/SdmSubscription'

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/id-translation-result:

get:

summary: retrieve a UE's SUPI or GPSI

operationId: GetSupiOrGpsi

tags:

- GPSI to SUPI Translation

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: app-port-id

in: query

description: Application port identifier

content:

application/json:

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/am-data/sor-ack:

put:

summary: Nudm\_Sdm Info service operation

operationId: SorAckInfo

tags:

- Providing acknowledgement of Steering of Roaming

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

responses:

'204':

description: Successful acknowledgement

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/am-data/upu-ack:

put:

summary: Nudm\_Sdm Info for UPU service operation

operationId: UpuAck

tags:

- Providing acknowledgement of UE Parameters Update

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

responses:

'204':

description: Successful acknowledgement

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/am-data/subscribed-snssais-ack:

put:

summary: Nudm\_Sdm Info operation for S-NSSAIs acknowledgement

operationId: S-NSSAIs Ack

tags:

- Providing acknowledgement of S-NSSAIs Update

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

responses:

'204':

description: Successful acknowledgement

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/am-data/cag-ack:

put:

summary: Nudm\_Sdm Info operation for CAG acknowledgement

operationId: CAG Ack

tags:

- Providing acknowledgement of CAG Update

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

responses:

'204':

description: Successful acknowledgement

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/am-data/update-sor:

post:

summary: Nudm\_Sdm custom operation to trigger SOR info update

operationId: Update SOR Info

tags:

- Trigger SOR info update

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/shared-data:

get:

summary: retrieve shared data

operationId: GetSharedData

tags:

- Retrieval of shared data

parameters:

- name: shared-data-ids

in: query

description: List of shared data ids

required: true

style: form

explode: false

schema:

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

- name: supportedFeatures

in: query

deprecated: true

description: Supported Features; this query parameter should not be used

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

type: array

items:

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

minItems: 1

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/shared-data-subscriptions:

post:

summary: subscribe to notifications for shared data

operationId: SubscribeToSharedData

tags:

- Subscription Creation for shared data

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'201':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-sdm/<apiVersion>/shared-data-subscriptions/{subscriptionId}'

required: true

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

default:

description: Unexpected error

callbacks:

datachangeNotification:

'{request.body#/callbackReference}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: Successful Notification response

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/shared-data-subscriptions/{subscriptionId}:

delete:

summary: unsubscribe from notifications for shared data

operationId: UnsubscribeForSharedData

tags:

- Subscription Deletion for shared data

parameters:

- name: subscriptionId

in: path

description: Id of the Shared data Subscription

required: true

schema:

type: string

responses:

'204':

description: Successful response

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

patch:

summary: modify the subscription

operationId: ModifySharedDataSubs

tags:

- Subscription Modification

parameters:

- name: subscriptionId

in: path

description: Id of the SDM Subscription

required: true

schema:

type: string

- name: supported-features

in: query

description: Features required to be supported by the target NF

schema:

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

requestBody:

content:

application/merge-patch+json:

schema:

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

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

oneOf:

- $ref: '#/components/schemas/SdmSubscription'

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/group-data/group-identifiers:

get:

summary: Mapping of Group Identifiers

operationId: GetGroupIdentifiers

tags:

- Group Identifiers

parameters:

- name: ext-group-id

in: query

description: External Group Identifier

required: false

schema:

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

- name: int-group-id

in: query

description: Internal Group Identifier

required: false

schema:

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

- name: ue-id-ind

in: query

description: Indication whether UE identifiers are required or not

required: false

schema:

type: boolean

default: false

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/shared-data/{sharedDataId}:

get:

summary: retrieve the individual shared data

operationId: GetIndividualSharedData

tags:

- Retrieval of the individual shared data

parameters:

- name: sharedDataId

in: path

description: Id of the Shared data

required: true

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Cache-Control:

description: Cache-Control containing max-age, as described in RFC 7234, 5.2

schema:

type: string

ETag:

description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

schema:

type: string

Last-Modified:

description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nudm-sdm: Access to the nudm-sdm API

schemas:

# COMPLEX TYPES:

DatasetNames:

type: array

items:

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

minItems: 2

uniqueItems: true

SubscriptionDataSets:

type: object

properties:

amData:

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

smfSelData:

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

uecAmfData:

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

uecSmfData:

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

uecSmsfData:

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

smsSubsData:

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

smData:

type: array

items:

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

minItems: 1

traceData:

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

smsMngData:

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

lcsPrivacyData:

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

lcsMoData:

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

v2xData:

$ref: '#/components/schemas/V2xSubscriptionData'

lcsBroadcastAssistanceTypesData:

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

UeContextInSmsfData:

type: object

properties:

smsfInfo3GppAccess:

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

smsfInfoNon3GppAccess:

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

SmsfInfo:

type: object

required:

- smsfInstanceId

- plmnId

properties:

smsfInstanceId:

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

plmnId:

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

AccessAndMobilitySubscriptionData:

type: object

properties:

supportedFeatures:

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

gpsis:

type: array

items:

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

internalGroupIds:

type: array

items:

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

minItems: 1

sharedVnGroupDataIds:

type: object

additionalProperties:

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

minProperties: 1

subscribedUeAmbr:

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

nssai:

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

ratRestrictions:

type: array

items:

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

forbiddenAreas:

type: array

items:

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

serviceAreaRestriction:

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

coreNetworkTypeRestrictions:

type: array

items:

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

rfspIndex:

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

subsRegTimer:

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

ueUsageType:

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

mpsPriority:

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

mcsPriority:

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

activeTime:

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

sorInfo:

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

sorInfoExpectInd:

type: boolean

sorafRetrieval:

type: boolean

default: false

sorUpdateIndicatorList:

type: array

items:

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

minItems: 1

upuInfo:

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

micoAllowed:

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

sharedAmDataIds:

type: array

items:

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

minItems: 1

odbPacketServices:

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

subscribedDnnList:

type: array

items:

anyOf:

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

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

serviceGapTime:

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

mdtUserConsent:

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

mdtConfiguration:

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

traceData:

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

cagData:

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

stnSr:

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

cMsisdn:

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

nbIoTUePriority:

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

nssaiInclusionAllowed:

type: boolean

default: false

rgWirelineCharacteristics:

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

ecRestrictionDataWb:

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

ecRestrictionDataNb:

type: boolean

default: false

expectedUeBehaviourList:

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

primaryRatRestrictions:

type: array

items:

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

secondaryRatRestrictions:

type: array

items:

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

edrxParametersList:

type: array

items:

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

minItems: 1

ptwParametersList:

type: array

items:

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

minItems: 1

iabOperationAllowed:

type: boolean

default: false

wirelineForbiddenAreas:

type: array

items:

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

wirelineServiceAreaRestriction:

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

CagData:

type: object

required:

- cagInfos

properties:

cagInfos:

description: A map (list of key-value pairs where PlmnId serves as key) of CagInfo

type: object

additionalProperties:

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

provisioningTime:

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

CagInfo:

type: object

required:

- allowedCagList

properties:

allowedCagList:

type: array

items:

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

cagOnlyIndicator:

type: boolean

SmfSelectionSubscriptionData:

type: object

properties:

supportedFeatures:

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

subscribedSnssaiInfos:

type: object

additionalProperties:

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

sharedSnssaiInfosId:

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

SnssaiInfo:

type: object

required:

- dnnInfos

properties:

dnnInfos:

type: array

items:

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

minItems: 1

DnnInfo:

type: object

required:

- dnn

properties:

dnn:

anyOf:

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

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

defaultDnnIndicator:

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

lboRoamingAllowed:

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

iwkEpsInd:

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

dnnBarred:

type: boolean

invokeNefInd:

type: boolean

smfList:

type: array

items:

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

minItems: 1

sameSmfInd:

type: boolean

Nssai:

type: object

required:

- defaultSingleNssais

properties:

supportedFeatures:

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

defaultSingleNssais:

type: array

items:

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

minItems: 1

singleNssais:

type: array

items:

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

minItems: 1

provisioningTime:

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

additionalSnssaiData:

type: object

additionalProperties:

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

minProperties: 1

nullable: true

UeContextInAmfData:

type: object

properties:

epsInterworkingInfo:

$ref: 'TS29503\_Nudm\_UECM.yaml#/components/schemas/EpsInterworkingInfo'

UeContextInSmfData:

type: object

properties:

pduSessions:

description: A map (list of key-value pairs where PduSessionId serves as key) of PduSessions

type: object

additionalProperties:

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

pgwInfo:

type: array

items:

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

minItems: 1

emergencyInfo:

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

EmergencyInfo:

type: object

oneOf:

- required:

- pgwFqdn

- required:

- pgwIpAddress

properties:

pgwFqdn:

type: string

pgwIpAddress:

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

smfInstanceId:

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

epdgInd:

type: boolean

default: false

PduSession:

type: object

required:

- dnn

- smfInstanceId

- plmnId

properties:

dnn:

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

smfInstanceId:

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

plmnId:

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

singleNssai:

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

PgwInfo:

type: object

required:

- dnn

- pgwFqdn

properties:

dnn:

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

pgwFqdn:

type: string

plmnId:

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

epdgInd:

type: boolean

default: false

SessionManagementSubscriptionData:

type: object

required:

- singleNssai

properties:

singleNssai:

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

dnnConfigurations:

description: A map (list of key-value pairs where Dnn, or optionally the Wildcard DNN, serves as key) of DnnConfigurations

type: object

additionalProperties:

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

internalGroupIds:

type: array

items:

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

minItems: 1

sharedVnGroupDataIds:

type: object

additionalProperties:

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

minProperties: 1

sharedDnnConfigurationsId:

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

odbPacketServices:

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

traceData:

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

sharedTraceDataId:

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

expectedUeBehavioursList:

type: object

additionalProperties:

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

minProperties: 1

suggestedPacketNumDlList:

type: object

additionalProperties:

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

minProperties: 1

3gppChargingCharacteristics:

$ref: '#/components/schemas/3GppChargingCharacteristics'

DnnConfiguration:

type: object

required:

- pduSessionTypes

- sscModes

properties:

pduSessionTypes:

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

sscModes:

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

iwkEpsInd:

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

5gQosProfile:

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

sessionAmbr:

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

3gppChargingCharacteristics:

$ref: '#/components/schemas/3GppChargingCharacteristics'

staticIpAddress:

type: array

items:

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

minItems: 1

maxItems: 2

upSecurity:

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

pduSessionContinuityInd:

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

niddNefId:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/NefId'

niddInfo:

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

redundantSessionAllowed:

type: boolean

acsInfo:

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

ipv4FrameRouteList:

type: array

items:

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

minItems: 1

ipv6FrameRouteList:

type: array

items:

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

minItems: 1

atsssAllowed:

type: boolean

default: false

secondaryAuth:

type: boolean

dnAaaIpAddressAllocation:

type: boolean

dnAaaAddress:

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

iptvAccCtrlInfo:

type: string

NiddInformation:

type: object

required:

- afId

properties:

afId:

type: string

gpsi:

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

extGroupId:

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

IpAddress:

type: object

oneOf:

- required:

- ipv4Addr

- required:

- ipv6Addr

- required:

- ipv6Prefix

properties:

ipv4Addr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

ipv6Addr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

ipv6Prefix:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

PduSessionTypes:

type: object

required:

- defaultSessionType

properties:

defaultSessionType:

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

allowedSessionTypes:

type: array

items:

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

minItems: 1

SscModes:

type: object

required:

- defaultSscMode

properties:

defaultSscMode:

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

allowedSscModes:

type: array

items:

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

minItems: 1

maxItems: 2

SmsSubscriptionData:

type: object

properties:

smsSubscribed:

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

sharedSmsSubsDataId:

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

SmsManagementSubscriptionData:

type: object

properties:

supportedFeatures:

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

mtSmsSubscribed:

type: boolean

mtSmsBarringAll:

type: boolean

mtSmsBarringRoaming:

type: boolean

moSmsSubscribed:

type: boolean

moSmsBarringAll:

type: boolean

moSmsBarringRoaming:

type: boolean

sharedSmsMngDataIds:

type: array

items:

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

minItems: 1

traceData:

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

SdmSubscription:

type: object

required:

- nfInstanceId

- callbackReference

- monitoredResourceUris

properties:

nfInstanceId:

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

implicitUnsubscribe:

type: boolean

expires:

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

callbackReference:

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

amfServiceName:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

monitoredResourceUris:

type: array

items:

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

minItems: 1

singleNssai:

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

dnn:

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

subscriptionId:

type: string

plmnId:

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

immediateReport:

type: boolean

default: false

report:

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

supportedFeatures:

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

contextInfo:

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

uniqueSubscription:

type: boolean

SdmSubsModification:

type: object

properties:

expires:

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

monitoredResourceUris:

type: array

items:

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

minItems: 1

ModificationNotification:

type: object

required:

- notifyItems

properties:

notifyItems:

type: array

items:

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

minItems: 1

IdTranslationResult:

type: object

required:

- supi

properties:

supportedFeatures:

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

supi:

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

gpsi:

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

AcknowledgeInfo:

type: object

required:

- provisioningTime

properties:

sorMacIue:

$ref: 'TS29509\_Nausf\_SoRProtection.yaml#/components/schemas/SorMac'

upuMacIue:

$ref: 'TS29509\_Nausf\_UPUProtection.yaml#/components/schemas/UpuMac'

securedPacket:

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

provisioningTime:

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

ueNotReachable:

type: boolean

default: false

SorInfo:

type: object

properties:

steeringContainer:

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

ackInd:

$ref: 'TS29509\_Nausf\_SoRProtection.yaml#/components/schemas/AckInd'

sorMacIausf:

$ref: 'TS29509\_Nausf\_SoRProtection.yaml#/components/schemas/SorMac'

countersor:

$ref: 'TS29509\_Nausf\_SoRProtection.yaml#/components/schemas/CounterSor'

provisioningTime:

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

required:

- ackInd

- provisioningTime

SharedDataIds:

type: array

items:

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

minItems: 1

uniqueItems: true

UpuInfo:

type: object

properties:

upuDataList:

type: array

items:

$ref: 'TS29509\_Nausf\_UPUProtection.yaml#/components/schemas/UpuData'

minItems: 1

upuRegInd:

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

upuAckInd:

$ref: 'TS29509\_Nausf\_UPUProtection.yaml#/components/schemas/UpuAckInd'

upuMacIausf:

$ref: 'TS29509\_Nausf\_UPUProtection.yaml#/components/schemas/UpuMac'

counterUpu:

$ref: 'TS29509\_Nausf\_UPUProtection.yaml#/components/schemas/CounterUpu'

provisioningTime:

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

required:

- upuDataList

- upuAckInd

- upuRegInd

- provisioningTime

SharedData:

type: object

required:

- sharedDataId

properties:

sharedDataId:

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

sharedAmData:

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

sharedSmsSubsData:

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

sharedSmsMngSubsData:

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

sharedDnnConfigurations:

type: object

additionalProperties:

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

sharedTraceData:

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

sharedSnssaiInfos:

type: object

additionalProperties:

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

sharedVnGroupDatas:

type: object

additionalProperties:

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

minProperties: 1

TraceDataResponse:

type: object

properties:

traceData:

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

sharedTraceDataId:

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

SteeringContainer:

oneOf:

- type: array

items:

$ref: 'TS29509\_Nausf\_SoRProtection.yaml#/components/schemas/SteeringInfo'

minItems: 1

- $ref: '#/components/schemas/SecuredPacket'

GroupIdentifiers:

type: object

properties:

extGroupId:

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

intGroupId:

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

ueIdList:

type: array

items:

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

minItems: 1

VnGroupData:

type: object

properties:

pduSessionTypes:

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

dnn:

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

singleNssai:

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

appDescriptors:

type: array

items:

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

minItems: 1

AppDescriptor:

type: object

properties:

osId:

$ref: 'TS29519\_Policy\_Data.yaml#/components/schemas/OsId'

appId:

type: string

AdditionalSnssaiData:

type: object

properties:

requiredAuthnAuthz:

type: boolean

AppPortId:

type: object

properties:

destinationPort:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint16'

originatorPort:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint16'

LcsPrivacyData:

type: object

properties:

lpi:

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

unrelatedClass:

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

plmnOperatorClasses:

type: array

items:

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

minItems: 1

Lpi:

type: object

required:

- locationPrivacyInd

properties:

locationPrivacyInd:

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

validTimePeriod:

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

UnrelatedClass:

type: object

required:

- defaultUnrelatedClass

properties:

defaultUnrelatedClass:

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

externalUnrelatedClass:

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

serviceTypeUnrelatedClasses:

type: array

items:

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

minItems: 1

PlmnOperatorClass:

type: object

required:

- lcsClientClass

- lcsClientIds

properties:

lcsClientClass:

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

lcsClientIds:

type: array

items:

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

minItems: 1

ValidTimePeriod:

type: object

properties:

startTime:

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

endTime:

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

ExternalUnrelatedClass:

properties:

lcsClientExternals:

type: array

items:

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

minItems: 1

afExternals:

type: array

items:

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

minItems: 1

lcsClientGroupExternals:

type: array

items:

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

minItems: 1

AfExternal:

type: object

properties:

afId:

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

allowedGeographicArea:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

minItems: 1

privacyCheckRelatedAction:

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

validTimePeriod:

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

LcsClientExternal:

type: object

properties:

allowedGeographicArea:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

minItems: 1

privacyCheckRelatedAction:

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

validTimePeriod:

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

LcsClientGroupExternal:

type: object

properties:

lcsClientGroupId:

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

allowedGeographicArea:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

minItems: 1

privacyCheckRelatedAction:

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

validTimePeriod:

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

ServiceTypeUnrelatedClass:

type: object

required:

- serviceType

properties:

serviceType:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/LcsServiceType'

allowedGeographicArea:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

minItems: 1

privacyCheckRelatedAction:

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

codeWordInd:

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

validTimePeriod:

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

codeWordList:

type: array

items:

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

minItems: 1

LcsMoData:

type: object

required:

- allowedServiceClasses

properties:

allowedServiceClasses:

type: array

items:

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

minItems: 1

LcsBroadcastAssistanceTypesData:

type: object

required:

- locationAssistanceType

properties:

locationAssistanceType:

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

EcRestrictionDataWb:

type: object

anyOf:

- required: [ ecModeARestricted ]

- required: [ ecModeBRestricted ]

properties:

ecModeARestricted:

type: boolean

ecModeBRestricted:

type: boolean

ExpectedUeBehaviourData:

type: object

properties:

stationaryIndication:

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

communicationDurationTime:

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

periodicTime:

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

scheduledCommunicationTime:

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

scheduledCommunicationType:

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

expectedUmts:

type: array

items:

$ref: 'TS29503\_Nudm\_PP.yaml#/components/schemas/LocationArea'

minItems: 1

description: Identifies the UE's expected geographical movement. The attribute is only applicable in 5G.

trafficProfile:

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

batteryIndication:

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

validityTime:

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

SuggestedPacketNumDl:

type: object

required:

- suggestedPacketNumDl

properties:

suggestedPacketNumDl:

type: integer

minimum: 1

validityTime:

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

FrameRouteInfo:

type: object

properties:

ipv4Mask:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4AddrMask'

ipv6Prefix:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

SorUpdateInfo:

type: object

required:

- vplmnId

properties:

vplmnId:

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

EnhancedCoverageRestrictionData:

type: object

properties:

plmnEcInfoList:

type: array

items:

$ref: 'TS29503\_Nudm\_PP.yaml#/components/schemas/PlmnEcInfo'

minItems: 1

EdrxParameters:

type: object

required:

- ratType

- edrxValue

properties:

ratType:

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

edrxValue:

type: string

pattern: '^([0-1]{4})$'

PtwParameters:

type: object

required:

- operationMode

- ptwValue

properties:

operationMode:

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

ptwValue:

type: string

pattern: '^([0-1]{4})$'

UeId:

type: object

required:

- supi

properties:

supi:

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

gpsiList:

type: array

items:

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

minItems: 1

V2xSubscriptionData:

type: object

properties:

nrV2xServicesAuth:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NrV2xAuth'

lteV2xServicesAuth:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/LteV2xAuth'

nrUePc5Ambr:

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

ltePc5Ambr:

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

DefaultUnrelatedClass:

type: object

properties:

allowedGeographicArea:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

minItems: 1

privacyCheckRelatedAction:

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

codeWordInd:

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

validTimePeriod:

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

codeWordList:

type: array

items:

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

minItems: 1

ContextInfo:

type: object

properties:

origHeaders:

type: array

items:

type: string

minItems: 1

# SIMPLE TYPES:

UeUsageType:

type: integer

MpsPriorityIndicator:

type: boolean

McsPriorityIndicator:

type: boolean

DnnIndicator:

type: boolean

LboRoamingAllowed:

type: boolean

SmsSubscribed:

type: boolean

3GppChargingCharacteristics:

type: string

MicoAllowed:

type: boolean

SharedDataId:

type: string

pattern: '^[0-9]{5,6}-.+$'

IwkEpsInd:

type: boolean

SecuredPacket:

type: string

format: byte

UpuRegInd:

type: boolean

ExtGroupId:

type: string

pattern: '^extgroupid-[^@]+@[^@]+$'

NbIoTUePriority:

type: integer

minimum: 0

maximum: 255

CodeWord:

type: string

AfId:

type: string

LcsClientId:

type: string

# ENUMS:

DataSetName:

anyOf:

- type: string

enum:

- AM

- SMF\_SEL

- UEC\_SMF

- UEC\_SMSF

- SMS\_SUB

- SM

- TRACE

- SMS\_MNG

- LCS\_PRIVACY

- LCS\_MO

- UEC\_AMF

- V2X

- type: string

PduSessionContinuityInd:

anyOf:

- type: string

enum:

- MAINTAIN\_PDUSESSION

- RECONNECT\_PDUSESSION

- RELEASE\_PDUSESSION

- type: string

LocationPrivacyInd:

anyOf:

- type: string

enum:

- LOCATION\_DISALLOWED

- LOCATION\_ALLOWED

- type: string

PrivacyCheckRelatedAction:

anyOf:

- type: string

enum:

- LOCATION\_NOT\_ALLOWED

- LOCATION\_ALLOWED\_WITH\_NOTIFICATION

- LOCATION\_ALLOWED\_WITHOUT\_NOTIFICATION

- LOCATION\_ALLOWED\_WITHOUT\_RESPONSE

- LOCATION\_RESTRICTED\_WITHOUT\_RESPONSE

- type: string

LcsClientClass:

anyOf:

- type: string

enum:

- BROADCAST\_SERVICE

- OM\_IN\_HPLMN

- OM\_IN\_VPLMN

- ANONYMOUS\_LOCATION\_SERVICE

- SPECIFIC\_SERVICE

- type: string

LcsMoServiceClass:

anyOf:

- type: string

enum:

- BASIC\_SELF\_LOCATION

- AUTONOMOUS\_SELF\_LOCATION

- TRANSFER\_TO\_THIRD\_PARTY

- type: string

OperationMode:

anyOf:

- type: string

enum:

- WB\_S1

- NB\_S1

- WB\_N1

- NB\_N1

- type: string

SorUpdateIndicator:

anyOf:

- type: string

enum:

- INITIAL\_REGISTRATION

- EMERGENCY\_REGISTRATION

- type: string

CodeWordInd:

anyOf:

- type: string

enum:

- CODEWORD\_CHECK\_IN\_UE

- CODEWORD\_CHECK\_IN\_GMLC

- type: string

MdtUserConsent:

anyOf:

- type: string

enum:

- CONSENT\_NOT\_GIVEN

- CONSENT\_GIVEN

- type: string

# A.3 Nudm\_UECM API

openapi: 3.0.0

info:

version: '1.1.6'

title: 'Nudm\_UECM'

description: |

Nudm Context Management Service.

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externalDocs:

description: 3GPP TS 29.503 Unified Data Management Services, version 16.14.0

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.503/'

servers:

- url: '{apiRoot}/nudm-uecm/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause clause 4.4 of 3GPP TS 29.501.

security:

- oAuth2ClientCredentials:

- nudm-uecm

- {}

paths:

/{ueId}/registrations:

get:

summary: retrieve UE registration data sets

operationId: GetRegistrations

tags:

- UECM Registration Info Retrieval

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

schema:

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

- name: registration-dataset-names

in: query

style: form

explode: false

description: List of UECM registration dataset names

required: true

schema:

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

- name: single-nssai

in: query

content:

application/json:

schema:

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

- name: dnn

in: query

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/registrations/amf-3gpp-access:

put:

summary: register as AMF for 3GPP access

operationId: 3GppRegistration

tags:

- AMF registration for 3GPP access

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

$ref: '#/components/schemas/Amf3GppAccessRegistration'

required: true

responses:

'201':

description: Created

content:

application/json:

schema:

$ref: '#/components/schemas/Amf3GppAccessRegistration'

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/amf-3gpp-access'

required: true

schema:

type: string

'200':

description: OK

content:

application/json:

schema:

$ref: '#/components/schemas/Amf3GppAccessRegistration'

'204':

description: No content

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

callbacks:

deregistrationeNotification:

'{request.body#/deregCallbackUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: Successful Notification response

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

pcscfRestorationNotification:

'{request.body#/pcscfRestorationCallbackUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: Successful Notification response

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'409':

$ref: 'TS29571\_CommonData.yaml#/components/responses/409'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

patch:

summary: Update a parameter in the AMF registration for 3GPP access

operationId: Update3GppRegistration

tags:

- Parameter update in the AMF registration for 3GPP access

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Features required to be supported by the target NF

schema:

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

requestBody:

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/Amf3GppAccessRegistrationModification'

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'204':

description: Expected response to a valid request

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'422':

description: Unprocessable Request

content:

application/problem+json:

schema:

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

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

get:

summary: retrieve the AMF registration for 3GPP access information

operationId: Get3GppRegistration

tags:

- AMF 3Gpp-access Registration Info Retrieval

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

$ref: '#/components/schemas/Amf3GppAccessRegistration'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/registrations/amf-3gpp-access/dereg-amf:

post:

summary: trigger AMF for 3GPP access deregistration

operationId: deregAMF

tags:

- Trigger AMF for 3GPP access deregistration

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'204':

description: No content

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/registrations/amf-3gpp-access/pei-update:

post:

summary: Updates the PEI in the 3GPP access registration context

operationId: PeiUpdate

tags:

- PEI Update

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'204':

description: No content

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/registrations/amf-non-3gpp-access:

put:

summary: register as AMF for non-3GPP access

operationId: Non3GppRegistration

tags:

- AMF registration for non-3GPP access

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

$ref: '#/components/schemas/AmfNon3GppAccessRegistration'

required: true

responses:

'201':

description: Created

content:

application/json:

schema:

$ref: '#/components/schemas/AmfNon3GppAccessRegistration'

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/amf-non-3gpp-access'

required: true

schema:

type: string

'200':

description: OK

content:

application/json:

schema:

$ref: '#/components/schemas/AmfNon3GppAccessRegistration'

'204':

description: No Content

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

callbacks:

deregistrationeNotification:

'{request.body#/deregCallbackUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: Successful Notification response

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

pcscfRestorationNotification:

'{request.body#/pcscfRestorationCallbackUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: Successful Notification response

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

patch:

summary: update a parameter in the AMF registration for non-3GPP access

operationId: UpdateNon3GppRegistration

tags:

- Parameter update in the AMF registration for non-3GPP access

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

description: Features required to be supported by the target NF

schema:

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

requestBody:

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/AmfNon3GppAccessRegistrationModification'

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'204':

description: Expected response to a valid request

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'422':

description: Unprocessable Request

content:

application/problem+json:

schema:

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

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

get:

summary: retrieve the AMF registration for non-3GPP access information

operationId: GetNon3GppRegistration

tags:

- AMF non-3GPP-access Registration Info Retrieval

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

$ref: '#/components/schemas/AmfNon3GppAccessRegistration'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/registrations/smf-registrations:

get:

summary: retrieve the SMF registration information

operationId: GetSmfRegistration

tags:

- SMF SmfRegistration

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: single-nssai

in: query

content:

application/json:

schema:

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

- name: dnn

in: query

schema:

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

- name: supported-features

in: query

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/registrations/smf-registrations/{pduSessionId}:

put:

summary: register as SMF

operationId: Registration

tags:

- SMF SmfRegistration

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: pduSessionId

in: path

description: Identifier of the PDU session

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'201':

description: Created

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/smf-registrations/{pduSessionId}'

required: true

schema:

type: string

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'204':

description: No content

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

callbacks:

deregistrationeNotification:

'{request.body#/deregCallbackUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: Successful Notification response

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

pcscfRestorationNotification:

'{request.body#/pcscfRestorationCallbackUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: Successful Notification response

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

delete:

summary: delete an SMF registration

operationId: SmfDeregistration

tags:

- SMF Deregistration

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: pduSessionId

in: path

description: Identifier of the PDU session

required: true

schema:

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

- name: smf-set-id

in: query

schema:

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

- name: smf-instance-id

in: query

schema:

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

responses:

'204':

description: Expected response to a valid request

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'422':

description: Unprocessable Request

content:

application/problem+json:

schema:

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

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

get:

summary: get an SMF registration

operationId: RetrieveSmfRegistration

tags:

- Retrieve SMF Registration

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: pduSessionId

in: path

description: Identifier of the PDU session

required: true

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/registrations/smsf-3gpp-access:

put:

summary: register as SMSF for 3GPP access

operationId: 3GppSmsfRegistration

tags:

- SMSF registration for 3GPP access

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'201':

description: Created

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/smsf-3gpp-access'

required: true

schema:

type: string

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'204':

description: No content

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

delete:

summary: delete the SMSF registration for 3GPP access

operationId: 3GppSmsfDeregistration

tags:

- SMSF Deregistration for 3GPP Access

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: smsf-set-id

in: query

schema:

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

responses:

'204':

description: Expected response to a valid request

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'422':

description: Unprocessable Request

content:

application/problem+json:

schema:

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

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

get:

summary: retrieve the SMSF registration for 3GPP access information

operationId: Get3GppSmsfRegistration

tags:

- SMSF 3GPP access Registration Info Retrieval

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/registrations/smsf-non-3gpp-access:

put:

summary: register as SMSF for non-3GPP access

operationId: Non3GppSmsfRegistration

tags:

- SMSF registration for non-3GPP access

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'201':

description: Created

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/smsf-non-3gpp-access'

required: true

schema:

type: string

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'204':

description: No content

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

delete:

summary: delete SMSF registration for non 3GPP access

operationId: Non3GppSmsfDeregistration

tags:

- SMSF Deregistration for non-3GPP access

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: smsf-set-id

in: query

schema:

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

responses:

'204':

description: Expected response to a valid request

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'422':

description: Unprocessable Request

content:

application/problem+json:

schema:

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

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

get:

summary: retrieve the SMSF registration for non-3GPP access information

operationId: GetNon3GppSmsfRegistration

tags:

- SMSF non-3GPP access Registration Info Retrieval

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/registrations/ip-sm-gw:

put:

summary: Register an IP-SM-GW

operationId: IpSmGwRegistration

tags:

- IP-SM-GW registration

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'201':

description: Created

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/ip-sm-gw'

required: true

schema:

type: string

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'204':

description: No content

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

delete:

summary: Delete the IP-SM-GW registration

operationId: IpSmGwDeregistration

tags:

- IP-SM-GW Deregistration

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

responses:

'204':

description: Expected response to a valid request

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

get:

summary: Retrieve the IP-SM-GW registration information

operationId: GetIpSmGwRegistration

tags:

- IP-SM-GW Registration Info Retrieval

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/restore-pcscf:

post:

summary: Trigger the Restoration of the P-CSCF

operationId: Trigger P-CSCF Restoration

tags:

- Trigger P-CSCF Restoration

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'204':

description: Successful response

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/registrations/location:

get:

summary: retrieve the target UE's location information

operationId: GetLocationInfo

tags:

- UE Location Information retrieval

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

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

- name: supported-features

in: query

schema:

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

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nudm-uecm: Access to the nudm-uecm API

schemas:

# COMPLEX TYPES:

Amf3GppAccessRegistration:

type: object

required:

- amfInstanceId

- deregCallbackUri

- guami

- ratType

properties:

amfInstanceId:

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

supportedFeatures:

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

purgeFlag:

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

pei:

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

imsVoPs:

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

deregCallbackUri:

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

amfServiceNameDereg:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

pcscfRestorationCallbackUri:

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

amfServiceNamePcscfRest:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

initialRegistrationInd:

type: boolean

guami:

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

backupAmfInfo:

type: array

items:

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

minItems: 1

drFlag:

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

ratType:

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

urrpIndicator:

type: boolean

amfEeSubscriptionId:

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

epsInterworkingInfo:

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

ueSrvccCapability:

type: boolean

registrationTime:

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

vgmlcAddress:

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

contextInfo:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

noEeSubscriptionInd:

type: boolean

supi:

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

Amf3GppAccessRegistrationModification:

type: object

required:

- guami

properties:

guami:

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

purgeFlag:

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

pei:

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

imsVoPs:

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

backupAmfInfo:

type: array

items:

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

epsInterworkingInfo:

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

ueSrvccCapability:

type: boolean

nullable: true

EpsInterworkingInfo:

type: object

properties:

epsIwkPgws:

description: A map (list of key-value pairs where Dnn serves as key) of EpsIwkPgws

type: object

additionalProperties:

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

EpsIwkPgw:

type: object

required:

- pgwFqdn

- smfInstanceId

properties:

pgwFqdn:

type: string

smfInstanceId:

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

AmfNon3GppAccessRegistration:

type: object

required:

- amfInstanceId

- imsVoPs

- deregCallbackUri

- guami

- ratType

properties:

amfInstanceId:

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

supportedFeatures:

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

purgeFlag:

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

pei:

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

imsVoPs:

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

deregCallbackUri:

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

amfServiceNameDereg:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

pcscfRestorationCallbackUri:

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

amfServiceNamePcscfRest:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

guami:

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

backupAmfInfo:

type: array

items:

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

minItems: 1

ratType:

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

urrpIndicator:

type: boolean

amfEeSubscriptionId:

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

registrationTime:

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

vgmlcAddress:

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

contextInfo:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

noEeSubscriptionInd:

type: boolean

supi:

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

AmfNon3GppAccessRegistrationModification:

type: object

required:

- guami

properties:

guami:

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

purgeFlag:

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

pei:

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

imsVoPs:

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

backupAmfInfo:

type: array

items:

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

SmfRegistration:

type: object

required:

- smfInstanceId

- pduSessionId

- singleNssai

- plmnId

properties:

smfInstanceId:

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

smfSetId:

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

supportedFeatures:

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

pduSessionId:

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

singleNssai:

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

dnn:

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

emergencyServices:

type: boolean

pcscfRestorationCallbackUri:

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

plmnId:

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

pgwFqdn:

type: string

epdgInd:

type: boolean

default: false

deregCallbackUri:

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

registrationReason:

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

registrationTime:

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

contextInfo:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

SmsfRegistration:

type: object

required:

- smsfInstanceId

- plmnId

properties:

smsfInstanceId:

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

smsfSetId:

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

supportedFeatures:

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

plmnId:

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

smsfMAPAddress:

$ref: '#/components/schemas/E164Number'

smsfDiameterAddress:

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

registrationTime:

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

contextInfo:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

DeregistrationData:

type: object

required:

- deregReason

properties:

deregReason:

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

accessType:

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

pduSessionId:

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

newSmfInstanceId:

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

PcscfRestorationNotification:

type: object

required:

- supi

properties:

supi:

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

NetworkNodeDiameterAddress:

type: object

required:

- name

- realm

properties:

name:

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

realm:

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

TriggerRequest:

type: object

required:

- supi

properties:

supi:

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

SmfRegistrationInfo:

type: object

required:

- smfRegistrationList

properties:

smfRegistrationList:

type: array

items:

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

minItems: 1

IpSmGwRegistration:

type: object

anyOf:

- required: [ ipSmGwMapAddress ]

- required: [ ipSmGwDiameterAddress ]

properties:

ipSmGwMapAddress:

$ref: '#/components/schemas/E164Number'

ipSmGwDiameterAddress:

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

unriIndicator:

type: boolean

default: false

AmfDeregInfo:

type: object

required:

- deregReason

properties:

deregReason:

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

LocationInfo:

type: object

required:

- registrationLocationInfoList

properties:

supi:

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

gpsi:

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

registrationLocationInfoList:

type: array

items:

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

minItems: 1

maxItems: 2

supportedFeatures:

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

RegistrationLocationInfo:

type: object

required:

- amfInstanceId

- accessTypeList

properties:

amfInstanceId:

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

guami:

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

plmnId:

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

vgmlcAddress:

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

accessTypeList:

type: array

items:

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

minItems: 1

maxItems: 2

VgmlcAddress:

type: object

properties:

vgmlcAddressIpv4:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

vgmlcAddressIpv6:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

vgmlcFqdn:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/Fqdn'

PeiUpdateInfo:

type: object

required:

- pei

properties:

pei:

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

RegistrationDatasetNames:

type: array

items:

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

minItems: 2

uniqueItems: true

RegistrationDataSets:

type: object

properties:

amf3Gpp:

$ref: '#/components/schemas/Amf3GppAccessRegistration'

amfNon3Gpp:

$ref: '#/components/schemas/AmfNon3GppAccessRegistration'

smfRegistration:

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

smsf3Gpp:

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

smsfNon3Gpp:

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

# SIMPLE TYPES:

PurgeFlag:

type: boolean

E164Number:

type: string

pattern: '^[0-9]{1,15}$'

DualRegistrationFlag:

type: boolean

# ENUMS:

ImsVoPs:

anyOf:

- type: string

enum:

- HOMOGENEOUS\_SUPPORT

- HOMOGENEOUS\_NON\_SUPPORT

- NON\_HOMOGENEOUS\_OR\_UNKNOWN

- type: string

DeregistrationReason:

anyOf:

- type: string

enum:

- UE\_INITIAL\_REGISTRATION

- UE\_REGISTRATION\_AREA\_CHANGE

- SUBSCRIPTION\_WITHDRAWN

- 5GS\_TO\_EPS\_MOBILITY

- 5GS\_TO\_EPS\_MOBILITY\_UE\_INITIAL\_REGISTRATION

- REREGISTRATION\_REQUIRED

- SMF\_CONTEXT\_TRANSFERRED

- type: string

RegistrationReason:

anyOf:

- type: string

enum:

- SMF\_CONTEXT\_TRANSFERRED

- type: string

RegistrationDataSetName:

anyOf:

- type: string

enum:

- AMF\_3GPP

- AMF\_NON\_3GPP

- SMF\_PDU\_SESSIONS

- SMSF\_3GPP

- SMSF\_NON\_3GPP

- type: string

# A.4 Nudm\_UEAU API

openapi: 3.0.0

info:

version: '1.1.3'

title: 'Nudm\_UEAU'

description: |

UDM UE Authentication Service.

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externalDocs:

description: 3GPP TS 29.503 Unified Data Management Services, version 16.12.0

url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.503/'

servers:

- url: '{apiRoot}/nudm-ueau/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause clause 4.4 of 3GPP TS 29.501.

security:

- oAuth2ClientCredentials:

- nudm-ueau

- {}

paths:

/{supiOrSuci}/security-information/generate-auth-data:

post:

summary: Generate authentication data for the UE

operationId: GenerateAuthData

tags:

- Generate Auth Data

parameters:

- name: supiOrSuci

in: path

description: SUPI or SUCI of the user

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supiOrSuci}/security-information-rg:

get:

summary: Get authentication data for the FN-RG

operationId: GetRgAuthData

tags:

- Get Auth Data for FN-RG

parameters:

- name: supiOrSuci

in: path

description: SUPI or SUCI of the user

required: true

schema:

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

- name: authenticated-ind

in: query

description: Authenticated indication

required: true

schema:

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

- name: supported-features

in: query

description: Supported Features

schema:

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

- name: plmn-id

in: query

description: serving PLMN ID

content:

application/json:

schema:

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

- name: If-None-Match

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.2

schema:

type: string

- name: If-Modified-Since

in: header

description: Validator for conditional requests, as described in RFC 7232, 3.3

schema:

type: string

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/auth-events:

post:

summary: Create a new confirmation event

operationId: ConfirmAuth

tags:

- Confirm Auth

parameters:

- name: supi

in: path

description: SUPI of the user

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'201':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-ueau/v1/{supi}/auth-events/{authEventId}'

required: true

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/hss-security-information/{hssAuthType}/generate-av:

post:

summary: Generate authentication data for the UE in EPS or IMS domain

operationId: GenerateAv

tags:

- Generate HSS Authentication Vectors

parameters:

- name: supi

in: path

description: SUPI of the user

required: true

schema:

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

- name: hssAuthType

in: path

description: Type of AV requested by HSS

required: true

schema:

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

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/auth-events/{authEventId}:

put:

summary: Deletes the authentication result in the UDM

operationId: DeleteAuth

tags:

- Delete Auth

parameters:

- name: supi

in: path

description: SUPI of the user

required: true

schema:

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

- name: authEventId

in: path

description: authEvent Id

required: true

schema:

type: string

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'204':

description: Expected response to a successful authentication result removal

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nudm-ueau: Access to the nudm-ueau API

schemas:

# COMPLEX TYPES:

AuthenticationInfoRequest:

type: object

required:

- servingNetworkName

- ausfInstanceId

properties:

supportedFeatures:

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

servingNetworkName:

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

resynchronizationInfo:

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

ausfInstanceId:

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

cellCagInfo:

type: array

items:

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

minItems: 1

n5gcInd:

type: boolean

default: false

AuthenticationInfoResult:

type: object

required:

- authType

properties:

authType:

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

supportedFeatures:

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

authenticationVector:

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

supi:

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

AuthenticationVector:

oneOf:

- $ref: '#/components/schemas/AvEapAkaPrime'

- $ref: '#/components/schemas/Av5GHeAka'

discriminator:

propertyName: avType

mapping:

5G\_HE\_AKA: '#/components/schemas/Av5GHeAka'

EAP\_AKA\_PRIME: '#/components/schemas/AvEapAkaPrime'

AvEapAkaPrime:

type: object

required:

- avType

- rand

- xres

- autn

- ckPrime

- ikPrime

properties:

avType:

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

rand:

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

xres:

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

autn:

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

ckPrime:

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

ikPrime:

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

Av5GHeAka:

type: object

required:

- avType

- rand

- xresStar

- autn

- kausf

properties:

avType:

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

rand:

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

xresStar:

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

autn:

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

kausf:

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

ResynchronizationInfo:

type: object

required:

- rand

- auts

properties:

rand:

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

auts:

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

AuthEvent:

type: object

required:

- nfInstanceId

- success

- timeStamp

- authType

- servingNetworkName

properties:

nfInstanceId:

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

success:

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

timeStamp:

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

authType:

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

servingNetworkName:

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

authRemovalInd:

type: boolean

default: false

nfSetId:

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

RgAuthCtx:

type: object

required:

- authInd

properties:

authInd:

type: boolean

default: false

supi:

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

supportedFeatures:

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

HssAuthenticationInfoRequest:

type: object

required:

- hssAuthType

- numOfRequestedVectors

properties:

supportedFeatures:

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

hssAuthType:

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

numOfRequestedVectors:

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

requestingNodeType:

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

servingNetworkId:

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

resynchronizationInfo:

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

anId:

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

HssAuthenticationInfoResult:

type: object

required:

- hssAuthenticationVectors

properties:

supportedFeatures:

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

hssAuthenticationVectors:

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

HssAuthenticationVectors:

oneOf:

- type: array

items:

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

minItems: 1

maxItems: 5

- type: array

items:

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

minItems: 1

maxItems: 5

- type: array

items:

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

minItems: 1

maxItems: 5

AvEpsAka:

type: object

required:

- avType

- rand

- xres

- autn

- kasme

properties:

avType:

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

rand:

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

xres:

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

autn:

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

kasme:

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

AvImsGbaEapAka:

type: object

required:

- avType

- rand

- xres

- autn

- ck

- ik

properties:

avType:

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

rand:

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

xres:

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

autn:

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

ck:

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

ik:

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

# SIMPLE TYPES:

Autn:

type: string

pattern: '^[A-Fa-f0-9]{32}$'

Auts:

type: string

pattern: '^[A-Fa-f0-9]{28}$'

CkPrime:

type: string

pattern: '^[A-Fa-f0-9]{32}$'

IkPrime:

type: string

pattern: '^[A-Fa-f0-9]{32}$'

Kausf:

type: string

pattern: '^[A-Fa-f0-9]{64}$'

Rand:

type: string

pattern: '^[A-Fa-f0-9]{32}$'

Xres:

type: string

pattern: '^[A-Fa-f0-9]{8,32}$'

XresStar:

type: string

pattern: '^[A-Fa-f0-9]{32}$'

ServingNetworkName:

type: string

pattern: '^5G:mnc[0-9]{3}[.]mcc[0-9]{3}[.]3gppnetwork[.]org(:[A-F0-9]{11})?$'

Success:

type: boolean

AuthenticatedInd:

type: boolean

ConfidentialityKey:

type: string

pattern: '^[A-Fa-f0-9]{32}$'

IntegrityKey:

type: string

pattern: '^[A-Fa-f0-9]{32}$'

Kasme:

type: string

pattern: '^[A-Fa-f0-9]{64}$'

NumOfRequestedVectors:

type: integer

minimum: 1

maximum: 5

# ENUMS:

AuthType:

anyOf:

- type: string

enum:

- 5G\_AKA

- EAP\_AKA\_PRIME

- EAP\_TLS

- type: string

AvType:

anyOf:

- type: string

enum:

- 5G\_HE\_AKA

- EAP\_AKA\_PRIME

- type: string

HssAuthType:

anyOf:

- type: string

enum:

- EPS\_AKA

- EAP\_AKA

- EAP\_AKA\_PRIME

- IMS\_AKA

- GBA\_AKA

- UMTS\_AKA

- type: string

HssAvType:

anyOf:

- type: string

enum:

- EPS\_AKA

- EAP\_AKA

- IMS\_AKA

- GBA\_AKA

- UMTS\_AKA

- type: string

HssAuthTypeInUri:

anyOf:

- type: string

enum:

- eps-aka

- eap-aka

- eap-aka-prime

- ims-aka

- gba-aka

- type: string

AccessNetworkId:

anyOf:

- type: string

enum:

- HRPD

- WIMAX

- WLAN

- ETHERNET

- type: string

NodeType:

anyOf:

- type: string

enum:

- AUSF

- VLR

- SGSN

- S\_CSCF

- BSF

- GAN\_AAA\_SERVER

- WLAN\_AAA\_SERVER

- MME

- type: string

# A.5 Nudm\_EE API

openapi: 3.0.0

info:

version: '1.1.4'

title: 'Nudm\_EE'

description: |

Nudm Event Exposure Service.

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externalDocs:

description: 3GPP TS 29.503 Unified Data Management Services, version 16.11.0

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.503/'

servers:

- url: '{apiRoot}/nudm-ee/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause clause 4.4 of 3GPP TS 29.501.

security:

- oAuth2ClientCredentials:

- nudm-ee

- {}

paths:

/{ueIdentity}/ee-subscriptions:

post:

summary: Subscribe

operationId: CreateEeSubscription

tags:

- Create EE Subscription

parameters:

- name: ueIdentity

in: path

description: Represents the scope of the UE for which the subscription is applied. Contains the GPSI of the user or the external group ID or any UE.

required: true

schema:

type: string

pattern: '^(msisdn-[0-9]{5,15}|.+|extid-[^@]+@[^@]+|extgroupid-[^@]+@[^@]+|anyUE)$'

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'201':

description: Expected response to a valid request

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nudm-ee/v1/{ueIdentity}/ee-subscriptions/{subscriptionId}'

required: true

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

callbacks:

eventOccurrenceNotification:

'{request.body#/callbackReference}':

post:

requestBody:

required: true

content:

application/json:

schema:

type: array

items:

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

minItems: 1

responses:

'204':

description: Successful Notification response

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueIdentity}/ee-subscriptions/{subscriptionId}:

delete:

summary: Unsubscribe

operationId: DeleteEeSubscription

tags:

- Delete EE Subscription

parameters:

- name: ueIdentity

in: path

description: Represents the scope of the UE for which the subscription is applied. Contains the GPSI of the user or the external group ID or any UE.

required: true

schema:

type: string

pattern: '^(msisdn-[0-9]{5,15}|.+|extid-[^@]+@[^@]+|extgroupid-[^@]+@[^@]+|anyUE)$'

- name: subscriptionId

in: path

description: Id of the EE Subscription

required: true

schema:

type: string

responses:

'204':

description: Successful response

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

patch:

summary: Patch

operationId: UpdateEeSubscription

tags:

- Update EE Subscription

parameters:

- name: ueIdentity

in: path

description: Represents the scope of the UE for which the subscription is applied. Contains the GPSI of the user or the external group ID or any UE.

required: true

schema:

type: string

pattern: '^(msisdn-[0-9]{5,15}|.+|extid-[^@]+@[^@]+|extgroupid-[^@]+@[^@]+|anyUE)$'

- name: subscriptionId

in: path

description: Id of the EE Subscription

required: true

schema:

type: string

- name: supported-features

in: query

description: Features required to be supported by the target NF

schema:

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

requestBody:

content:

application/json-patch+json:

schema:

type: array

items:

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

minItems: 1

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'204':

description: Successful response

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

default:

description: Unexpected error

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nudm-ee: Access to the nudm-ee API

schemas:

# COMPLEX TYPES:

CreatedEeSubscription:

type: object

required:

- eeSubscription

properties:

eeSubscription:

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

numberOfUes:

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

eventReports:

type: array

items:

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

minItems: 1

epcStatusInd:

type: boolean

EeSubscription:

type: object

required:

- callbackReference

- monitoringConfigurations

properties:

callbackReference:

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

monitoringConfigurations:

description: A map (list of key-value pairs where ReferenceId serves as key) of MonitoringConfigurations

type: object

additionalProperties:

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

minProperties: 1

reportingOptions:

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

supportedFeatures:

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

subscriptionId:

type: string

contextInfo:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

epcAppliedInd:

type: boolean

default: false

scefDiamHost:

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

scefDiamRealm:

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

notifyCorrelationId:

type: string

MonitoringConfiguration:

type: object

required:

- eventType

properties:

eventType:

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

immediateFlag:

type: boolean

locationReportingConfiguration:

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

associationType:

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

datalinkReportCfg:

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

lossConnectivityCfg:

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

maximumLatency:

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

maximumResponseTime:

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

suggestedPacketNumDl:

type: integer

minimum: 1

pduSessionStatusCfg:

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

reachabilityForSmsCfg:

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

mtcProviderInformation:

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

afId:

type: string

idleStatusInd:

type: boolean

default: false

LossConnectivityCfg:

type: object

properties:

maxDetectionTime:

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

LocationReportingConfiguration:

type: object

required:

- currentLocation

properties:

currentLocation:

type: boolean

oneTime:

type: boolean

accuracy:

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

n3gppAccuracy:

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

ReportingOptions:

type: object

properties:

reportMode:

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

maxNumOfReports:

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

expiry:

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

samplingRatio:

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

guardTime:

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

reportPeriod:

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

MonitoringReport:

type: object

required:

- referenceId

- eventType

- timeStamp

properties:

referenceId:

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

eventType:

$ref: '#/components/schemas/EventType'

report:

$ref: '#/components/schemas/Report'

reachabilityForSmsReport:

$ref: '#/components/schemas/ReachabilityForSmsReport'

gpsi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

timeStamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

Report:

oneOf:

- $ref: '#/components/schemas/ChangeOfSupiPeiAssociationReport'

- $ref: '#/components/schemas/RoamingStatusReport'

- $ref: '#/components/schemas/CnTypeChangeReport'

- $ref: '#/components/schemas/CmInfoReport'

- $ref: '#/components/schemas/LossConnectivityReport'

- $ref: '#/components/schemas/LocationReport'

- $ref: '#/components/schemas/PdnConnectivityStatReport'

ReachabilityForSmsReport:

type: object

required:

- smsfAccessType

properties:

smsfAccessType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AccessType'

maxAvailabilityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

ChangeOfSupiPeiAssociationReport:

type: object

required:

- newPei

properties:

newPei:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Pei'

RoamingStatusReport:

type: object

required:

- roaming

- newServingPlmn

properties:

roaming:

type:

boolean

newServingPlmn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnId'

CnTypeChangeReport:

type: object

required:

- newCnType

properties:

newCnType:

$ref: '#/components/schemas/CnType'

oldCnType:

$ref: '#/components/schemas/CnType'

DatalinkReportingConfiguration:

type: object

properties:

dddTrafficDes:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DddTrafficDescriptor'

minItems: 1

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

slice:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

dddStatusList:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DlDataDeliveryStatus'

minItems: 1

CmInfoReport:

type: object

properties:

oldCmInfoList:

type: array

items:

$ref: 'TS29518\_Namf\_EventExposure.yaml#/components/schemas/CmInfo'

minItems: 1

maxItems: 2

newCmInfoList:

type: array

items:

$ref: 'TS29518\_Namf\_EventExposure.yaml#/components/schemas/CmInfo'

minItems: 1

maxItems: 2

required:

- newCmInfoList

PduSessionStatusCfg:

type: object

properties:

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

LossConnectivityReport:

type: object

required:

- lossOfConnectReason

properties:

lossOfConnectReason:

$ref: 'TS29518\_Namf\_EventExposure.yaml#/components/schemas/LossOfConnectivityReason'

LocationReport:

type: object

required:

- location

properties:

location:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

PdnConnectivityStatReport:

type: object

required:

- pdnConnStat

properties:

pdnConnStat:

$ref: '#/components/schemas/PdnConnectivityStatus'

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

pduSeId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionId'

ipv4Addr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

ipv6Prefixes:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

minItems: 1

ipv6Addrs:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

minItems: 1

pduSessType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionType'

# SIMPLE TYPES:

ReferenceId:

type: integer

MaxNumOfReports:

type: integer

# ENUMS:

ReachabilityForSmsConfiguration:

anyOf:

- type: string

enum:

- REACHABILITY\_FOR\_SMS\_OVER\_NAS

- REACHABILITY\_FOR\_SMS\_OVER\_IP

- type: string

EventType:

anyOf:

- type: string

enum:

- LOSS\_OF\_CONNECTIVITY

- UE\_REACHABILITY\_FOR\_DATA

- UE\_REACHABILITY\_FOR\_SMS

- LOCATION\_REPORTING

- CHANGE\_OF\_SUPI\_PEI\_ASSOCIATION

- ROAMING\_STATUS

- COMMUNICATION\_FAILURE

- AVAILABILITY\_AFTER\_DDN\_FAILURE

- CN\_TYPE\_CHANGE

- DL\_DATA\_DELIVERY\_STATUS

- PDN\_CONNECTIVITY\_STATUS

- UE\_CONNECTION\_MANAGEMENT\_STATE

- type: string

LocationAccuracy:

anyOf:

- type: string

enum:

- CELL\_LEVEL

- TA\_LEVEL

- N3IWF\_LEVEL

- UE\_IP

- UE\_PORT

- type: string

CnType:

anyOf:

- type: string

enum:

- SINGLE\_4G

- SINGLE\_5G

- DUAL\_4G5G

- type: string

AssociationType:

anyOf:

- type: string

enum:

- IMEI\_CHANGE

- IMEISV\_CHANGE

- type: string

EventReportMode:

anyOf:

- type: string

enum:

- PERIODIC

- ON\_EVENT\_DETECTION

- type: string

PdnConnectivityStatus:

anyOf:

- type: string

enum:

- ESTABLISHED

- RELEASED

- type: string

# A.6 Nudm\_PP API

openapi: 3.0.0

info:

version: '1.1.3'

title: 'Nudm\_PP'

description: |

Nudm Parameter Provision Service.

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externalDocs:

description: 3GPP TS 29.503 Unified Data Management Services, version 16.8.0

url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.503/'

servers:

- url: '{apiRoot}/nudm-pp/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause clause 4.4 of 3GPP TS 29.501.

security:

- oAuth2ClientCredentials:

- nudm-pp

- {}

paths:

/{ueId}/pp-data:

patch:

summary: provision parameters

operationId: Update

tags:

- Subscription Data Update

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

anyOf:

- $ref: 'TS29571\_CommonData.yaml#/components/schemas/VarUeId'

- $ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ExtGroupId'

- name: supported-features

in: query

description: Features required to be supported by the target NF

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

requestBody:

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/PpData'

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PatchResult'

'204':

description: Expected response to a valid request

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/5g-vn-groups/{extGroupId}:

put:

summary: create a 5G VN Group

operationId: Create 5G VN Group

tags:

- 5G VN Group Creation

parameters:

- name: extGroupId

in: path

description: External Identifier of the Group

required: true

schema:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ExtGroupId'

requestBody:

content:

application/json:

schema:

$ref: '#/components/schemas/5GVnGroupConfiguration'

required: true

responses:

'201':

description: Expected response to a valid request

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

delete:

summary: delete a 5G VN Group

operationId: Delete 5G VN Group

tags:

- 5G VN Group Deletion

parameters:

- name: extGroupId

in: path

description: External Identifier of the Group

required: true

schema:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ExtGroupId'

- name: mtc-provider-info

in: query

description: MTC Provider Information that originated the service operation

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

- name: af-id

in: query

description: AF ID that originated the service operation

schema:

type: string

responses:

'204':

description: Expected response to a valid request

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

patch:

summary: modify a 5G VN Group

operationId: Modify 5G VN Group

tags:

- 5G VN Group Modification

parameters:

- name: extGroupId

in: path

description: External Identifier of the group

required: true

schema:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ExtGroupId'

- name: supported-features

in: query

description: Features required to be supported by the target NF

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

requestBody:

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/5GVnGroupConfiguration'

required: true

responses:

'204':

description: Expected response to a valid request

'200':

description: Expected response to a valid request

content:

application/json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PatchResult'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

get:

summary: get 5G VN Group

operationId: Get 5G VN Group

tags:

- 5G VN Group Modification

parameters:

- name: extGroupId

in: path

description: External Identifier of the group

required: true

schema:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ExtGroupId'

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

$ref: '#/components/schemas/5GVnGroupConfiguration'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nudm-pp: Access to the nudm-pp API

schemas:

# COMPLEX TYPES:

PpData:

type: object

properties:

communicationCharacteristics:

$ref: '#/components/schemas/CommunicationCharacteristics'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

expectedUeBehaviourParameters:

$ref: '#/components/schemas/ExpectedUeBehaviour'

ecRestriction:

$ref: '#/components/schemas/EcRestriction'

acsInfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AcsInfoRm'

stnSr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/StnSrRm'

lcsPrivacy:

$ref: '#/components/schemas/LcsPrivacy'

sorInfo:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/SorInfo'

CommunicationCharacteristics:

type: object

properties:

ppSubsRegTimer:

$ref: '#/components/schemas/PpSubsRegTimer'

ppActiveTime:

$ref: '#/components/schemas/PpActiveTime'

ppDlPacketCount:

$ref: '#/components/schemas/PpDlPacketCount'

ppDlPacketCountExt:

$ref: '#/components/schemas/PpDlPacketCountExt'

ppMaximumResponseTime:

$ref: '#/components/schemas/PpMaximumResponseTime'

ppMaximumLatency:

$ref: '#/components/schemas/PpMaximumLatency'

PpSubsRegTimer:

type: object

required:

- subsRegTimer

- afInstanceId

- referenceId

properties:

subsRegTimer:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

afInstanceId:

type: string

referenceId:

$ref: '#/components/schemas/ReferenceId'

validityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

mtcProviderInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

nullable: true

PpActiveTime:

type: object

required:

- activeTime

- afInstanceId

- referenceId

properties:

activeTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

afInstanceId:

type: string

referenceId:

$ref: '#/components/schemas/ReferenceId'

validityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

mtcProviderInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

nullable: true

5GVnGroupConfiguration:

type: object

properties:

5gVnGroupData:

$ref: '#/components/schemas/5GVnGroupData'

members:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

minItems: 1

referenceId:

$ref: '#/components/schemas/ReferenceId'

afInstanceId:

type: string

internalGroupIdentifier:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/GroupId'

mtcProviderInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

5GVnGroupData:

type: object

required:

- dnn

- sNssai

properties:

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

sNssai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

pduSessionTypes:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionType'

minItems: 1

appDescriptors:

type: array

items:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/AppDescriptor'

minItems: 1

secondaryAuth:

type: boolean

dnAaaAddress:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/IpAddress'

ExpectedUeBehaviour:

type: object

required:

- afInstanceId

- referenceId

properties:

afInstanceId:

type: string

referenceId:

$ref: '#/components/schemas/ReferenceId'

stationaryIndication:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/StationaryIndicationRm'

communicationDurationTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSecRm'

scheduledCommunicationType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ScheduledCommunicationTypeRm'

periodicTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSecRm'

scheduledCommunicationTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ScheduledCommunicationTimeRm'

expectedUmts:

type: array

items:

$ref: '#/components/schemas/LocationArea'

minItems: 1

nullable: true

description: Identifies the UE's expected geographical movement. The attribute is only applicable in 5G.

trafficProfile:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TrafficProfileRm'

batteryIndication:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/BatteryIndicationRm'

validityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

mtcProviderInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

LocationArea:

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: '#/components/schemas/NetworkAreaInfo'

NetworkAreaInfo:

description: Describes a network area information in which the NF service consumer requests the number of UEs.

type: object

properties:

ecgis:

description: Contains a list of E-UTRA cell identities.

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ecgi'

minItems: 1

ncgis:

description: Contains a list of NR cell identities.

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ncgi'

minItems: 1

gRanNodeIds:

description: Contains a list of NG RAN nodes.

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/GlobalRanNodeId'

minItems: 1

tais:

description: Contains a list of tracking area identities.

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Tai'

minItems: 1

EcRestriction:

type: object

required:

- afInstanceId

- referenceId

properties:

afInstanceId:

type: string

referenceId:

$ref: '#/components/schemas/ReferenceId'

plmnEcInfos:

type: array

items:

$ref: '#/components/schemas/PlmnEcInfo'

minItems: 1

mtcProviderInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

PlmnEcInfo:

type: object

required:

- plmnId

properties:

plmnId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnId'

ecRestrictionDataWb:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/EcRestrictionDataWb'

ecRestrictionDataNb:

type: boolean

default: false

PpDlPacketCountExt:

type: object

required:

- afInstanceId

- referenceId

properties:

afInstanceId:

type: string

referenceId:

$ref: '#/components/schemas/ReferenceId'

validityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

mtcProviderInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

nullable: true

PpMaximumResponseTime:

type: object

required:

- maximumResponseTime

- afInstanceId

- referenceId

properties:

maximumResponseTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

afInstanceId:

type: string

referenceId:

$ref: '#/components/schemas/ReferenceId'

validityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

mtcProviderInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

nullable: true

PpMaximumLatency:

type: object

required:

- maximumLatency

- afInstanceId

- referenceId

properties:

maximumLatency:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

afInstanceId:

type: string

referenceId:

$ref: '#/components/schemas/ReferenceId'

validityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

mtcProviderInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

nullable: true

LcsPrivacy:

type: object

properties:

afInstanceId:

type: string

referenceId:

$ref: '#/components/schemas/ReferenceId'

lpi:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/Lpi'

mtcProviderInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

# SIMPLE TYPES:

ReferenceId:

type: integer

PpDlPacketCount:

type: integer

nullable: true

# ENUMS:

# A.7 Nudm\_NIDDAU API

openapi: 3.0.0

info:

version: '1.0.3'

title: 'Nudm\_NIDDAU'

description: |

Nudm NIDD Authorization Service.

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externalDocs:

description: 3GPP TS 29.503 Unified Data Management Services, version 16.13.0

url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.503/'

servers:

- url: '{apiRoot}/nudm-niddau/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause clause 4.4 of 3GPP TS 29.501.

security:

- oAuth2ClientCredentials:

- nudm-niddau

- {}

paths:

/{ueIdentity}/authorize:

post:

summary: Authorize the NIDD configuration request.

operationId: AuthorizeNiddData

tags:

- Authorize the NIDD configuration request

parameters:

- name: ueIdentity

in: path

description: Represents the scope of the UE for which the NIDD configuration are authorized. Contains the GPSI of the user or the external group ID.

required: true

schema:

type: string

pattern: '^(msisdn-[0-9]{5,15}|.+|extid-[^@]+@[^@]+|extgroupid-[^@]+@[^@]+)$'

requestBody:

content:

application/json:

schema:

$ref: '#/components/schemas/AuthorizationInfo'

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

$ref: '#/components/schemas/AuthorizationData'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

callbacks:

niddAuthUpdateNotification:

'{request.body#/authUpdateCallbackUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/NiddAuthUpdateNotification'

responses:

'204':

description: Expected response to a valid request

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nudm-niddau: Access to the nudm-niddau API

schemas:

# COMPLEX TYPES:

#

AuthorizationData:

type: object

required:

- authorizationData

properties:

authorizationData:

type: array

items:

$ref: '#/components/schemas/UserIdentifier'

minItems: 1

uniqueItems: true

validityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

UserIdentifier:

type: object

required:

- supi

properties:

supi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'

gpsi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

validityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

NiddAuthUpdateInfo:

type: object

required:

- authorizationData

properties:

authorizationData:

$ref: '#/components/schemas/AuthorizationData'

invalidityInd:

type: boolean

snssai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

niddCause:

$ref: '#/components/schemas/NiddCause'

NiddAuthUpdateNotification:

type: object

required:

- niddAuthUpdateInfoList

properties:

niddAuthUpdateInfoList:

type: array

items:

$ref: '#/components/schemas/NiddAuthUpdateInfo'

minItems: 1

AuthorizationInfo:

type: object

required:

- snssai

- dnn

- mtcProviderInformation

- authUpdateCallbackUri

properties:

snssai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

mtcProviderInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MtcProviderInformation'

authUpdateCallbackUri:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

afId:

type: string

nefId:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/NefId'

validityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

# SIMPLE TYPES:

# ENUMS:

NiddCause:

anyOf:

- type: string

enum:

- SUBSCRIPTION\_WITHDRAWAL

- DNN\_REMOVED

- type: string

# A.8 Nudm\_MT API

openapi: 3.0.0

info:

version: '1.0.2'

title: 'Nudm\_MT'

description: |

UDM MT Service.

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externalDocs:

description: 3GPP TS 29.503 Unified Data Management Services, version 16.10.0

url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.503/'

servers:

- url: '{apiRoot}/nudm-mt/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause clause 4.4 of 3GPP TS 29.501.

security:

- oAuth2ClientCredentials:

- nudm-mt

- {}

paths:

/{supi}:

get:

summary: Query Information for the UE

operationId: QueryUeInfo

tags:

- Query UE Info

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'

- name: fields

in: query

description: attributes to be retrieved

required: true

schema:

type: array

items:

type: string

minItems: 1

style: form

explode: false

- name: supported-features

in: query

description: Supported Features

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

$ref: '#/components/schemas/UeInfo'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{supi}/loc-info/provide-loc-info:

post:

summary: Provides the UE's 5GS location information

operationId: ProvideLocationInfo

tags:

- Provide UE Location

parameters:

- name: supi

in: path

description: Identifier of the UE

required: true

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'

requestBody:

content:

application/json:

schema:

$ref: '#/components/schemas/LocationInfoRequest'

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

$ref: '#/components/schemas/LocationInfoResult'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nudm-mt: Access to the nudm-mt API

schemas:

# COMPLEX TYPES:

UeInfo:

type: object

properties:

tadsInfo:

$ref: 'TS29518\_Namf\_MT.yaml#/components/schemas/UeContextInfo'

userState:

$ref: 'TS29518\_Namf\_EventExposure.yaml#/components/schemas/5GsUserState'

5gSrvccInfo:

$ref: '#/components/schemas/5GSrvccInfo'

5GSrvccInfo:

type: object

required:

- ue5GSrvccCapability

properties:

ue5GSrvccCapability:

type: boolean

stnSr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/StnSr'

cMsisdn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/CMsisdn'

LocationInfoRequest:

type: object

properties:

req5gsLoc:

type: boolean

default: false

reqCurrentLoc:

type: boolean

default: false

reqRatType:

type: boolean

default: false

reqTimeZone:

type: boolean

default: false

reqServingNode:

type: boolean

default: false

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

LocationInfoResult:

type: object

properties:

vPlmnId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnId'

amfInstanceId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

smsfInstanceId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

ncgi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ncgi'

ecgi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ecgi'

tai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Tai'

currentLoc:

type: boolean

geoInfo:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

locationAge:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/AgeOfLocationEstimate'

ratType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

timezone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

# SIMPLE TYPES:

# ENUMS:

Annex B (informative):  
Stateless UDMs

Figure B-1 shows a scenario where the stateless UDM receives and processes a request from an NF.



Figure B-1: Stateless UDM

1. The stateless UDM receives a request from an NF. This can be a request to perform an Nudm service, or a Notification that the UDM has previously subscribed to at the NF by means of a service the UDM consumes from the NF. In the later case the NF can be the UDR.

2. The UDM retrieves data from the UDR that are required to process the request. This step can be skipped if the request was a notification from the UDR and contained enough information so that the UDM can process the request.

3. The UDM processes the received request. This can include consuming services from other NFs, consuming services from the UDR (e.g. to update data or subscribe to notifications), and sending notifications to NFs that have subscribed at the UDM to receive notifications, and includes sending the response to the NF (all not shown in the figure).

4. The UDM locally deletes the data retrieved in step 2 and/or received in step 1.

Figure B-2 shows a scenario where an AMF subscribes to notifications of data change (permanent provisioned subscription data) at the stateless UDM. The UDM (UDM 1) stores the subscription to notification in the UE's context data at the UDR.



Figure B-2: Subscription to notification

1. The stateless UDM 1 receives a subscribe request from an AMF; see clause 5.2.2.3.2.

2.-3 The UDM retrieves UE context data from the UDR to be able to perform required plausibility checks; see 3GPP TS 29.504 [9] clause 5.2.2.2.2.

4. The UDM creates a new sdm subscription at the UDR; see 3GPP TS 29.504 [9] clause 5.2.2.6.3.

5. The UDR sends a 201 Created response containig a subscription ID

6. The UDM send a 201 Created response passing the subscription ID received in step 5 to the AMF.

7. Permanent provisioned Subscription data are modified at the UDR.

8. The UDR selects a suitable UDM and sends a Notification; see 3GPP TS 29.504 [9] clause 5.2.2.8. In addition to the data that have changed, the Notification request message can contain enough (unchanged) information (e.g. the information that has been created in step 4) allowing the UDM to perform step 10 without the need to additionally retrieve information from the UDR.

9. The UDM responds with 204 No Content.

10. The UDM notifies the AMF according to the callback URI of the AMF contained in the Notification received in step 8; see clause 5.2.2.5.2.

11. The AMF responds with 204 No Content.

Figure B-3 shows a scenario where an AMF registers at the stateless UDM. The UDM (UDM 1) stores the registration in the UE's context data at the UDR. The AMF then requests to update the registration e.g. due to change of PEI. This request is sent to UDM2 which belongs to the same UDM group as UDM1.



Figure B-3: AMF Registration and Update

1. The AMF discovers (by means of NRF query) and selects an UDM and sends the register request;

2.-3 The UDM retrieves UE context data from the UDR e.g. to be able to perform required plausibility checks;

4.-5 The UDM updates UE context data in the UDR. The UDM also performs other actions not shown in the figure, e.g deregister an old AMF, notify a subscribed NEF, ...

6. The UDM acknowldeges the AMF registration. The AMF stores the UDM group ID as discovered and selected in step 1. The UDM locally deletes the data retrieved in step 3.

7. The AMF sends an update request (e.g. change of PEI) to one of the available UDMs (UDM2) that belongs to the same UDM group as UDM1.

8.-9. The UDM retrieves UE context data from the UDR e.g. to be able to perform required plausibility checks;

10.-11. The UDM updates UE context data in the UDR.The UDM also performs other actions not shown in the figure, e.g. notify a subscribed NEF, ...

12. The UDM sends update response to the AMF and locally deletes the data retrieved in step 9.

NOTE: When a previously received Location Header or Callback URI is used for a subsequent UDM contact, the authority part may need to be replaced to point to the selected UDM.

Figure B-4 shows a scenario where an AF requests a subscription for all UEs (any UE) for a given network event. The NEF discovers all UDM NFs providing the necessary service to perform a bulk subscription. If one or several UDM Group IDs are received, NEF selects only one instance of UDM for each Group ID in order to perform the bulk subscription.



Figure B-4: Any UE Subscription

1. An AF subscribes to a network event (e.g. SUPI-PEI association change) for any UE (i.e. all UEs)

2. The NEF discovers (by means of NRF query) all UDM instances supporting the required service (e.g. nudm-ee). The NEF selects an UDM instance (e.g. UDM 1) from each UDM Group ID discovered (UDM 1 and UDM 2 are in the same UDM Group ID) and sends the subscribe request. The NEF also stores the UDM Group ID information to select a UDM for subsequent subscriptions.

3-4. The UDM retrieves data from the UDR for group of UEs, e.g. to be able to perform required plausibility checks

5-6. The UDM stores data for group of UEs in the UDR.

7. The UDM acknowldeges the NEF subscription request. The UDM locally deletes the data retrieved in step 3.

Steps 7-12 in Figure B-3 are performed. As result of the subscription, NEF is notified by UDM 2 (change of PEI). Subsequently, when the event occurs for any UE (within the SUPI range, if applicable, served by the UDM Group ID), NEF is notified by either UDM1 or UDM 2.

Annex C (informative):  
SUCI encoding

The structure of the Subscription Concealed Identifier (SUCI) is defined in 3GPP TS 23.003 [8].

When SUCI needs to be sent as a character string (e.g. as a string in a JSON payload of any of the service operations defined in the APIs defined in this specification), the SUCI is composed as an UTF-8 character string, where the different components are separated by the "minus" character "-" (UTF-8 0x2D).

These components shall be formatted as follows:

1) SUPI Type: a single decimal digit, from 0 to 7, formatted as a single UTF-8 character (UTF-8 0x30 to 0x37)

2) Home Network Identifier.

When the SUPI Type is an IMSI, the Home Network Identifier consists on 2 components: MCC and MNC, separated by the "minus" character; these components are formatted as a string of 3 characters for MCC and a string of 2 or 3 characters for MNC (UTF-8 0x30 to 0x39).

When the SUPI type is a Network Specific Identifier, Global Line Identifier (GLI) or Global Cable Identifier (GCI) the Home Network Identifier consists of a string of characters with a variable length, formatted as an UTF-8 character string.

3) Routing Indicator, consisting of 1 to 4 decimal digits formatted as a string of 1 to 4 characters (UTF-8 0x30 to 0x39).

4) Protection Scheme Identifier, consisting in a value in the range of 0 to 15, representing a single hexadecimal digit, formatted as a single UTF-8 character (UTF-8 0x30 to 0x39, or 0x41 to 0x46, or 0x61 to 0x66).

5) Home Network Public Key Identifier, consisting in a value in the range 0 to 255, formatted as a sequence of 1 to 3 decimal digits, formatted of 1 to 3 UTF-8 characters (UTF-8 0x30 to 0x39).

6) Scheme Output, consisting of a string of UTF-8 characters with a variable length, or a sequence of hexadecimal digits, dependent on the used protection scheme. It represents the output of a public key protection scheme specified in Annex C of 3GPP TS 33.501 [6] or the output of a protection scheme specified by the HPLMN.

EXAMPLES:

- SUPI is IMSI-based; MCC=123, MNC=45, MSIN: 0123456789

SUPI type: 0 (IMSI)

Routing Identifier: 012

Protection Scheme: 0 (NULL scheme)

Home Network Public Key Identifier: 0

Scheme output = MSIN (cleartext)

SUCI UTF-8 string:

"0-123-45-012-0-0-0123456789"

NOTE: According to 3GPP TS 33.501 [6] (see annex C.2) the NULL scheme returns the same output as the input (i.e. MSIN in this example), which can be packed BCD coded. However, when formatted as character string in JSON, the scheme output is expected to be reformatted from packed BCD (5 octets in this example) to a sequence of decimal digits in UTF-8 (10 characters in this example).

- SUPI is IMSI-based, MCC=123, MNC=45, MSIN: 9876543210 (coded as 10 hexadecimal digits using 5 octets packed BCD coding: 89, 67, 45, 23, 01)

SUPI type: 0 (IMSI)

Routing Identifier: 0002

Protection Scheme: 1 (Profile A)

Home Network Public Key Identifier: 17

Scheme output = ECC ephemeral public key (32 octets, first bolded part below) + Encrypted MSIN (where MSIN has 10 digits i.e. 5 octets coded as hexadecimal digits using packed BCD coding, italic part below) + MAC tag (8 octets, last bolded part below) = 50 octets = 100 hexadecimal characters (NOTE: the encrypted content below is fictitious).

SUCI UTF-8 string:

"0-123-45-0002-1-17-**e9b9916c911f448d8792e6b2f387f85d3ecab9040049427d9edbb5431b0bc711***023be6a057***b45d936238aebeb7**"

- SUPI is NAI-based, SUPI = alice@example.com

SUPI type = 1 (Network Specific Identifier)

Routing Identifier: 84

Protection Scheme: 2 (Profile B)

Home Network Public Key Identifier: 250

Scheme output = ECC ephemeral public key (33 octets, first bolded part below) + Encrypted username of NAI (5 octets, italic part below) + MAC tag (8 octets, last bolded part below) = 46 octets = 92 hexadecimal characters (NOTE: the encrypted content below is fictitious)

SUCI UTF-8 string:

"1-example.com-84-2-250-**e9b9916c911f448d8792e6b2f387f85d3ecab9040049427d9edbb5431b0bc71195***023be6a057***b45d936238aebeb7**"

- SUPI is NAI-based; SUPI = 00-00-5E-00-53-00@operator.com

SUPI type: 3 (GCI)

Routing Identifier: 012

Protection Scheme: 0 (NULL scheme)

Home Network Public Key Identifier: 0

Scheme output = 00-00-5E-00-53-00 (cleartext)

SUCI UTF-8 string:

"3-operator.com-012-0-0-00-00-5E-00-53-00"

Annex D (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2017-10 | CT4#80 | C4-175320 |  |  |  | TS skeleton | 0.1.0 |
| 2017-10 | CT4#80 | C4-175362 |  |  |  | Implementation of pCRs agreed at CT4#80. | 0.2.0 |
| 2017-12 | CT4#81 | C4-176150 C4-176153 C4-176423 C4-176365 C4-176424 C4-176425 |  |  |  | Implementation of pCRs agreed at CT4#81 | 0.3.0 |
| 2018-01 | CT4#82 | C4-181277 C4-181278 C4-181239 C4-181241 C4-181245 C4-181280 C4-181282 C4-181131 C4-181247 C4-181284 C4-181250 C4-181273 C4-181252 C4-181254 |  |  |  | Implementation of pCRs agreed at CT4#82 | 0.4.0 |
| 2018-03 | CT4#83 | C4-182178 C4-182270 C4-182354 C4-182352 C4-182274 C4-182400 C4-182402 C4-182356 C4-182351 C4-182401 C4-182268 |  |  |  | Implementation of pCRs agreed at CT4#83 | 0.5.0 |
| 2018-04 | CT4#84 | C4-183124 C4-183143 C4-183221 C4-183225 C4-183228 C4-183230 C4-183232 C4-183234 C4-183244 C4-183300 C4-183302 C4-183304 C4-183305 C4-183306 C4-183307 C4-183308 C4-183374 C4-183381 C4-183382 C4-183425 C4-183427 C4-183430 C4-183480 C4-183483 C4-183486 C4-183508 C4-183509 |  |  |  | Implementation of pCRs agreed at CT4#84 | 0.6.0 |
| 2018-05 |  |  |  |  |  | "yaml files" added into the zip-file | 0.6.1 |
| 2018-05 | CT4#85 | C4-184351 C4-184356 C4-184210 C4-184211 C4-184358 C4-184359 C4-184558 C4-184559 C4-184381 C4-184556 C4-184423 C4-184557 C4-184310 C4-184572 C4-184622 |  |  |  | Implementation of pCRs agreed at CT4#85 | 0.7.0 |
| 2018-06 | CT#80 | CP-181001 |  |  |  | Presented for information and approval. | 1.0.0 |
| 2018-06 | CT#80 | CP-181196 |  |  |  | Approved in CT#80 | 15.0.0 |
| 2018-09 | CT#81 | CP-182056 | 0001 | 3 | B | UDM receives notification of target/new AMF after AMF planned removal | 15.1.0 |
| 2018-09 | CT#81 | CP-182170 | 0002 | 1 | F | DeregistrationData alignment with stage 2 | 15.1.0 |
| 2018-09 | CT#81 | CP-182172 | 0003 | 6 | F | Event subscription alignment with stage 2 | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0005 | 5 | F | Data Change Notification | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0004 | 1 | F | NfInstanceId | 15.1.0 |
| 2018-09 | CT#81 | CP-182049 | 0006 | 3 | F | UDM support for dynamic 5QIs and for standard 5QIs whose default QoS characteristics are overridden | 15.1.0 |
| 2018-09 | CT#81 | CP-182068 | 0007 | 4 | B | Add support for 5G Trace to Nudm\_SDM | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0008 | 4 | B | Shared Data | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0009 | 1 | F | Feature Negotiation | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0010 | 2 | F | Nudm\_SDM\_Get | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0011 | 1 | F | Allowing multiple monitoring reports in a single event occurrence notification | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0015 | 1 | F | UDM Data change notification | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0016 | 3 | F | Nudm\_SDM\_Info Service Operation Description | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0022 |  | F | Authentication Info Result | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0025 | 2 | B | Add MicoAllowed in am-data | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0026 | 2 | B | Introduction of PLMN Id in UECM & UE Authentication Services | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0028 | 2 | F | Mobility Restriction | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0029 | 1 | F | SMSF addresses | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0030 | 4 | F | SMS subscription data | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0031 |  | F | Clause Numbering | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0032 | 1 | F | Formal OpenAPI corrections | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0033 |  | F | GMLC | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0034 |  | F | AUSF Instance Id | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0036 | 2 | F | Avoid stale sdm-subscriptions | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0037 |  | B | Nudm\_SDM retrieval of SMS Management Subscription data | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0038 | 1 | F | Nudm\_UECM Errors | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0039 |  | F | P-CSCF restoration callbacks | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0040 | 1 | F | Nudm\_UEAU Errors | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0041 | 1 | F | Nudm\_EE Errors | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0042 | 1 | F | Nudm\_PP Errors | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0043 | 2 | F | UDM Group | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0045 | 1 | F | SUCI coding | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0046 | 2 | F | BackUp AMF Info | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0047 | 2 | F | Interworking with EPS indication | 15.1.0 |
| 2018-09 | CT#81 | CP-182171 | 0048 | 2 | F | Nudm\_SDM\_Subscribe for SMF | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0050 | 1 | F | User Plane Security Policy | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0051 |  | F | Description of Structured data types | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0054 | 1 | F | Provide DNN with LADN indicator per NSSAI | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0055 |  | F | UE Context In SMF Data Retrieval | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0057 |  | F | Time Stamp in EE Notify | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0058 |  | F | Naming Conventions | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0059 |  | F | Storage and retrieval of PGW FQDN | 15.1.0 |
| 2018-09 | CT#81 | CP-182056 | 0060 |  | F | API version number update | 15.1.0 |
| 2018-12 | CT#82 | CP-183014 | 0061 | 1 | F | Remove key attributes from map elements | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0062 | 2 | F | imsVoPS for non-3GPP access | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0063 | 2 | F | Internal-Group Identifier | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0064 | 2 | F | Stateless AMF support updates | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0065 | 2 | F | Location Reporting Configuration in Nudm\_EE service | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0066 | 1 | F | Nudm\_SDM Errors | 15.2.0 |
| 2018-12 | CT#82 | CP-183164 | 0067 | 4 | F | Shared Data completion | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0068 | 1 | F | Cardinality for arrays | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0069 | 5 | F | Single Registration Flag | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0070 | 2 | F | Adding headers for cache control and conditional request to the Nudm\_SubscriberDataManagement Service API | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0072 | 3 | F | Initial Registration | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0076 | 1 | F | Correcting Nudm\_UEAuthentication service description | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0078 | 1 | F | Add Serving Network Name to AuthEvent | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0079 | 2 | F | Remove PLMN-ID from AMF registration in OpenAPI | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0080 |  | F | Make ARP mandatory in QoS parameters | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0081 | 1 | F | RAT type | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0082 | 1 | F | Correction in UDM error and response codes | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0083 | 1 | F | Retrieving UE SMSF Context with its own URI | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0084 | 1 | F | Data type associated with Subscribed Default QoS for Default QoS Flow | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0085 | 1 | F | Alignment of pattern for External identifier | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0086 | 1 | F | Callback URI for Deregistration Notification | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0088 | 1 | F | Static Ip Address in DNN Configuration | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0090 |  | F | ImsVoPs type and attribute name correction | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0091 | 1 | F | Clarification on nullable attributes in AmfRegistration types | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0092 |  | F | Retrieval of multiple datasets | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0094 | 2 | F | DeRegistration Reason: Re-registration Required | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0095 |  | F | APIRoot Clarification | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0098 |  | F | Shared Data Ids | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0099 | 1 | F | Subscription lifetime | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0100 | 3 | F | Secured packet in SorInfo | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0103 | 1 | F | Abbreviations | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0104 | 1 | F | Nudm\_UECM\_Deregistration clarification | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0105 |  | F | Location Header | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0107 | 1 | F | SUCI Encoding | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0108 | 1 | F | S-NSSAI information in SmfRegistration | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0109 |  | F | SUCI NAI Clarification | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0110 | 1 | F | Bulk subscriptions in UDM NF correction | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0111 | 1 | F | Introduction of Barring | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0112 |  | F | UDM Corrections | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0114 | 2 | F | Optionality of OAuth2 | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0115 |  | F | Implement MCS priority indicator | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0116 |  | F | API version | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0117 | 1 | F | Shared Authentication Subscription | 15.2.0 |
| 2018-12 | CT#82 | CP-183014 | 0118 |  | F | ExternalDocs update | 15.2.0 |
| 2018-12 |  |  |  |  |  | 'TS29505\_Nudr\_DataRepository.yaml' changed to 'TS29505\_Subscription\_Data.yaml' in Nudm\_SDM API | 15.2.1 |
| 2019-03 | CT#83 | CP-190019 | 0119 | 1 | F | Content of attribute singleNssais | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0120 | 1 | F | Formal OpenAPI corrections | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0121 | 1 | F | SdmSubscription identification | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0122 | 1 | F | Clarification on SMS barring | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0123 | 1 | F | Allow retrieval of AMF registrations with SUPI | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0125 |  | F | Address Editor's Note on naming conventions | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0126 |  | F | Remove Editor's Note on authorization | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0127 |  | F | Remove Editor's Note on data retrieval | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0128 | 1 | F | Sdm Subscription Modification | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0130 | 1 | F | LADN Indicator removal | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0131 | 1 | F | Subscribed DNN List | 15.3.0 |
| 2019-03 | CT#83 | CP-190065 | 0134 | 2 | F | Emergency Session | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0137 | 1 | F | Application Errors | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0138 | 1 | F | Plmn ID in SdmSubscriptions | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0139 | 1 | F | URRP Indicator | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0141 | 1 | F | Handling of Multi-PDU during EPS Interworking | 15.3.0 |
| 2019-03 | CT#83 | CP-190152 | 0143 | 4 | F | UE parameters update support | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0144 | 1 | F | Cardinality of Dateset-names | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0145 | 2 | F | Removal of SharedAuthenticationSubscription | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0146 | 1 | F | Update method for event subscription | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0147 | 2 | F | SOR correction | 15.3.0 |
| 2019-03 | CT#83 | CP-190019 | 0148 | 1 | F | Storage of OpenAPI specification files | 15.3.0 |
| 2019-03 | CT#83 | CP-190204 | 0149 | 1 | F | API version update | 15.3.0 |
| 2019-06 | CT#84 | CP-191030 | 0150 | 1 | F | Location Header Description | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0151 |  | F | OperationId | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0154 | 1 | F | Adding SubsId to EESubscription | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0155 | 2 | F | Essential Corrections and Re-arrange Clause Structure | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0156 | 2 | F | Partial Deletion of Monitored Resources | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0158 | 1 | F | Correct the reference in ServingNetworkName in AuthenticationInfoRequest | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0160 | 3 | F | Add trace data retrieval procedure | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0161 | 1 | F | Group Identifier Translation | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0162 |  | F | SUCI with Null Protection Scheme | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0164 |  | F | CR 0128r1 was not correctly implemented | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0166 | 1 | F | Storage of OpenAPI specification files | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0167 | 1 | F | Sdm-Subscription incorrect attribute name | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0168 | 1 | F | Location header in redirect response | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0169 |  | F | Application error correction | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0193 | 1 | F | Storage of SubscriptionId | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0195 | 1 | F | Shared Data Ids | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0196 | 1 | F | Copyright Note in YAML files | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0201 |  | F | ODB for SMF | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0202 | 2 | F | SUCI encoding | 15.4.0 |
| 2019-06 | CT#84 | CP-191030 | 0204 |  | F | 3GPP TS 29.503 API version update | 15.4.0 |
| 2019-06 | CT#84 | CP-191050 | 0163 | 3 | B | Nudm\_NIDDAuthorization service | 16.0.0 |
| 2019-06 | CT#84 | CP-191957 | 0170 | 1 | B | Non cacheable 501 response | 16.0.0 |
| 2019-06 | CT#84 | CP-191050 | 0176 | 2 | B | Add PDU Session continuity at inter RAT mobility to and from NB-IoT in SM Subscription data | 16.0.0 |
| 2019-06 | CT#84 | CP-191050 | 0177 | 2 | B | Add Service Gap timer in AM subscription Data t to support Overload Control for small data | 16.0.0 |
| 2019-06 | CT#84 | CP-191050 | 0178 | 2 | B | Update SM data supporting small data transfer | 16.0.0 |
| 2019-06 | CT#84 | CP-191057 | 0197 | 1 | B | Subscription to event "Change of Core Network Type" | 16.0.0 |
| 2019-06 | CT#84 | CP-191057 | 0199 |  | B | Subscription Data for Tracing | 16.0.0 |
| 2019-06 | CT#84 | CP-191048 | 0203 |  | F | 3GPP TS 29.503 API version update | 16.0.0 |
| 2019-09 | CT#85 | CP-192103 | 0211 | 1 | A | DNN Barring | 16.1.0 |
| 2019-09 | CT#85 | CP-192103 | 0221 | 1 | A | Monitored Resource URI | 16.1.0 |
| 2019-09 | CT#85 | CP-192123 | 0206 | 1 | B | Network Slicing Subscription Change | 16.1.0 |
| 2019-09 | CT#85 | CP-192191 | 0207 | 2 | B | P-CSCF Restoration Trigger | 16.1.0 |
| 2019-09 | CT#85 | CP-192191 | 0209 |  | B | SMS Alerting | 16.1.0 |
| 2019-09 | CT#85 | CP-192032 | 0212 | 1 | B | Closed Access Group | 16.1.0 |
| 2019-09 | CT#85 | CP-192133 | 0213 | 2 | B | VN-Group parameter provisioning | 16.1.0 |
| 2019-09 | CT#85 | CP-192188 | 0214 | 1 | B | Providing 5G SRVCC Related Subscription to AMF | 16.1.0 |
| 2019-09 | CT#85 | CP-192188 | 0215 | 1 | B | Report 5G SRVCC Capability to UDM | 16.1.0 |
| 2019-09 | CT#85 | CP-192123 | 0216 |  | F | Retrieve Subscribed S-NSSAI from UDM by PGW+SMF | 16.1.0 |
| 2019-09 | CT#85 | CP-192187 | 0217 | 1 | B | Subscription on redundant sessions | 16.1.0 |
| 2019-09 | CT#85 | CP-192123 | 0219 | 2 | B | Indicating partially implemented PATCH | 16.1.0 |
| 2019-09 | CT#85 | CP-192026 | 0222 | 3 | B | Slice Specific Authentication and Authorization Data | 16.1.0 |
| 2019-09 | CT#85 | CP-192123 | 0223 | 1 | F | UDM Application errors | 16.1.0 |
| 2019-09 | CT#85 | CP-192025 | 0224 | 2 | B | 5G VN group data | 16.1.0 |
| 2019-09 | CT#85 | CP-192123 | 0225 | 2 | F | Correction on the subscription Id sent to the consumer | 16.1.0 |
| 2019-09 | CT#85 | CP-192132 | 0228 | 3 | B | Add NB-IoT UE Priority in AM subscription data | 16.1.0 |
| 2019-09 | CT#85 | CP-192132 | 0229 | 3 | B | Granted Validity Time for NIDD authorisation | 16.1.0 |
| 2019-09 | CT#85 | CP-102132 | 0232 |  | F | Correction of CN Type change event | 16.1.0 |
| 2019-09 | CT#85 | CP-192132 | 0233 | 2 | B | Network configuration Parameters Provisioning | 16.1.0 |
| 2019-09 | CT#85 | CP-192092 | 0234 | 3 | B | Expected UE Behaviour Parameters provision | 16.1.0 |
| 2019-09 | CT#85 | CP-192132 | 0235 | 2 | B | Id translation for MSISDN-less MO SMS service | 16.1.0 |
| 2019-09 | CT#85 | CP-192123 | 0239 |  | F | Correction to sharedDataSubscription description | 16.1.0 |
| 2019-09 | CT#85 | CP-192135 | 0241 |  | B | Services invoked by NWDAF | 16.1.0 |
| 2019-09 | CT#85 | CP-192120 | 0243 |  | F | API Version Update | 16.1.0 |
| 2019-12 | CT#86 | CP-193027 | 0268 | 2 | A | Missing AssociationType parameter | 16.2.0 |
| 2019-12 | CT#86 | CP-193054 | 0208 | 5 | B | Domain Selection Info Retrieval | 16.2.0 |
| 2019-12 | CT#86 | CP-193048 | 0247 |  | B | Subscribed NSSAI from the UDM | 16.2.0 |
| 2019-12 | CT#86 | CP-193050 | 0250 | 2 | B | Serving Network Name in SNPN | 16.2.0 |
| 2019-12 | CT#86 | CP-193046 | 0252 | 3 | B | QoS for wireline access network | 16.2.0 |
| 2019-12 | CT#86 | CP-193055 | 0253 | 2 | B | LCS privacy | 16.2.0 |
| 2019-12 | CT#86 | CP-193055 | 0254 | 1 | B | Mobile Originated Data | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0255 | 4 | B | Retrieve Enhance Coverage Restriction Data | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0256 | 5 | B | Update Enhance Coverage Restriction Data | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0258 | 6 | B | BatteryIndication and scheduledCommunicationType parameter provision | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0259 | 2 | F | Correct Identifier Translation in Resource Overview | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0260 | 1 | B | Extend PpDlPacketCount | 16.2.0 |
| 2019-12 | CT#86 | CP-193279 | 0261 | 6 | B | UE expected behaviour in SDM | 16.2.0 |
| 2019-12 | CT#86 | CP-193050 | 0262 | 2 | B | 5G VN group data in SharedData | 16.2.0 |
| 2019-12 | CT#86 | CP-193050 | 0263 | 1 | B | 5G VN group data in PP | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0265 | 4 | B | Network Configuration Parameters in SDM | 16.2.0 |
| 2019-12 | CT#86 | CP-193063 | 0266 | 1 | B | Location report for non-3GPP access | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0269 |  | B | Downlink Data Delivery Status Event | 16.2.0 |
| 2019-12 | CT#86 | CP-193036 | 0270 | 2 | F | Correction on notifications for AMF registration in UDM | 16.2.0 |
| 2019-12 | CT#86 | CP-193027 | 0272 | 1 | A | Nssai Inclusion Allowed | 16.2.0 |
| 2019-12 | CT#86 | CP-193027 | 0280 |  | A | Regular Expression of SuciOrSupi | 16.2.0 |
| 2019-12 | CT#86 | CP-193027 | 0299 |  | A | Availability after DDN Failure | 16.2.0 |
| 2019-12 | CT#86 | CP-193031 | 0300 | 1 | A | Wildcard DNN | 16.2.0 |
| 2019-12 | CT#86 | CP-193027 | 0302 |  | A | Content Types in Nudm\_EE | 16.2.0 |
| 2019-12 | CT#86 | CP-193050 | 0275 |  | B | NID in AMF Registration | 16.2.0 |
| 2019-12 | CT#86 | CP-193063 | 0276 |  | F | Registration Time | 16.2.0 |
| 2019-12 | CT#86 | CP-193053 | 0281 |  | B | Group Identifier Translation | 16.2.0 |
| 2019-12 | CT#86 | CP-193036 | 0282 | 1 | B | Updating support for subscription-based access restriction | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0283 | 2 | B | NIDD Authorization Update Notify | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0284 | 1 | B | NIDD Authorization Authorize | 16.2.0 |
| 2019-12 | CT#86 | CP-193063 | 0287 | 1 | B | Subscription level Charging Characteristics | 16.2.0 |
| 2019-12 | CT#86 | CP-193281 | 0288 | 4 | B | SMF Instance Id retrieval | 16.2.0 |
| 2019-12 | CT#86 | CP-193280 | 0289 | 4 | B | Expected UE Behaviour parameters | 16.2.0 |
| 2019-12 | CT#86 | CP-193046 | 0290 | 1 | B | ACS information in ParameterProvision | 16.2.0 |
| 2019-12 | CT#86 | CP-193046 | 0291 | 1 | B | ACS information | 16.2.0 |
| 2019-12 | CT#86 | CP-193046 | 0292 | 2 | B | Authentication Indication from W-AGF | 16.2.0 |
| 2019-12 | CT#86 | CP-193039 | 0293 |  | B | Indication of access from ePDG | 16.2.0 |
| 2019-12 | CT#86 | CP-193057 | 0294 | 1 | B | DeregistrationNotification for SMF Context Transfer | 16.2.0 |
| 2019-12 | CT#86 | CP-193052 | 0295 | 2 | B | Group Reporting Guard Time | 16.2.0 |
| 2019-12 | CT#86 | CP-193036 | 0296 | 1 | F | Add reference to TS 29.524 | 16.2.0 |
| 2019-12 | CT#86 | CP-193282 | 0297 | 5 | B | Frame Routes | 16.2.0 |
| 2019-12 | CT#86 | CP-193063 | 0303 | 2 | B | Subscription Data Consistency with Immediate Report | 16.2.0 |
| 2019-12 | CT#86 | CP-193055 | 0305 |  | F | Revisions on UDM Reference Model Figure | 16.2.0 |
| 2019-12 | CT#86 | CP-193049 | 0306 | 1 | F | NIDD Configuration | 16.2.0 |
| 2019-12 | CT#86 | CP-193054 | 0307 | 2 | B | Retrieval of Authentication Vectors for HSS | 16.2.0 |
| 2019-12 | CT#86 | CP-193044 | 0310 |  | F | API version update | 16.2.0 |
| 2020-03 | CT#87e | CP-200019 | 0244 | 2 | B | AMF Deregistration | 16.3.0 |
| 2020-03 | CT#87e | CP-200039 | 0311 | 1 | F | Add Corresponding API descriptions in clause 5.1 | 16.3.0 |
| 2020-03 | CT#87e | CP-200032 | 0312 | 1 | F | NID | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0313 | 1 | F | Copyright Note | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0314 | 1 | F | References | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0315 | 2 | F | Eps Interworking Info | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0317 | 1 | F | Presence condition of monitoredResourceUris in SdmSubsModification | 16.3.0 |
| 2020-03 | CT#87e | CP-200176 | 0318 | 3 | B | Nudm\_MT service completion | 16.3.0 |
| 2020-03 | CT#87e | CP-200019 | 0319 | 1 | B | Nudm\_MT\_ProvideLocationInfo service operation | 16.3.0 |
| 2020-03 | CT#87e | CP-200035 | 0320 | 1 | F | Spare Data Type Definition of RgAuthenticationInfo | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0321 | 1 | F | Clarification on SM-Data Retrieval | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0322 | 2 | B | NF deregistrations | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0323 | 1 | F | Supported Features in PATCH | 16.3.0 |
| 2020-03 | CT#87e | CP-200019 | 0324 | 1 | B | STN-SR | 16.3.0 |
| 2020-03 | CT#87e | CP-200029 | 0327 | 2 | F | Dynamic SOR update trigger | 16.3.0 |
| 2020-03 | CT#87e | CP-200033 | 0328 | 1 | B | Availability after DDN Failure Event | 16.3.0 |
| 2020-03 | CT#87e | CP-200033 | 0329 | 1 | B | Configuration of Downlink data delivery status Events | 16.3.0 |
| 2020-03 | CT#87e | CP-200240 | 0330 | 1 | B | External Group Identifier in NIDD information | 16.3.0 |
| 2020-03 | CT#87e | CP-200033 | 0331 | 3 | B | Retrieve the status of Enhanced Coverage Restriction | 16.3.0 |
| 2020-03 | CT#87e | CP-200239 | 0332 | 3 | B | Subscribed eDRX and PTW value | 16.3.0 |
| 2020-03 | CT#87e | CP-200033 | 0333 |  | B | Provision of parameters Maximum Response Time and Maximum Latency | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0334 | 2 | B | Optionality of ProblemDetails | 16.3.0 |
| 2020-03 | CT#87e | CP-200031 | 0335 | 2 | B | ATSSS Support Indication in UE Subscription | 16.3.0 |
| 2020-03 | CT#87e | CP-200016 | 0336 | 1 | B | SMF Set ID in SMF Registration | 16.3.0 |
| 2020-03 | CT#87e | CP-200016 | 0337 | 1 | B | SMSF Set ID in SMSF Registration | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0338 |  | B | SMF Registration Retrieval | 16.3.0 |
| 2020-03 | CT#87e | CP-200045 | 0339 |  | B | Clarification on ODB Setting | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0340 | 1 | F | Registration Time for NF Registration | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0341 | 1 | B | Patch Result for partial PATCH | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0342 |  | F | EpsIwkPgw for EPS interworking | 16.3.0 |
| 2020-03 | CT#87e | CP-200031 | 0345 |  | B | Update on additionalSnssaiData | 16.3.0 |
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