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# Contents

# 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:

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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

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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 Specification Version 3.0.0", https://spec.openapis.org/oas/v3.0.0.

[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 33.535: "Authentication and Key Management for Applications (AKMA) based on 3GPP credentials in the 5G System (5GS)".

[56]        3GPP TS 37.355: "LTE Positioning Protocol (LPP)".

[57]        3GPP TS 23.304: "Proximity based Services (ProSe) in the 5G System (5GS)".

[58]        3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

[59]        3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services; Stage 2".

[60]        3GPP TS 23.548: "5G System Enhancements for Edge Computing; Stage 2".

[61]        3GPP TS 33.220: "Generic Authentication Architecture (GAA); Generic Bootstrapping Architecture (GBA)".

[62]        3GPP TS 29.563: "5G System; Home Subscriber Server (HSS) services for interworking with Unified Data Management (UDM); Stage 3"

[63]        3GPP TS 33.558: "Security aspects of enhancement of support for enabling edge applications; Stage 2".

[64]        3GPP TS 33.503: " Security Aspects of Proximity based Services (ProSe) in the 5G System (5GS)".

[65]        3GPP TS 29.562: "5G System; Home Subscriber Server (HSS) Services; Stage 3"

[66]        3GPP TS 23.540: " 5G System; Technical realization of Service Based Short Message Service; Stage 2".

[67]        3GPP TS 32.256: "Charging management; 5G connection and mobility domain charging; Stage 2".

# 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 |
| 5G PKMF | 5G ProSe Key Management Function |
| 5G ProSe | 5G Proximity-based Services |
| ACS | Auto-Configuration Server |
| AKMA | Authentication and Key Management for Applications |

| | |
|---|---|
| AMF | Access and Mobility Management Function |
| AUSF | Authentication Server Function |
| DCCF | Data Collection Coordination Function |
| DNN | Data Network Name |
| EES | Edge Enabler Server |
| 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 |
| NIDD | Non-IP Data Delivery |
| 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, AUSF, HSS, GBA's BSF, SMS-GMSC, DCCF, 5GDDNMF, PAnF and 5G PKMF via the Nudm service-based interface (see 3GPP TS 23.501 [2], 3GPP TS 23.502 [3], 3GPP TS 23.288 [35], GPP TS 23.304 [57], 3GPP TS 23.540 [66], and 3GPP TS 33.503[64]).

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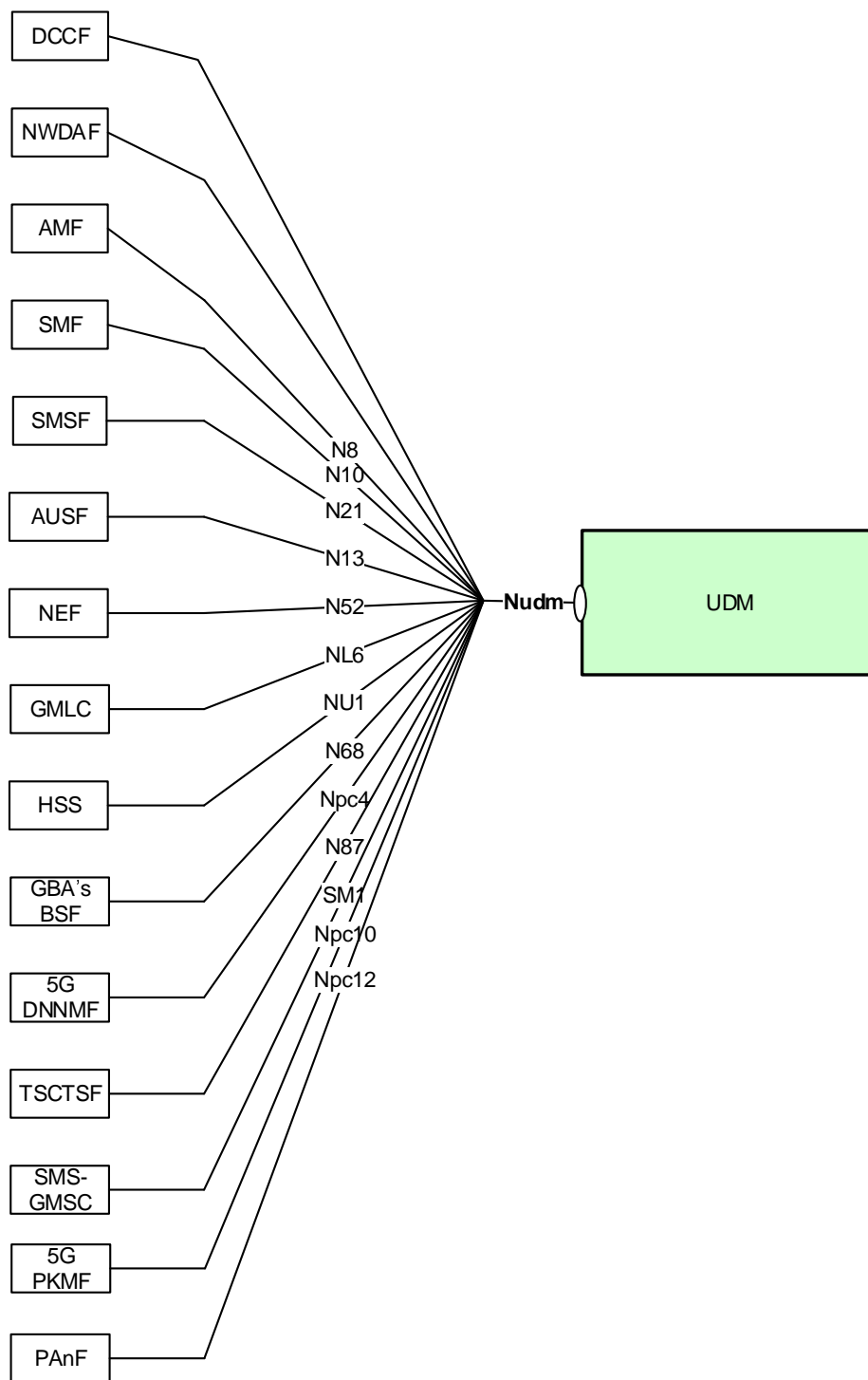
**Figure 4.1-1: Reference model – UDM**

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 Service

- Nudm_MT Service

- Nudm_ServiceSpecificAuthorization Service

- Nudm_ReportSMDeliveryStatus Service

- Nudm_UEIdentifier Service

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 |
| Nudm_ServiceSpecificAuthorization | 6.8 | UDM Service Specific Authorization Service | TS29503_Nudm_SSAU.yaml | nudm-ssau | A.9 |
| Nudm_ReportSMDeliveryStatus | 6.9 | UDM Report SM-Delivery Status Service | TS29503_Nudm_RSDS.yaml | nudm-rsds | A.10 |
| Nudm_UEIdentifier | 6.10 | UDM UE Identifier Service | TS29503_Nudm_UEID.yaml | nudm-ueid | A.11 |

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, NEF, 5G DDNMF, NWDAF, DCCF, trusted AF) 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 unless the shared data is already cached. The retrieved shared data shall be cached as long as the consumer NF serves an UE for which the shared data is relevant.

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, NEF, GMLC, 5G DDNMF, NWDAF, DCCF, trusted AF) 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

- Group Identifier Translation

- 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

- ProSe Subscription Data Retrieval

- Individual Shared Subscription Data Retrieval

- 5MBS Subscription Data Retrieval

- User Consent Subscription Data Retrieval

- Multiple Identifiers Translation

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 unless the feature SharedDataTreatment is supported in which case treatment instructions may be applicable; shared data "SharedDataX" identified by a sharedDataId X takes precedence over shared data "SharedDataY" identified by a sharedDataId Y if X appears immediately before Y within the list of SharedDataIds in the UE-individual data unless the feature SharedDataTreatment is supported in which case the treatment instructions associated to SharedDataY are applicable after treatment instructions associated to SharedDataX have been applied.

#### 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).
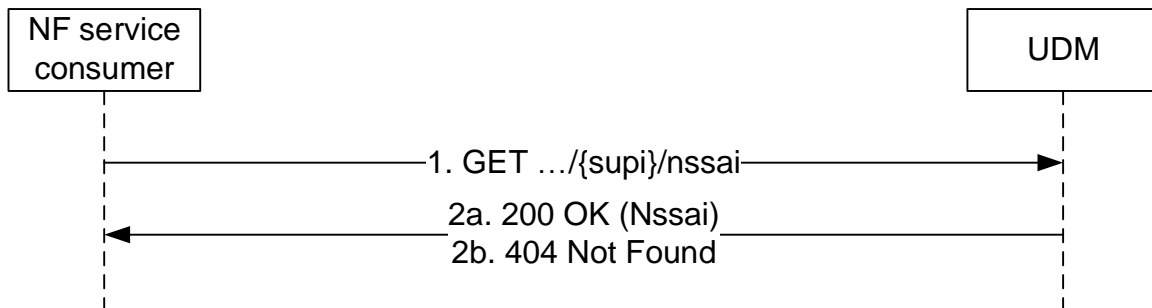


**Figure 5.2.2.2.2-1: Requesting a UE's NSSAI**

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).
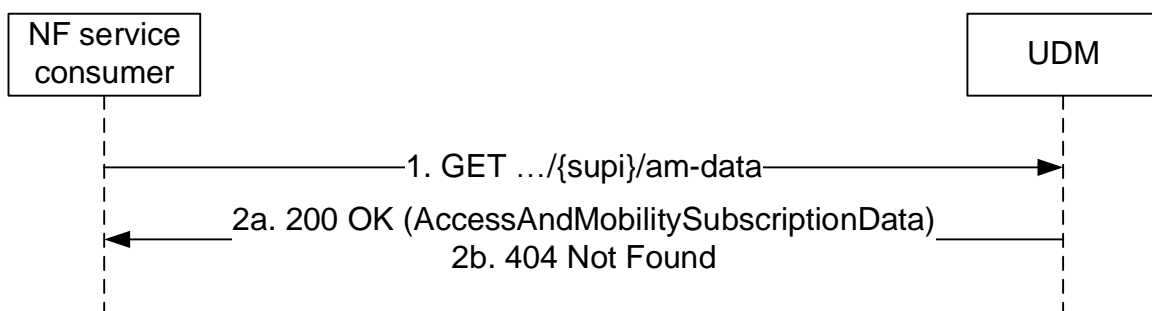


**Figure 5.2.2.2.3-1: Requesting a UE's Access and Mobility Subscription Data**

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). As described in clause C.2 of 3GPP°TS°23.122 [20] (step 4), if UDM supports SOR-CMCI, then UDM indicates in the response to NF service consumer (i.e. AMF) to send acknowledgement that will include the "ME support of SOR-CMCI". UDM will also delete the "ME support of SOR-CMCI" updating AuthenticationSoR of Nudr_DataRepository service as specified in 3GPP TS 29.505 [10] clause 5.2.25, if the UE is performing initial registration or emergency registration. UDM will decide whether to provide SOR-CMCI based on "usimSupportOfSorCmci" retrieved via AuthenticationSoR of Nudr_DataRepository service as specified in 3GPP TS 29.505 [10] clause 5.2.25.

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]).

NOTE 3: If UPU data have previously been provisioned, but have not yet been acknowledged by the UE, e.g. because no AMF was registered at provisioning time, the UDM needs to convey the UPU data (after AUSF protection) within 200 OK AccessAndMobilitySubscriptionDatato to the AMF.

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).
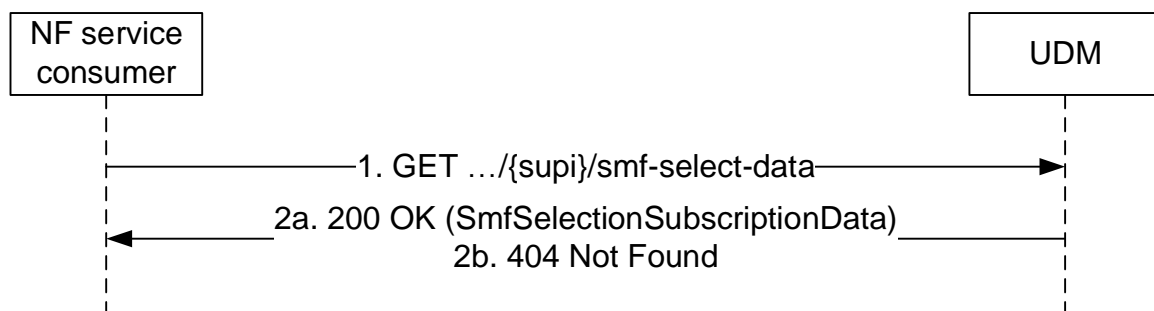


**Figure 5.2.2.2.4-1: Requesting a UE's SMF Selection Subscription Data**

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).
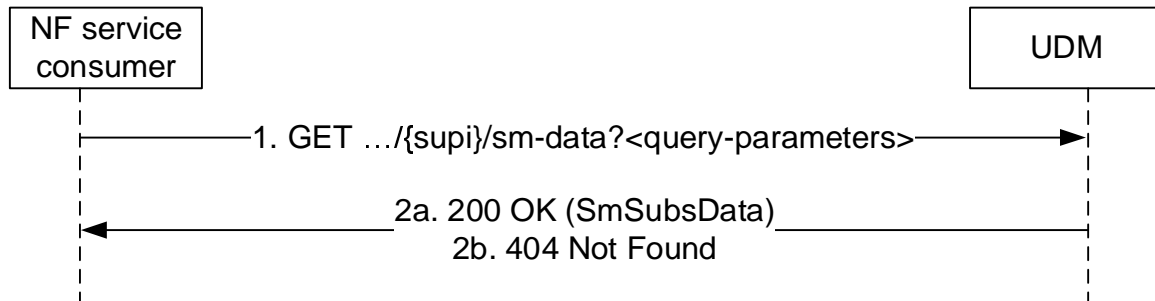


**Figure 5.2.2.2.5-1: Requesting a UE's Session Management Subscription Data**

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 and/or SharedDataIds, 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).
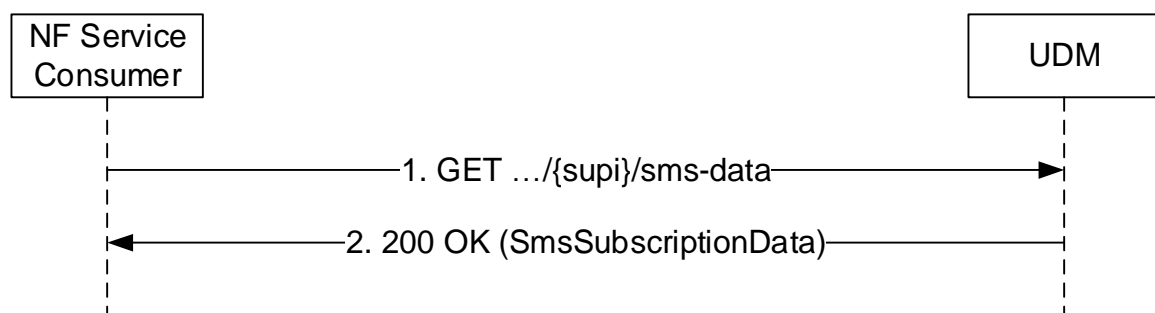


**Figure 5.2.2.2.6-1: Requesting UE's SMS Subscription Data**

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).
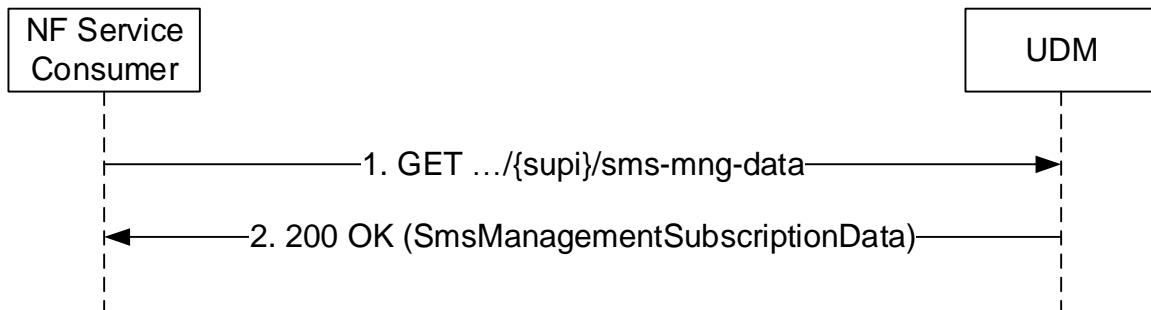


**Figure 5.2.2.2.7-1: Requesting UE's SMS Management Subscription Data**

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, NWDAF, DCCF) 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).
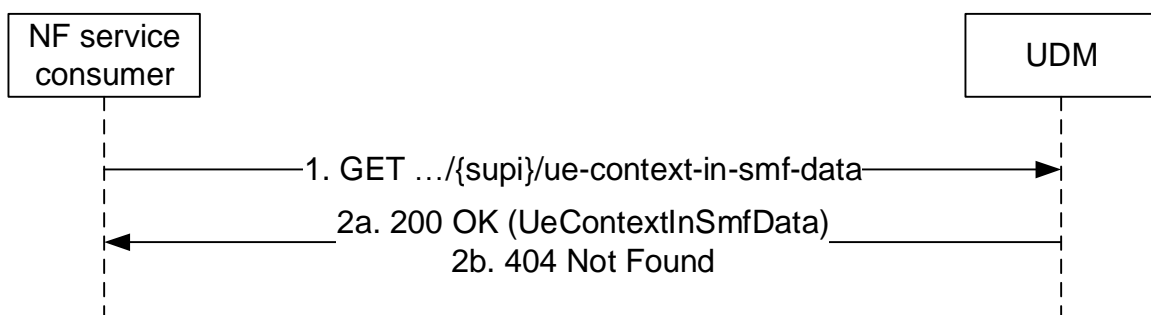


**Figure 5.2.2.2.8-1: Requesting a UE's Context in SMF Data**

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. If no PDU session is stored in the UDM the UEContextInSmfData within "200 OK" shall be empty.

2b. If there is no valid subscription data for the UE, HTTP status code "404 Not Found" may 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). The data sets allowed in multiple data sets retrieval are listed in table 6.1.6.3.3-1.
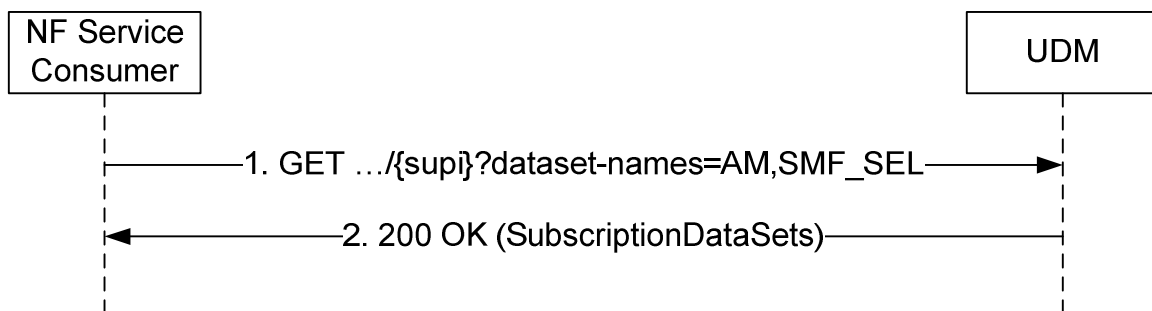


**Figure 5.2.2.2.9-1: Retrieval of Multiple Data Sets**

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, clause 4.13.7.2) and clause 4.15.z. 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.
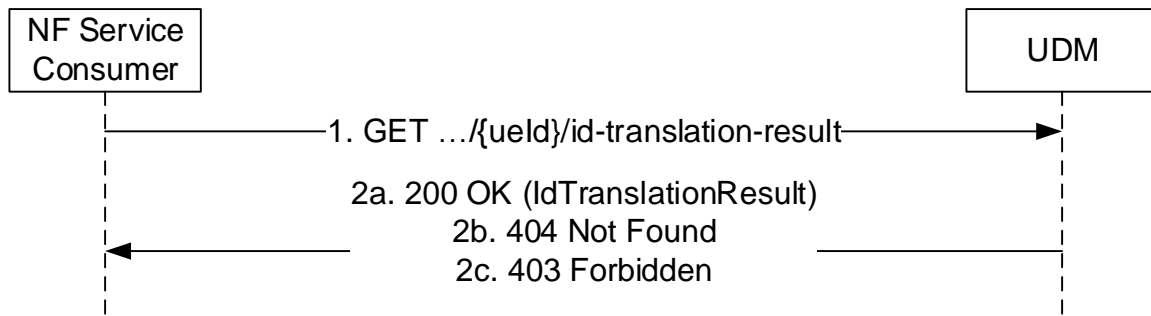
**Figure 5.2.2.2.10-1: Identifier Translation**

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 necessary information used for identifier translation (e.g. af-id, app-port-id, etc.).

2a. On success, the UDM shall respond with "200 OK" with the message body containing the UE's requested identity (GPSI or SUPI).

　　If the expected result of identifier translation is GPSI and the AF specific query parameters (e.g. af-id, app-port-id, af-service-id, mtc-provider-info, etc) are provided, the UDM shall take the provided AF specific information into account to determine the GPSI (i.e. External Identifier) to be returned for the UE.

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 AF included in the request is 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.

### 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 (supported-features, shared-data-ids).
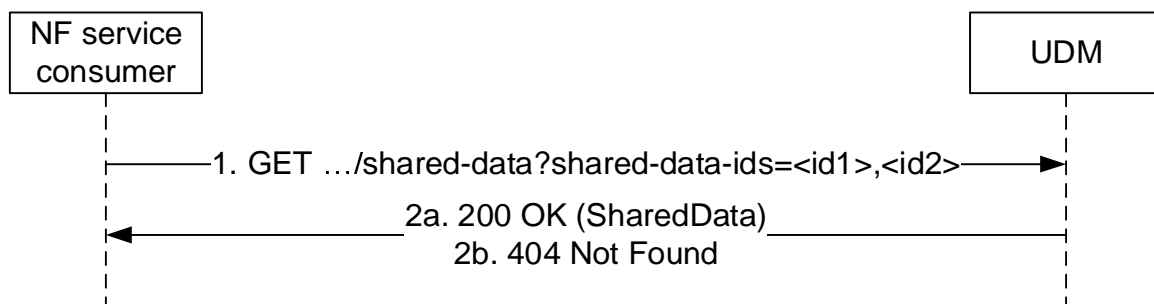


**Figure 5.2.2.2.11-1: Requesting shared data**

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

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).
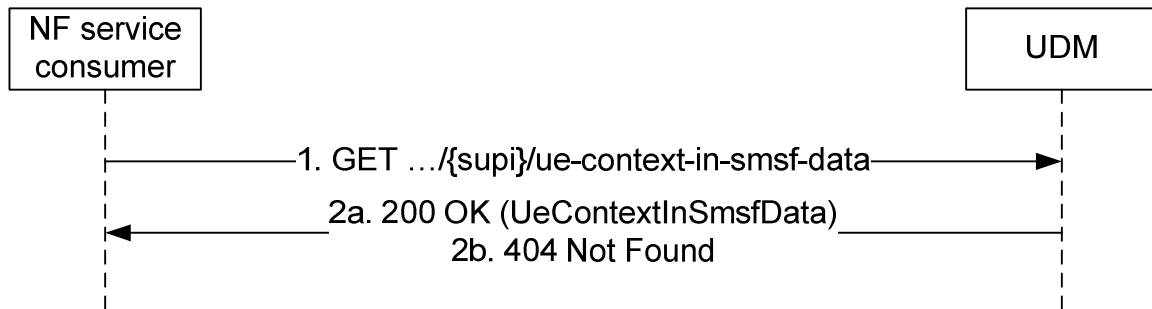


**Figure 5.2.2.2.12-1: Requesting a UE's Context in SMSF Data**

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.
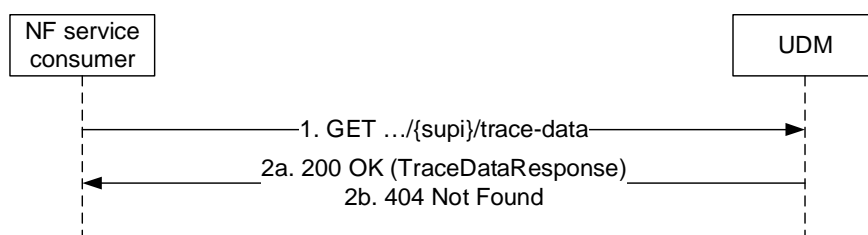


**Figure 5.2.2.2.13-1: Requesting a UE's trace Data**

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 (e.g NEF, GMLC) 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.

The NF service consumer (e.g TSCTSF) may also send a request to the UDM to receive the list of the UE identifiers (e.g. SUPIs) that corresponds to the provided External Group Identifier (see 3GPP TS 23.502 [3] clause 4.15.9.2 and clause 4.15.9.4)
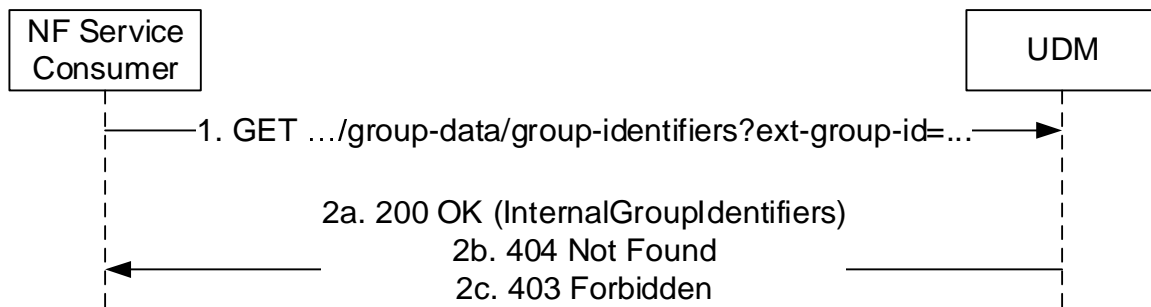


**Figure 5.2.2.2.14-1: External Group Identifier Translation**

1. The NF Service Consumer (e.g. NEF, GMLC, TSCTSF) 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.

2a. On success, 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.

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

2c. If the AF included in the request is not allowed to perform this operation for the group, 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.

Figure 5.2.2.2.14-2 shows another scenario where the NF service consumer (e.g NEF, GMLC) 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 or the NF service consumer (e.g TSCTSF) sends a request to the UDM to receive the list of the UE identifiers (e.g. SUPIs) that corresponds to the provided Internal Group Identifier (see 3GPP TS 23.502 [3] clause 4.15.9.2 and clause 4.15.9.4).
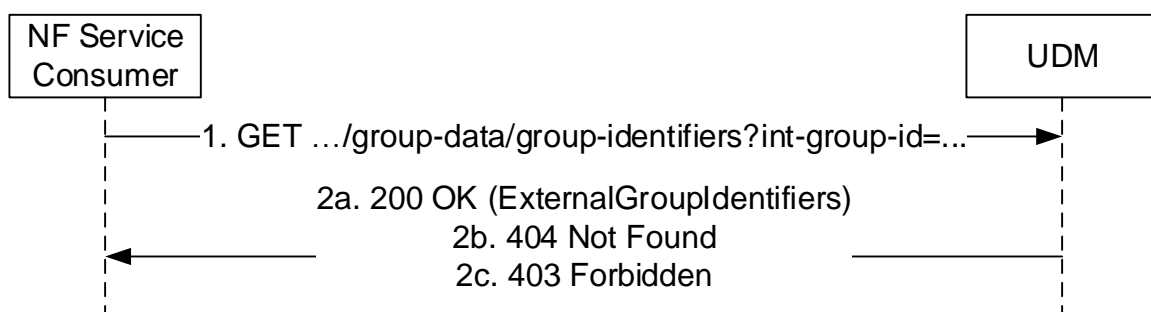


**Figure 5.2.2.2.14-2: Internal Group Identifier Translation**

1. The NF Service Consumer (e.g. NEF, GMLC, TSCTSF) 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.

2a. On success, 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 Internal Group Identifier.

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

2c. If the AF included in the request is not allowed to perform this operation for the group, 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.

### 5.2.2.2.15 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).
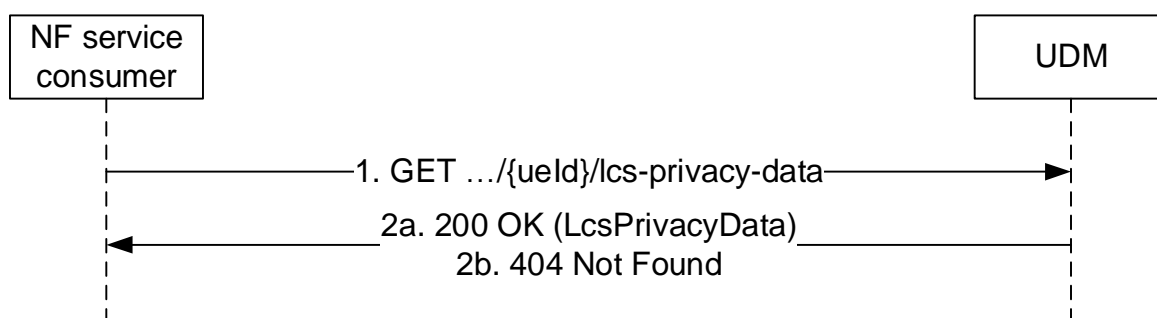


**Figure 5.2.2.2.15-1: Requesting a UE's LCS Privacy Data**

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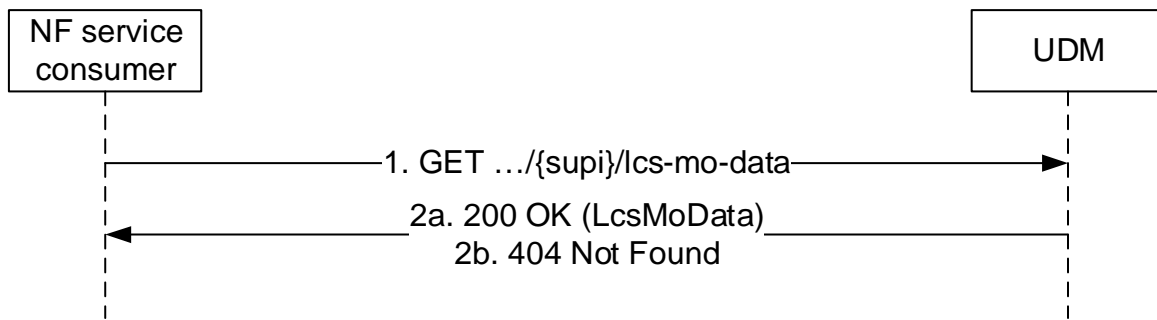
**Figure 5.2.2.2.16-1: Requesting a UE's LCS Mobile Originated Data**

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).
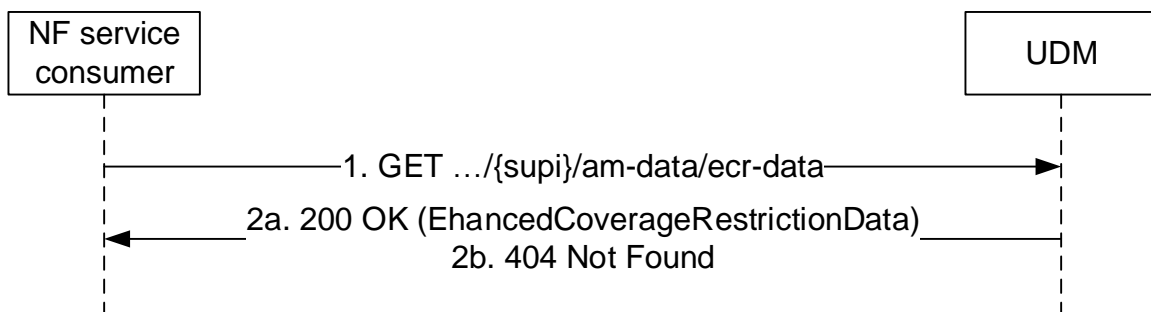


**Figure 5.2.2.2.17-1: NF service consumer retrieves Enhance Coverage Restriction Data**

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).
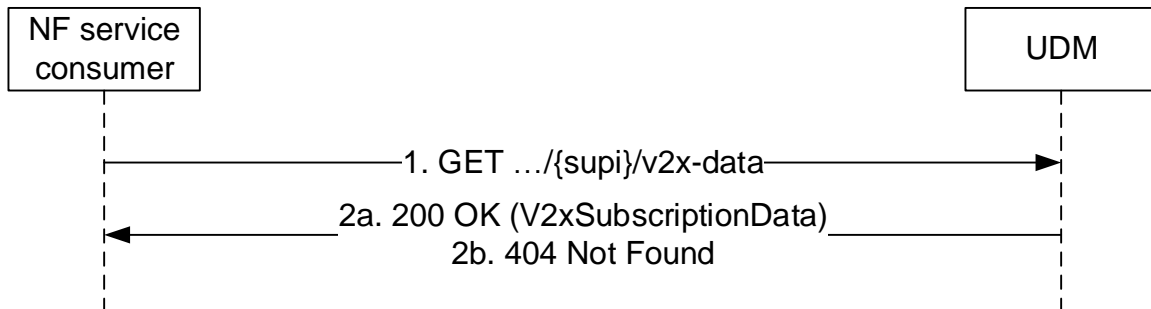


**Figure 5.2.2.2.18-1: NF service consumer retrieves V2X Subscription Data**

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).
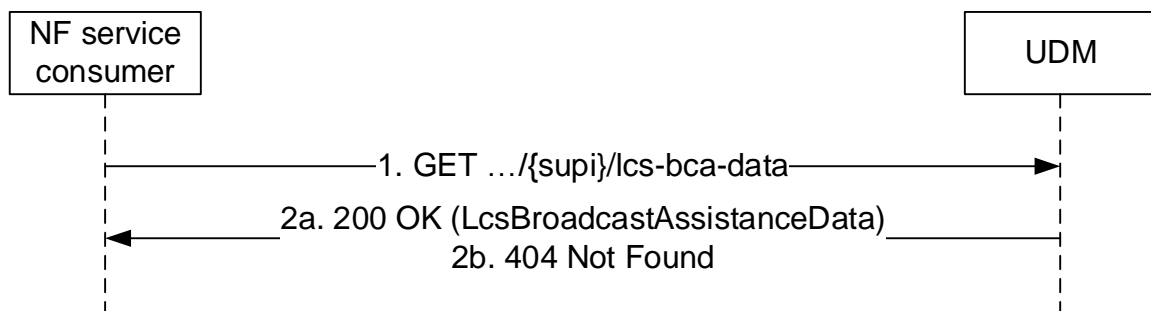


**Figure 5.2.2.2.19-1: Requesting a UE's LCS Broadcast Assistance Subscription Data**

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, NWDAF, DCCF) sends a request to the UDM to receive the UE's Context In AMF data (see 3GPP TS 23.632 [32] figure 5.3.4-1 step 2 and 3 and also 3GPP TS 23.288[35]). The request contains the UE's identity (/{supi}), the type of the requested information (/ue-context-in-amf-data) and query parameters (supported-features).
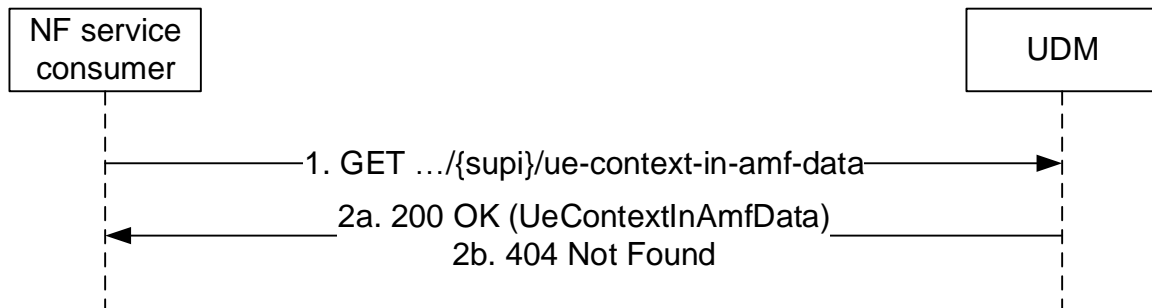


**Figure 5.2.2.2.20-1: Requesting a UE's Context in AMF Data**

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} and query parameters (supported-features)).
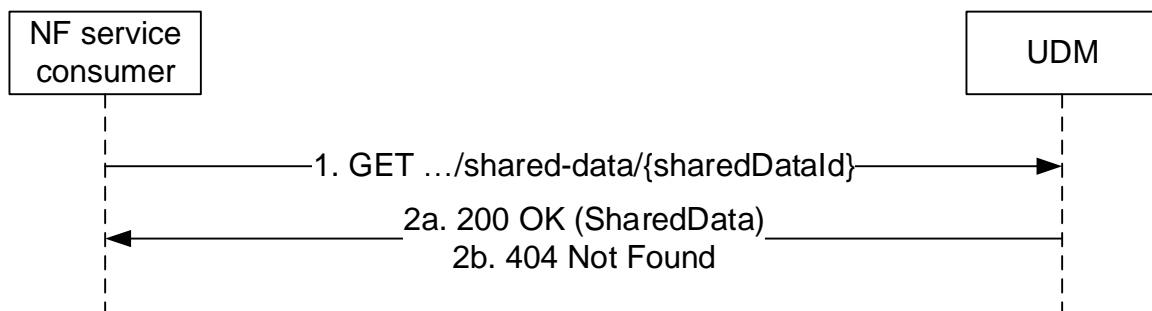


**Figure 5.2.2.2.21-1: Requesting shared data**

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.

### 5.2.2.2.22　　　Prose Subscription Data Retrieval

Figure 5.2.2.2.22-1 shows a scenario where the NF service consumer (e.g. 5G DDNMF, 5G PKMF, PAnF) sends a request to the UDM to receive the UE's ProSe Subscription Data. The request contains the UE's identity (/{supi}), the type of the requested information (/prose-data) and query parameters (supported-features).
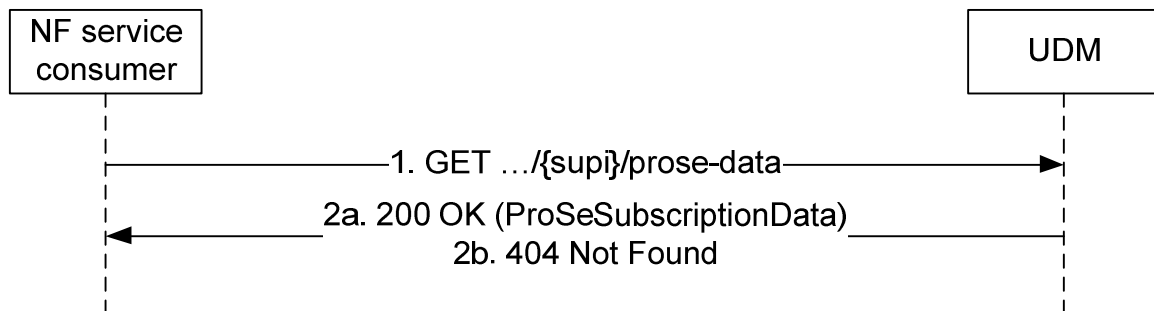


**Figure 5.2.2.2.22-1: Requesting a UE's ProSe Subscription Data**

1.　The NF service consumer (e.g. 5G DDNMF, 5G PKMF, PAnF) sends a GET request to the resource representing the UE's ProSe 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 ProSe Data as relevant for the requesting NF service consumer.

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.

### 5.2.2.2.23　　　5MBS Subscription Data Retrieval

Figure 5.2.2.2.23-1 shows a scenario where the NF service consumer (e.g. SMF) sends a request to the UDM to receive the UE's 5MBS Subscription Data. The request contains the UE's identity (/{supi}), the type of the requested information (/mbs-data) and query parameters (supported-features).
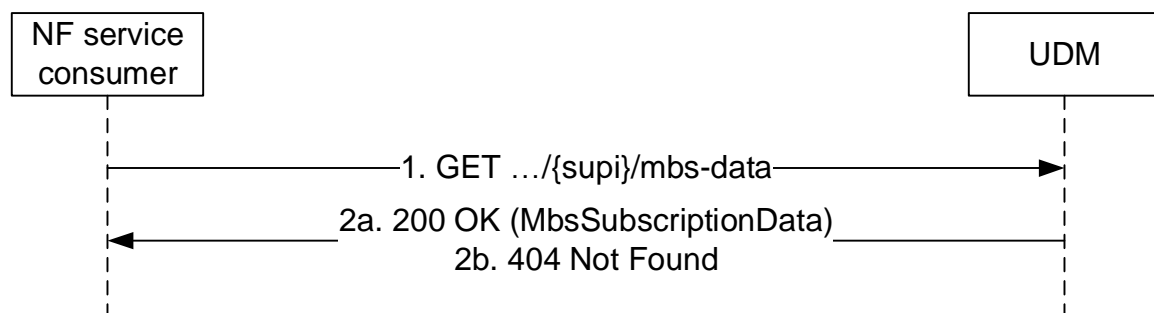


**Figure 5.2.2.2.23-1: Requesting a UE's 5MBS Subscription Data**

1.　The NF service consumer (e.g. SMF) sends a GET request to the resource representing the UE's 5MBS 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 5MBS Subscription Data as relevant for the requesting NF service consumer.

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.

### 5.2.2.2.24　　　User Consent Subscription Data Retrieval

Figure 5.2.2.2.24-1 shows a scenario where the NF service consumer (e.g. NWDAF, DCCF, NEF, trusted AF) sends a request to the UDM to receive the UE's User Consent Subscription Data. The request contains the UE's identity (/{supi}), the type of the requested information (/uc-data) and query parameters (uc-purpose and/or supported-features).
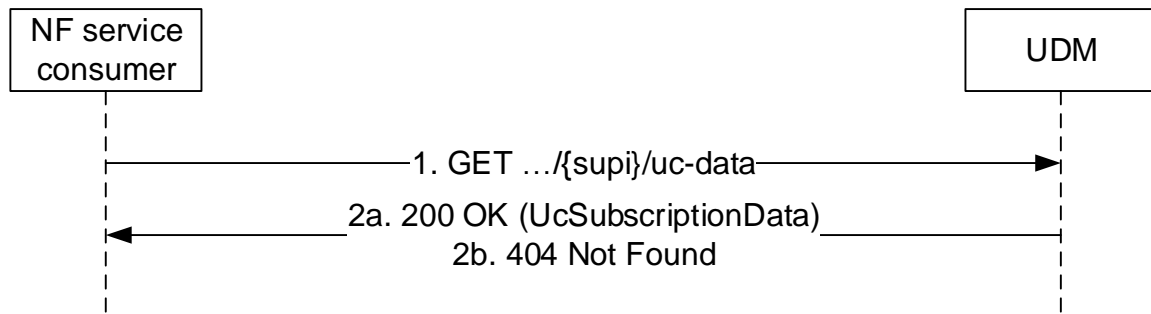
**Figure 5.2.2.2.24-1: Requesting a UE's User Consent Subscription Data**

1. The NF service consumer (e.g. NWDAF, DCCF, NEF, trusted AF) sends a GET request to the resource representing the UE's User Consent Subscription Data, with query parameters indicating the uc-purpose and/or supported-features.

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

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.

### 5.2.2.2.25 Multiple Identifiers Translation

Figure 5.2.2.2.25-1 shows a scenario where the NF service consumer (e.g TSCTSF) sends a request to the UDM to receive the list of the UE identifiers (i.e. SUPIs) that corresponds to the provided UE identifiers (i.e. GPSIs) (see 3GPP TS 23.502 [3] clause 4.15.9.2 and clause 4.15.9.4).
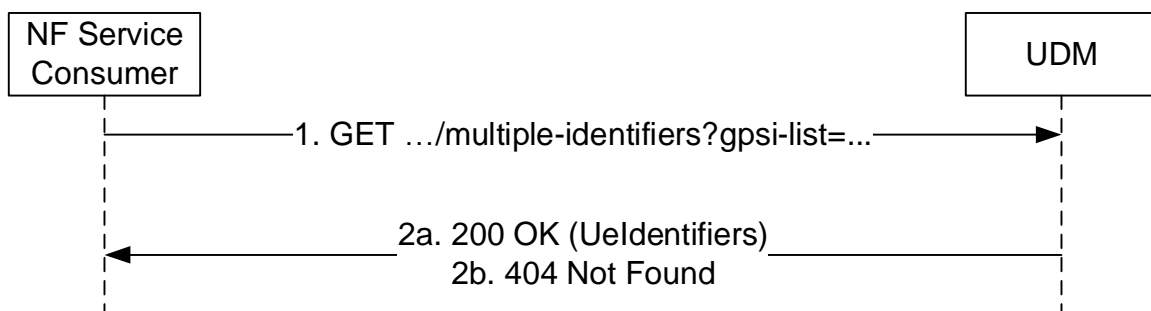


**Figure 5.2.2.2.25: GPSIs Translation**

1. The NF Service Consumer (e.g. TSCTSF) shall send a GET request to the resource representing the list of GPSIs handled by UDM; the list of GPSIs are passed in a query parameter of the request URI.

2a. On success, the UDM shall respond with "200 OK" with the message body containing the list of UE Identifiers with list of SUPIs that belong to each provided GPSI.

2b. If there is no valid data for this list of GPSIs, 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.
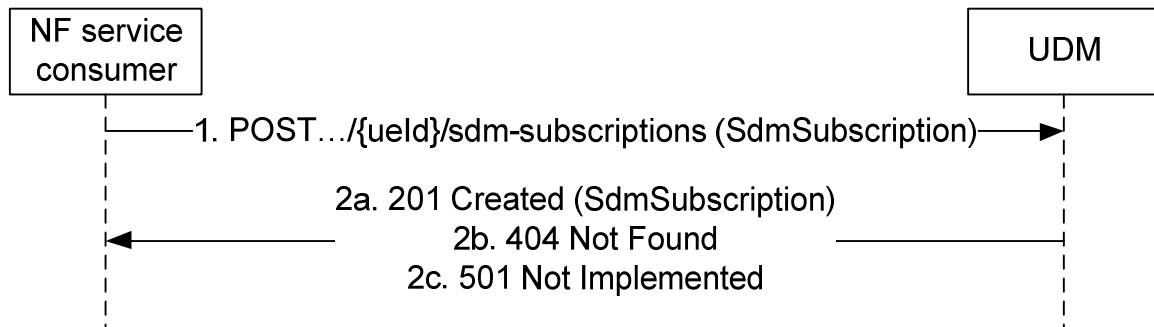


**Figure 5.2.2.3.2-1: NF service consumer subscribes to notifications**

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.

In case of partial success, "201 Created" should contain only the monitores resource Uris that are supported by the UDM.

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).

"501 Not Implemented" shall be returned only when none of the montitoredResourceUris are supported by the UDM.

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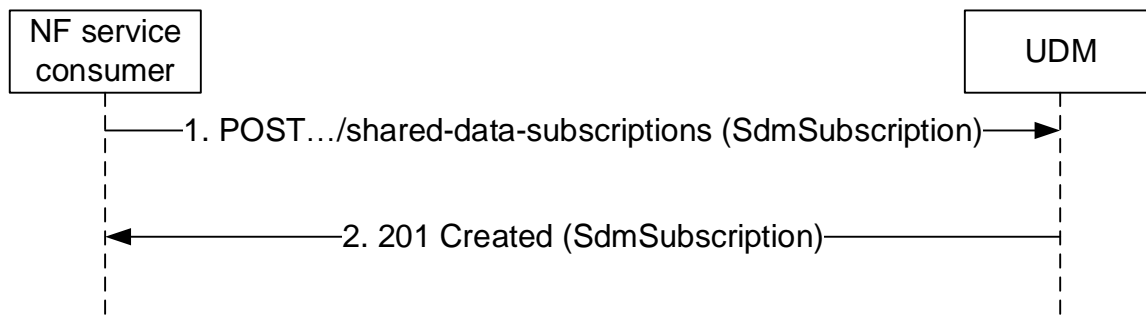
**Figure 5.2.2.3.3-1: NF service consumer subscribes to notifications of shared data change**

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.
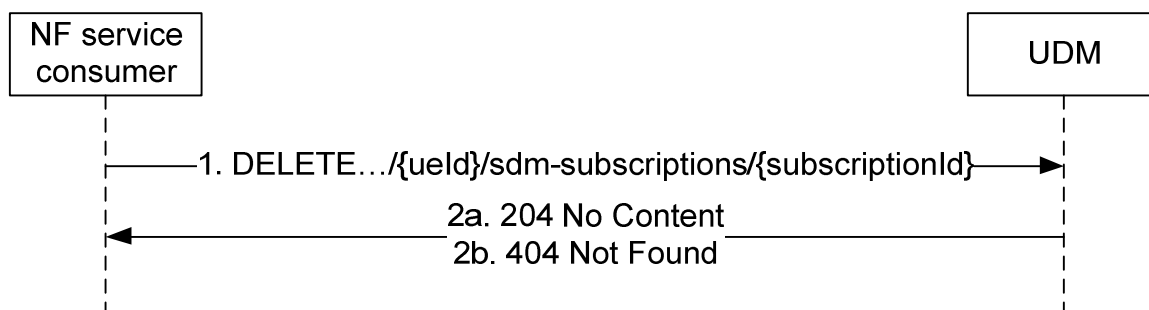


**Figure 5.2.2.4.2-1: NF service consumer unsubscribes to notifications**

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.
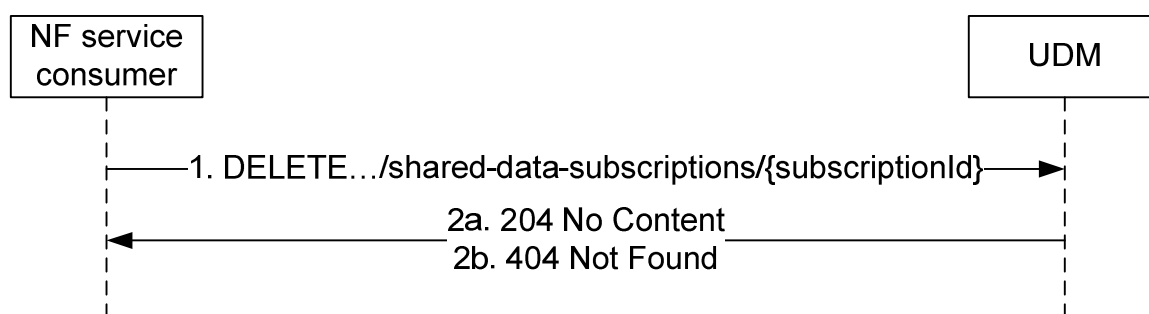


**Figure 5.2.2.4.3-1: NF service consumer unsubscribes to notifications for shared data**

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.

- UDR-initiated Data Restoration Notification

#### 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).
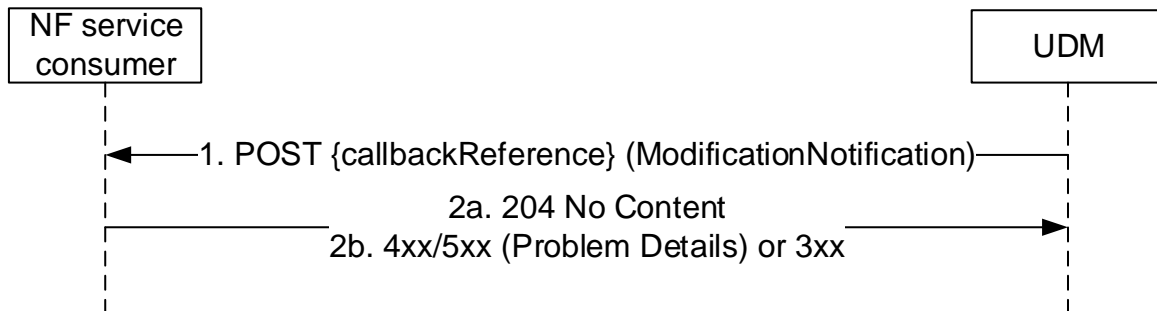


**Figure 5.2.2.5.2-1: Subscription Data Change Notification**

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

2a. On success, the NF service consumer responds with "204 No Content".

2b. On failure or redirection, one of the appropriate HTTP status code listed in Table 6.1.5.2-3 shall be returned. For a 4xx/5xx response, the message body may contain appropriate additional error information.

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.

### 5.2.2.5.3 UDR-initiated Data Restoration Notification

Figure 5.2.2.5.3-1 shows a scenario where the UDM notifies the NF Service Consumer about the need to restore data (e.g., SDM subscriptions) due to a potential data-loss event occurred at the UDR. The request contains identities representing those UEs potentially affected by such event.



**Figure 5.2.2.5.3-1: UDR-initiated Data Restoration**

1. The UDM (after receiving a notification from UDR about a potential data-loss event) sends a POST request to the dataRestorationCallbackUri; such callback URI may be provided by the NF service consumer during the

creation of an SDM subscription, or dynamically discovered by UDM by querying the NRF for the NF Profile of the NF Service Consumer.

2a. On success, the NF Service Consumer responds with "204 No Content".

2b. On failure or redirection, one of the appropriate HTTP status codes listed in Table 6.1.5.3-3 shall be returned. For a 4xx/5xx response, the message body may contain appropriate additional error information.

### 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.
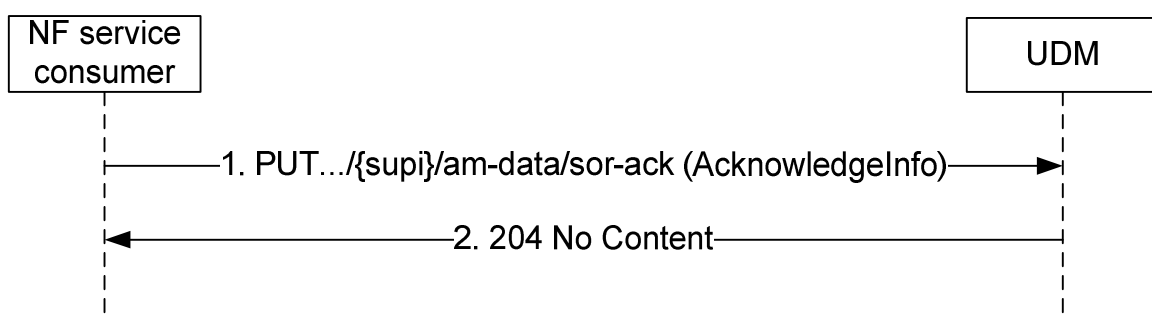


**Figure 5.2.2.6.2-1: Providing acknowledgement of Steering of Roaming**

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.
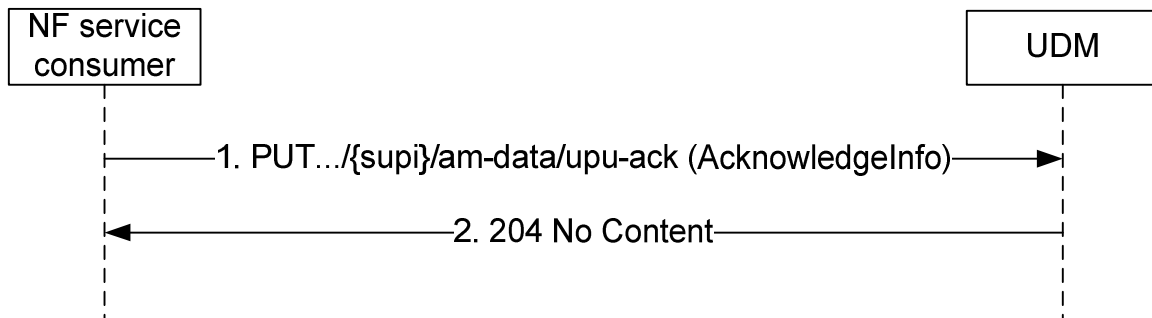


**Figure 5.2.2.6.3-1: Providing acknowledgement of UE parameters update**

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-I$_{UE}$ 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).
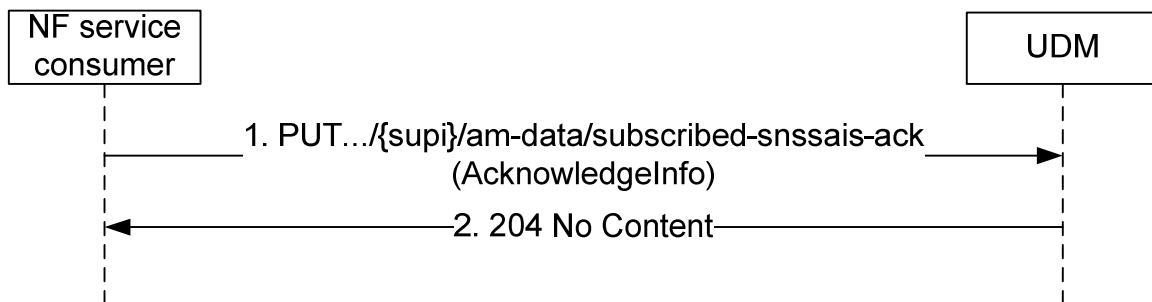


**Figure 5.2.2.6.4-1: Providing acknowledgement of UE for Network Slicing Subscription Change**

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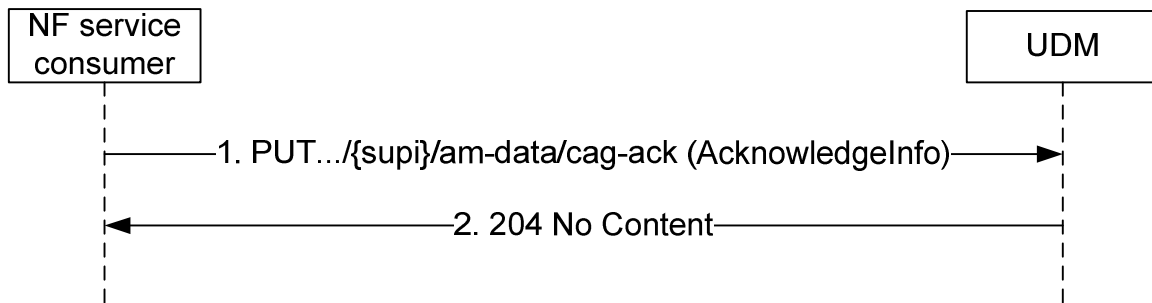
**Figure 5.2.2.6.5-1: Providing acknowledgement of UE for CAG configuration change**

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.
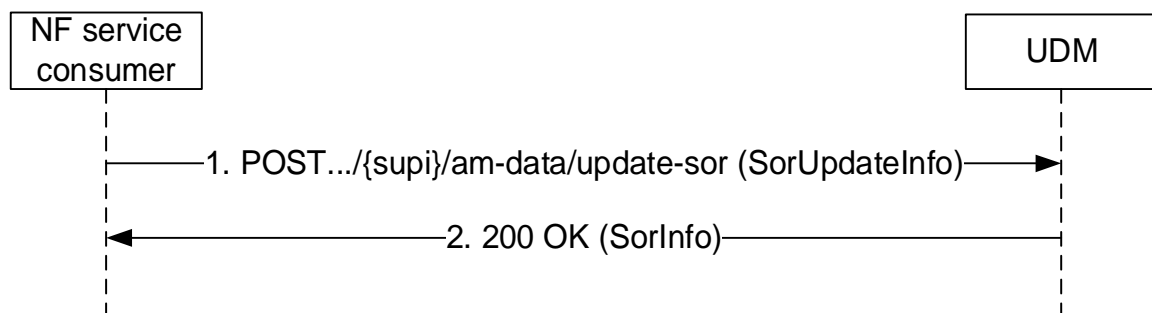


**Figure 5.2.2.6.6-1: Triggering update of Steering Of Roaming information**

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.
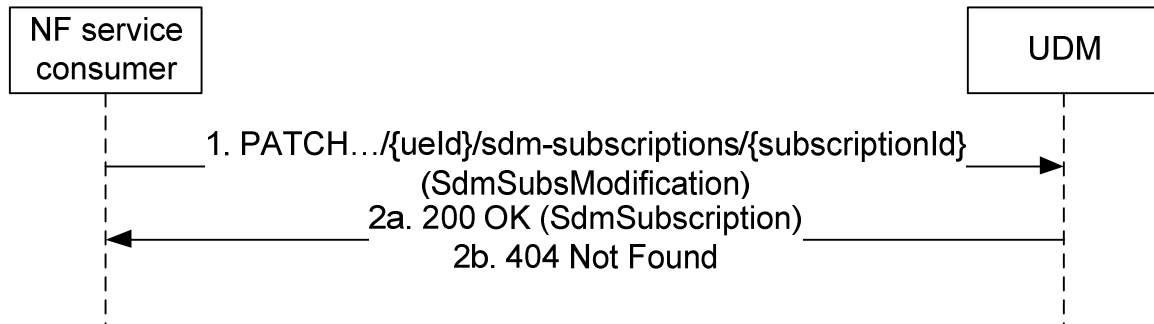


**Figure 5.2.2.7.2-1: NF service consumer modifies a subscription to notifications**

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.
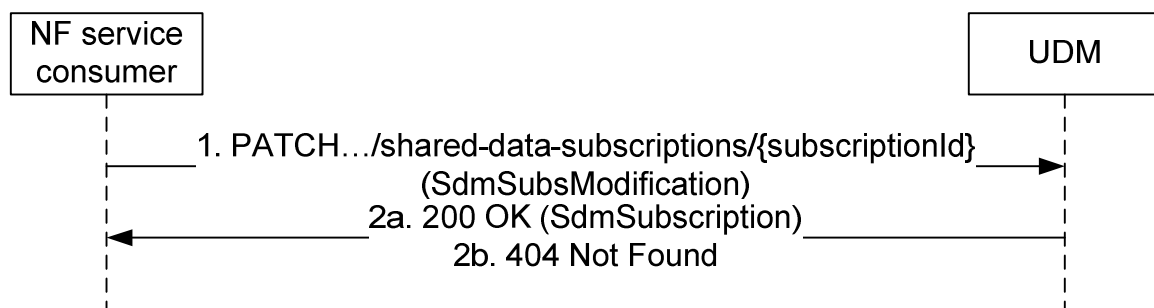


**Figure 5.2.2.7.3-1: NF service consumer modifies a subscription to notifications for shared data**

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

- DataRestorationNotification

- SendRoutingInfoForSM

The Nudm_UEContextManagement Service is used by Consumer NFs (AMF, SMF, SMSF, NWDAF) 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, NWDAF) to deregister from the UDM by means of the Deregistration service operation.

It is also used by consumer NFs (NEF, NWDAF, NSSAAF, DCCF, SMF) 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, NWDAF) 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 stored PEI in e.g. the UDR, by means of the PEI-Update service operation.

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

It is also used by consumer NFs to retrieve addressing information for MT SMS delivery, e.g. addressing of the IP-SM-GW, SMS Router or SMSF serving nodes in both 3GPP and non-3GPP accesses, by means of the SendRoutingInfoForSM 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

-    NWDAF 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.
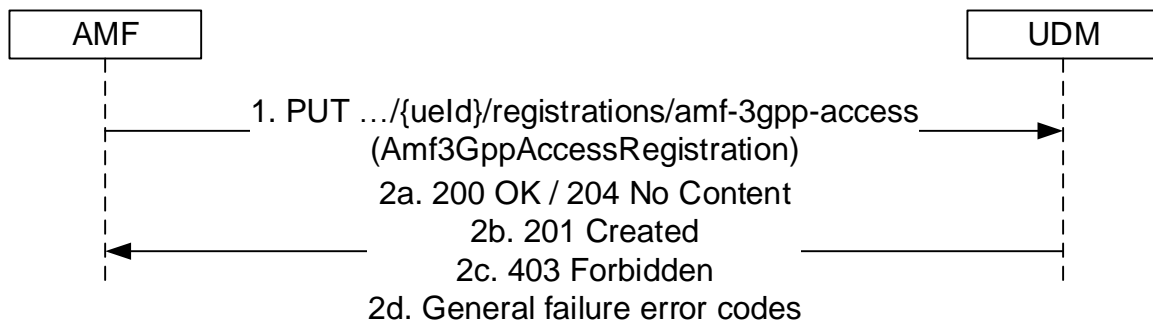
**Figure 5.3.2.2.2-1: AMF registering for 3GPP access**

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.

   The AMF shall include ueReachableInd IE if the UE is currently not reachable (e.g. in not allowed areas) or the UE reachability is unknown (e.g. service restriction area of the UE is not received at the AMF during initial registration).

   The AMF shall include the "backupAmfInfo" IE containing all of the GUAMI served by the AMF and the related backup AMF name if the AMF supports the AMF management without UDSF as specified in clause 6.5.2 of 3GPP TS 29.500 [4]. The "backupAmfInfo" IE is only applicable to this UE in 3GPP access.

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.

   If ueReachableInd IE is received indicating that the UE is not reachable, the UDM shall not trigger Reachability Report for the UE upon this UECM registration. The AMF shall subsequently generate UE Reachability Report when it detects the UE is reachable. If the If ueReachableInd IE is received indicating that the UE reachability is unknown, the UDM may trigger Reachability Report for the UE when needed based on operator policy.

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, core network restriction, or if an UE performs registration in an SNPN using credentials from the Credentials Holder, but it is not authorized to access the SNPN, HTTP status code "403 Forbidden" should be returned including additional error information in the response body (in "ProblemDetails" element).

2d. 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.
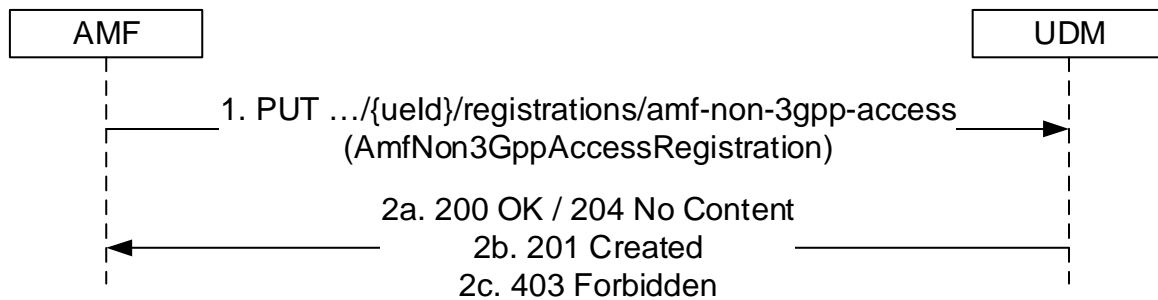


**Figure 5.3.2.2.3-1: AMF registering for non 3GPP access**

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.

   The AMF shall include the "backupAmfInfo" IE containing all of the GUAMI served by the AMF and the related backup AMF name if the AMF supports the AMF management without UDSF as specified in clause 6.5.2 of 3GPP TS 29.500 [4]. The "backupAmfInfo" IE is only applicable to this UE in non 3GPP access.

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] clause 4.3.2.2.1 step 16c and clause 4.26.5.3 step 11). The request contains the UE's identity (/{ueId}) which shall be a SUPI and the SMF Registration Information.
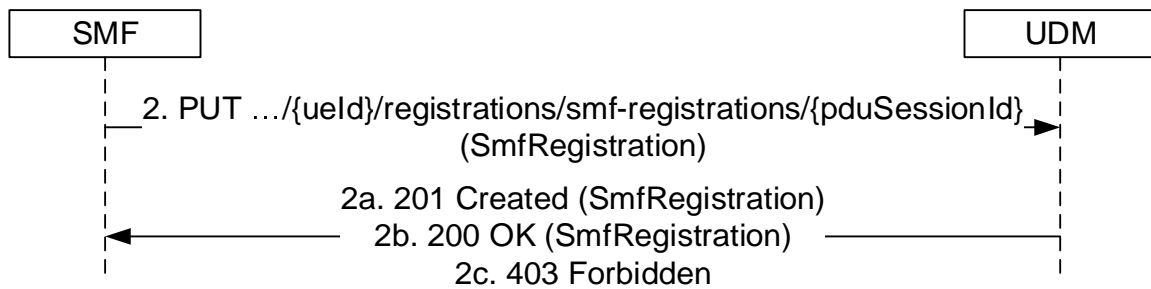
**Figure 5.3.2.2.4-1: SMF registration**

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.

   During SM Context Transfer procedure (see clause 4.26.5.3 of 3GPP TS 23.502 [3]) the SMF shall include registrationReason IE set to the value "SMF_CONTEXT_TRANSFERRED" 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.

   If EPS interworking is supported, the SMF+PGW-C shall include the PCF ID selected for the PDU session to the UDM when the SMF+PGW-C register in the UDM.

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

2b. If the individual resource exists, on success, the UDM updates the resource by replacing it with the received resource information, and responds with "200 OK" with the message body containing a representation of the updated Individual SmfRegistration resource.

   If the new SMF is not in a 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.

2c. If the operation cannot be authorized due to e.g UE does not have required subscription 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). Subscription information associated to a specific DNN (if any) shall take precedence over subscription information associated to the Wildcard DNN.

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.

When a UE requests SMS service from both 3GPP access and Non-3GPP access, the SMSF shall perform seperate individual SMSF registration for each access type.
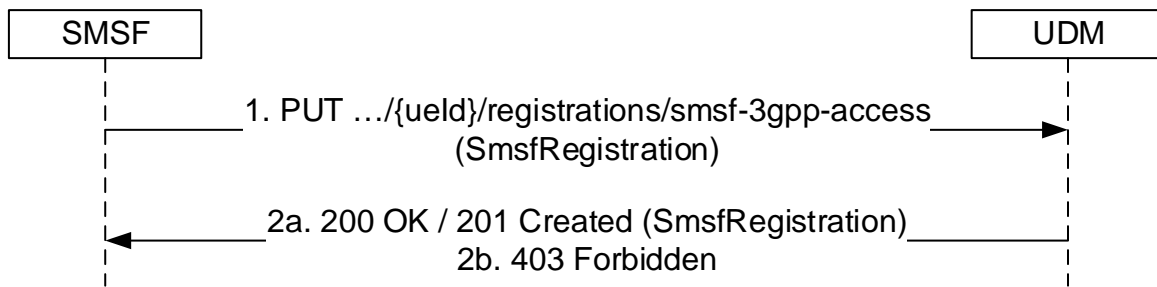
**Figure 5.3.2.2.5-1: SMSF registering for 3GPP Access**

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 supports SBI-based MT SM transmit, the "SBI support indication" of the SMSF shall be included in the 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.

When a UE requests SMS service from both 3GPP access and Non-3GPP access, the SMSF shall perform seperate individual SMSF registration for each access type.
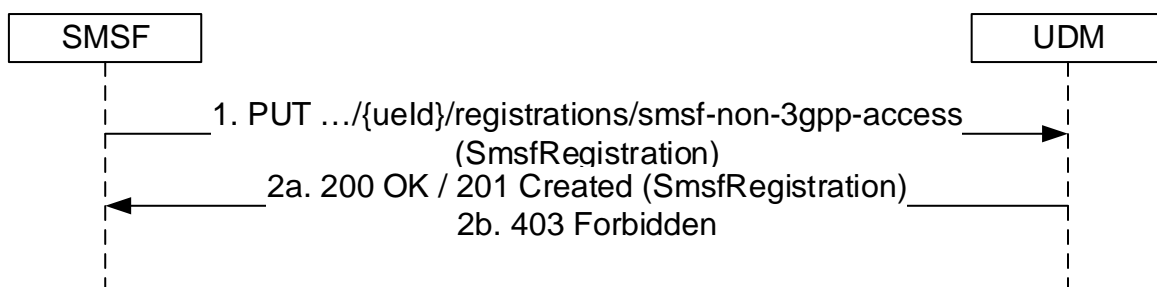


**Figure 5.3.2.2.6-1: SMSF registering for Non 3GPP Access**

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 supports SBI-based MT SM transmit, the "SBI support indication" of the SMSF shall be included in the 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 5.5.6.2.1-1 step 2). The request contains the UE's identity (/{ueId}) which shall be a SUPI and the IP-SM-GW registration information.
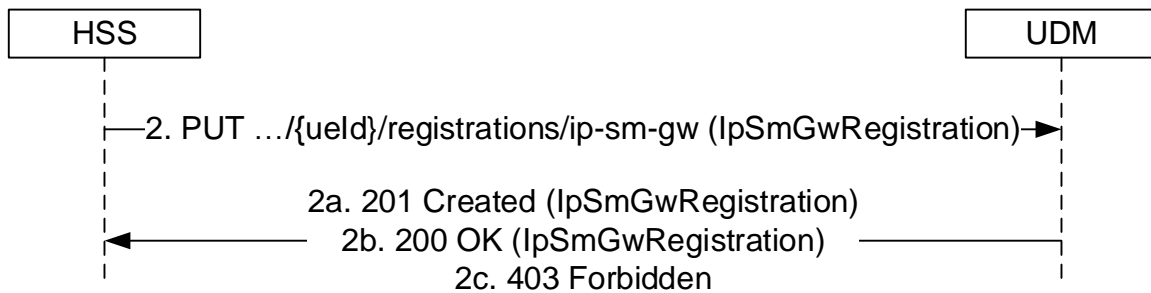


**Figure 5.3.2.2.7-1: IP-SM-GW registration**

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.

   If the IP-SM-GW indicated support for SBI-based SMS when registering in HSS, "SBI Support Indication" shall be included in the IP-SM-GW registration information.

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.

### 5.3.2.2.8 NWDAF registration

Figure 5.3.2.2.8-1 shows a scenario where an NWDAF sends a request to the UDM to create a new registration. The request contains the UE's identity (/{ueId}) which shall be a SUPI, the NWDAF's registration identity (/{nwdafRegistrationId}), and the NWDAF Registration Information.
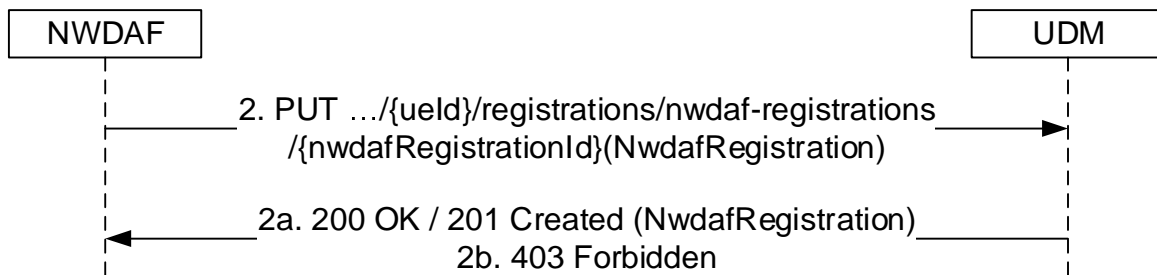
**Figure 5.3.2.2.8-1: NWDAF registration**

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

NOTE 1: nwdafRegistrationId could be the NfInstanceId, the combination of NfSetId and NfInstance ID or other identifier forms of the NWDAF. NWDAF implementation shall secure the global uniqueness of this resource ID.

2a. The UDM responds with "200 OK" or "201 Created" with the message body containing a representation of the created NWDAF registration.

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 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, 3GPP TS 23.502 [3] figure 4.2.2.3.3-1 step 1 and 3GPP TS 23.502 [3] figure 4.26.4.1.1-1 step 14). The request contains the deregCallbackUri 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.

The UDM may also initiate deregistration notification for the disaster inbound roaming UE when a disaster condition is no longer being applicable.

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).

The UDM also initiates the deregistration procedures towards the SMF of the old PDU session when a new PDU session has been established with the same PDU session ID from a different SMF, during SM Context Transfer procedure (see clause 4.26.5.3 of 3GPP TS 23.502 [3]) or when duplicated PDU sessions existing in the network (e.g. the AMF failed to release the old PDU session before creation of the new PDU session with the same PDU session ID).
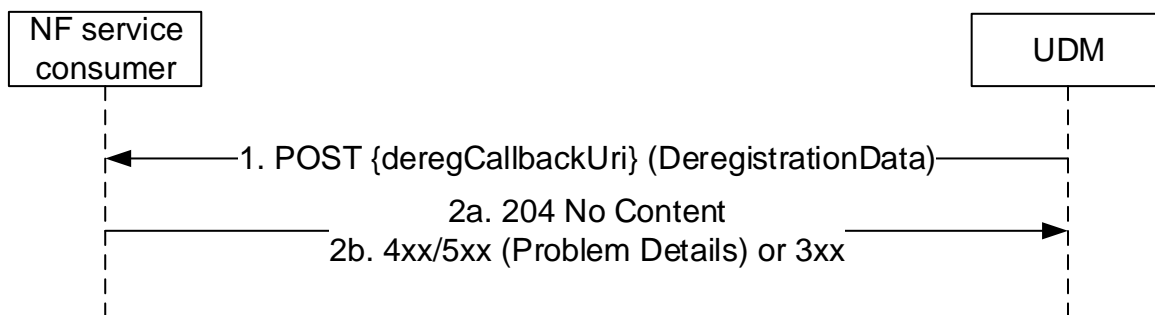
**Figure 5.3.2.3.2-1: UDM initiated NF Deregistration**

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

   If the SMF deregistration is triggered by SM Context Transfer procedure, i.e. the UDM has received a registration request with registrationReason IE set to the value "SMF_CONTEXT_TRANSFERRED" from another SMF, the UDM shall set the deregReason IE to the value "SMF_CONTEXT_TRANSFERRED". If the SMF deregistration is due to duplicated PDU sessions in the network, i.e. the UDM has received a registration request from another SMF without registrationReason IE set to the value "SMF_CONTEXT_TRANSFERRED", the UDM shall set the deregReason IE to the value "DUPLICATE_PDU_SESSION".

2a. On success, the NF service consumer responds with "204 No Content".

   An SMF received the deregistration notification shall release the PDU session but shall not send a SM Context Status Notification to the AMF. For a PDU session with I-SMF or V-SMF, the anchor SMF shall send a Status Notification to the I-SMF or V-SMF indicating that the PDU session is released due to duplicated PDU sessions.

2b. On failure or redirection, one of the appropriate HTTP status code listed in Table 6.2.5.2-3 shall be returned. For a 4xx/5xx response, the message body may contain appropriate additional error information.

## 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

- NWDAF 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.
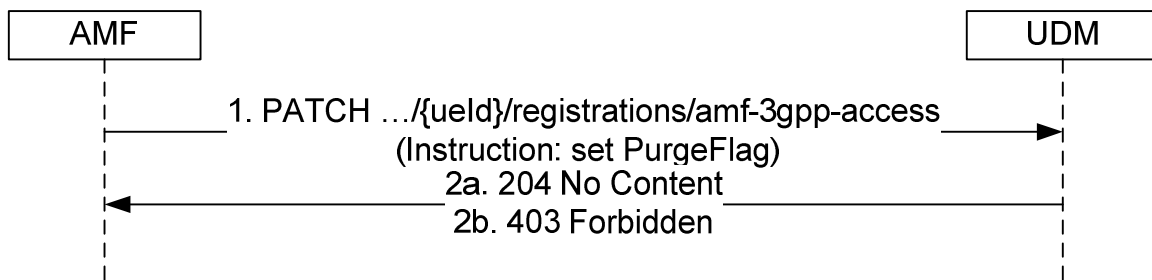
**Figure 5.3.2.4.2-1: AMF deregistering for 3GPP access**

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.
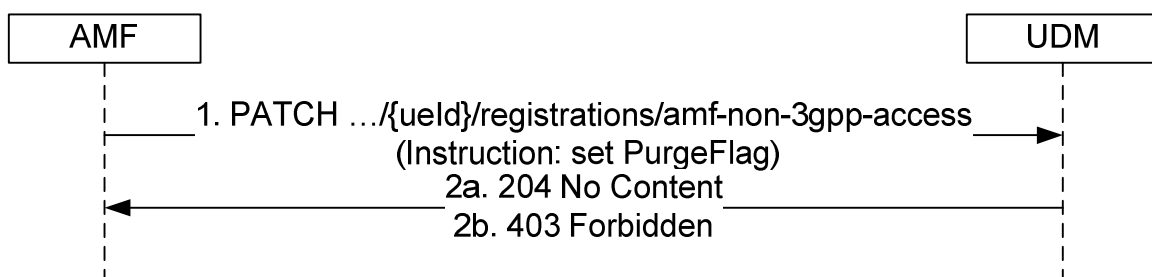


**Figure 5.3.2.4.3-1: AMF deregistering for non-3GPP access**

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}.
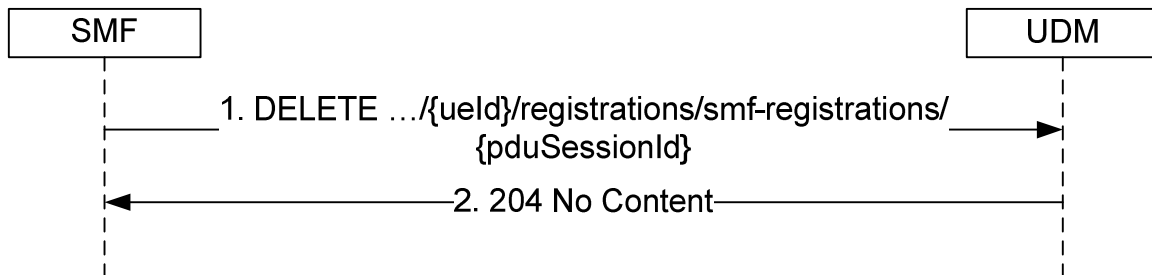


**Figure 5.3.2.4.4-1: SMF deregistration**

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.

For a UE previously requests SMS service from both 3GPP access and Non-3GPP access, if SMS service is disabled from one access type, the SMSF shall only delete the corresponding SMSF registration for that access type. If SMS service is disabled from both 3GPP access and Non-3GPP access, the SMSF shall delete the SMSF registration for both access types.
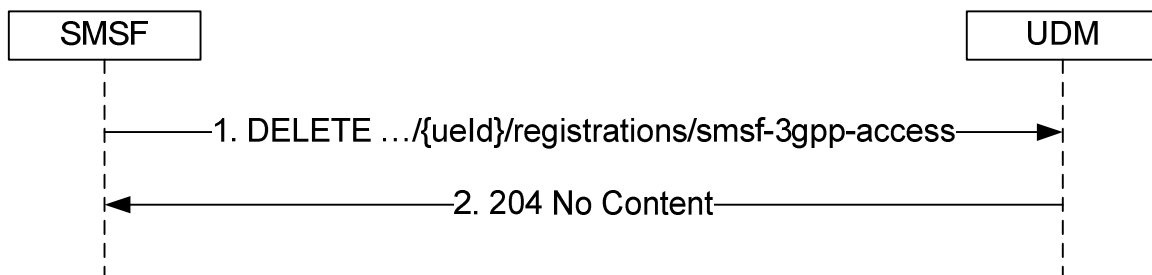


**Figure 5.3.2.4.5-1: SMSF Deregistering for 3GPP Access**

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.

For a UE previously requests SMS service from both 3GPP access and Non-3GPP access, if SMS service is disabled from one access type, the SMSF shall only delete the corresponding SMSF registration for that access type. If SMS service is disabled from both 3GPP access and Non-3GPP access, the SMSF shall delete the SMSF registration for both access types.

```
   ┌──────────┐                                    ┌──────────┐
   │   SMSF   │                                    │   UDM    │
   └──────────┘                                    └──────────┘
        │                                               │
        │─1. DELETE …/{ueId}/registrations/smsf-non-3gpp-access─▶│
        │                                               │
        │◀────────────2. 204 No Content─────────────────│
        │                                               │
```
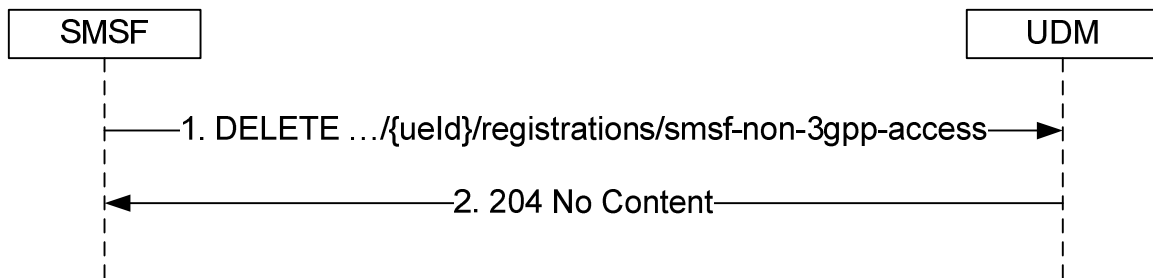
**Figure 5.3.2.4.6-1: SMSF Deregistering for Non 3GPP Access**

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.

```
   ┌──────────┐                                    ┌──────────┐
   │   HSS    │                                    │   UDM    │
   └──────────┘                                    └──────────┘
        │                                               │
        │─1. DELETE …/{ueId}/registrations/ip-sm-gw────▶│
        │                                               │
        │◀────────────2. 204 No Content─────────────────│
        │                                               │
```
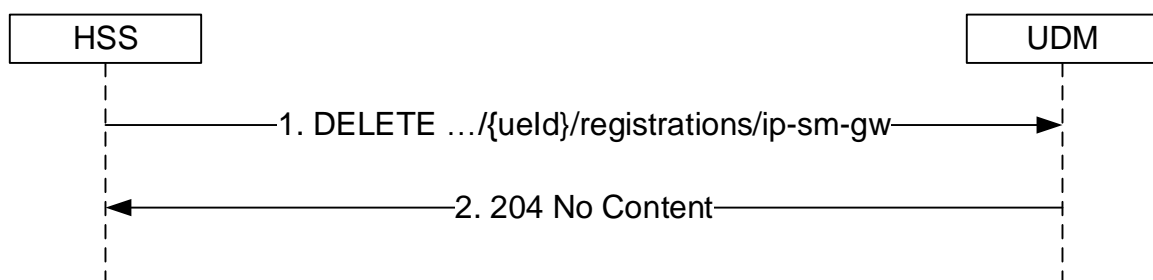
**Figure 5.3.2.4.7-1: IP-SM-GW deregistration**

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.

### 5.3.2.4.8 NWDAF deregistration

Figure 5.3.2.4.8-1 shows a scenario where the NWDAF sends a request to the UDM to deregister the NWDAF from the UDM. The request contains the UE's identity (/{ueId}) which shall be a SUPI ,and the NWDAF's registration identity (/{nwdafRegistrationId}).
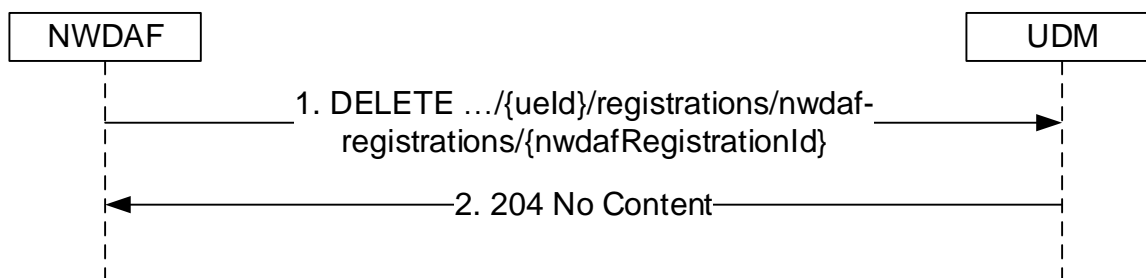


**Figure 5.3.2.4.8-1: NWDAF deregistration**

1. The NWDAF sends a DELETE request to the resource representing the UE's NWDAF 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

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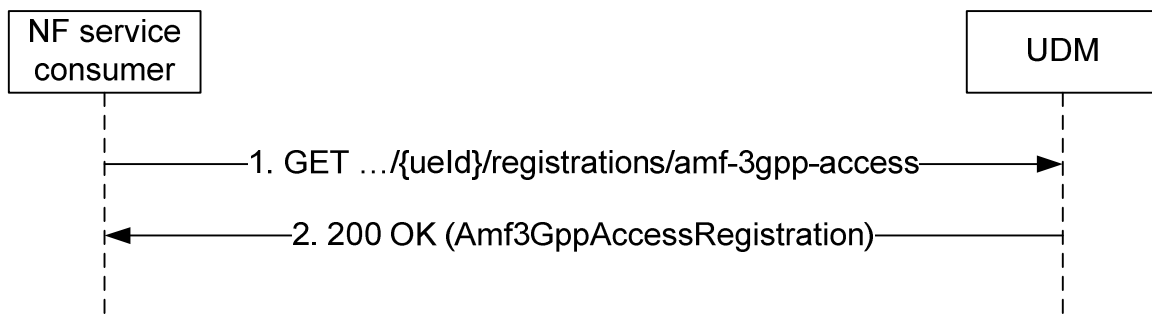
**Figure 5.3.2.5.2-1: Requesting a UE's AMF Registration Information for 3GPP Access**

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).
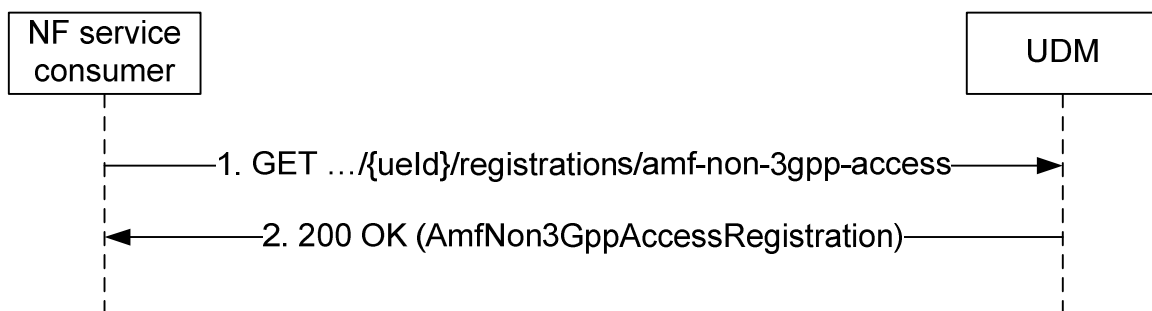


**Figure 5.3.2.5.3-1: Requesting a UE's AMF Registration Information for non-3GPP Access**

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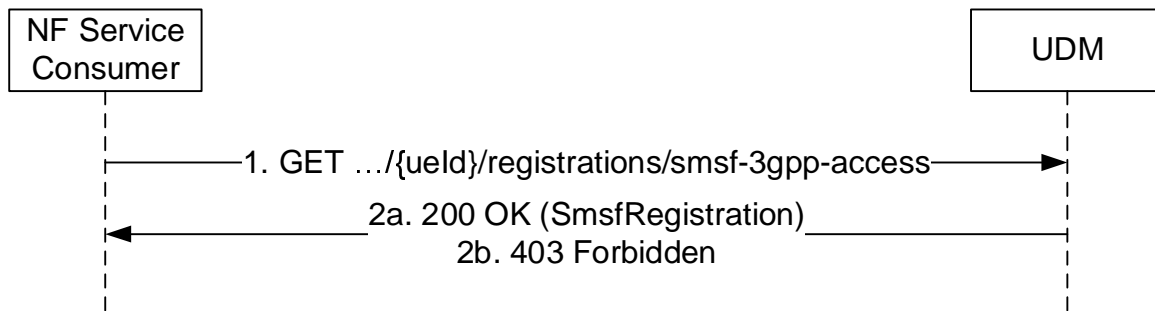
**Figure 5.3.2.5.5-1: Requesting a UE's SMSF Registration Information for 3GPP Access**

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).
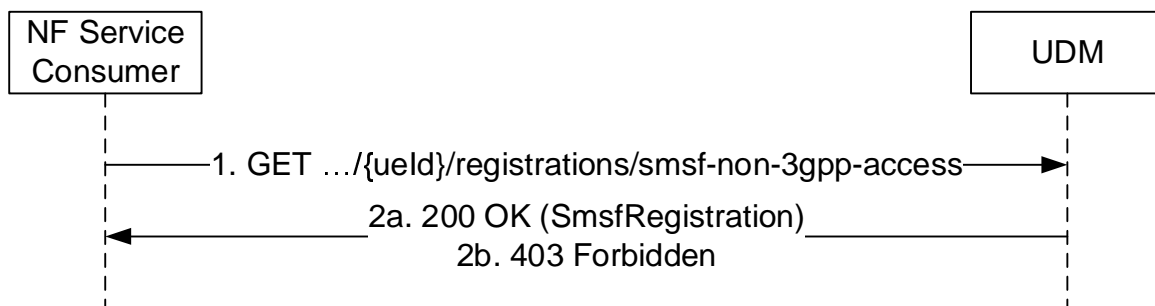


**Figure 5.3.2.5.6-1: Requesting a UE's SMSF Registration Information for Non-3GPP Access**

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, SMF) sends a request to the UDM to retrieve the UE's SmfRegistration Information. NF Service Consumer (e.g. SMF) may send request to UDM to retrieve SMF registration information to ensure the uniqueness of PDU Session ID if handover between EPS and EPC/ePDG. 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).
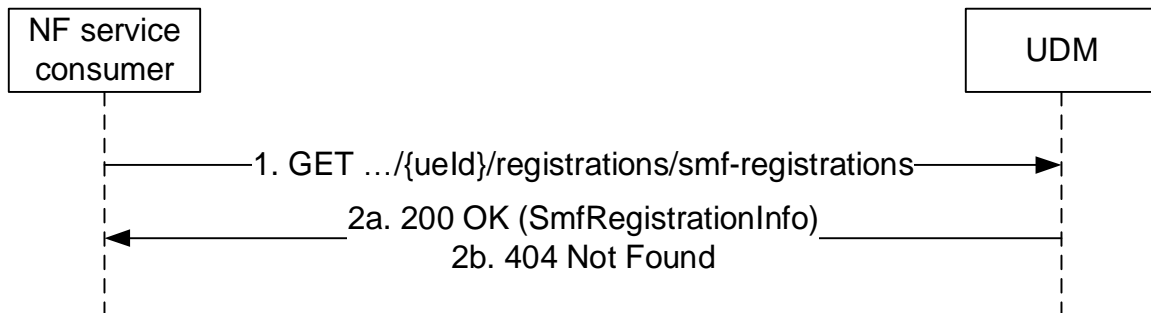


**Figure 5.3.2.5.7-1: Requesting a UE's SMF Registration Information**

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.
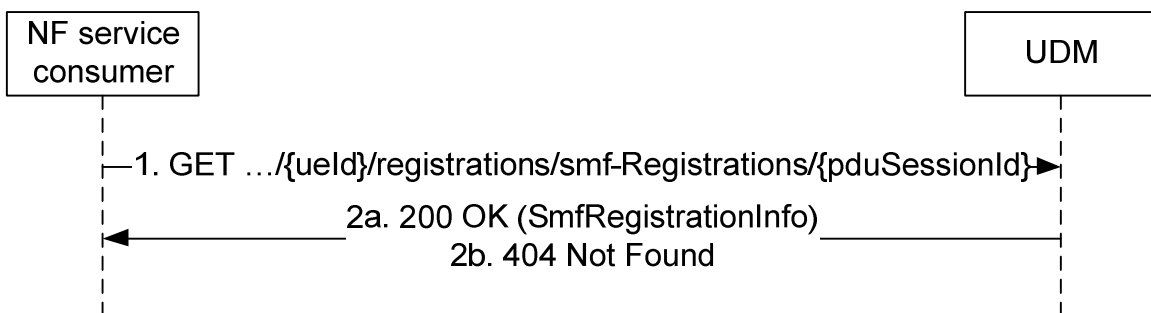


**Figure 5.3.2.5.8-1: Requesting individual SMF Registration Information**

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).
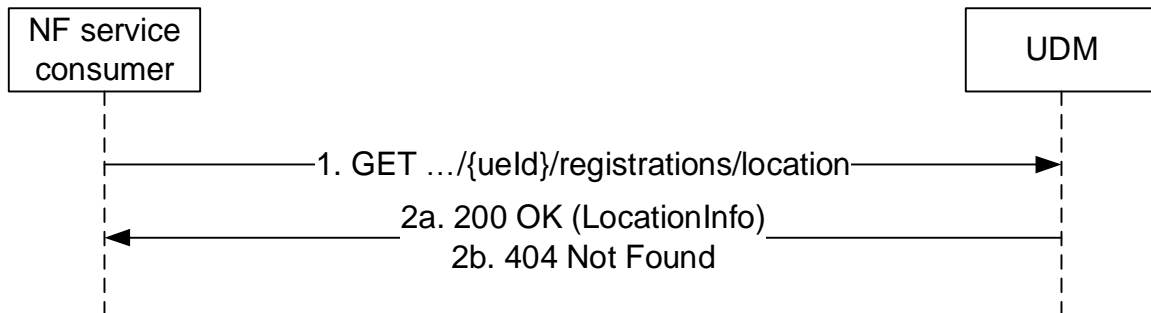


**Figure 5.3.2.5.9-1: Requesting a UE's Location Information**

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).
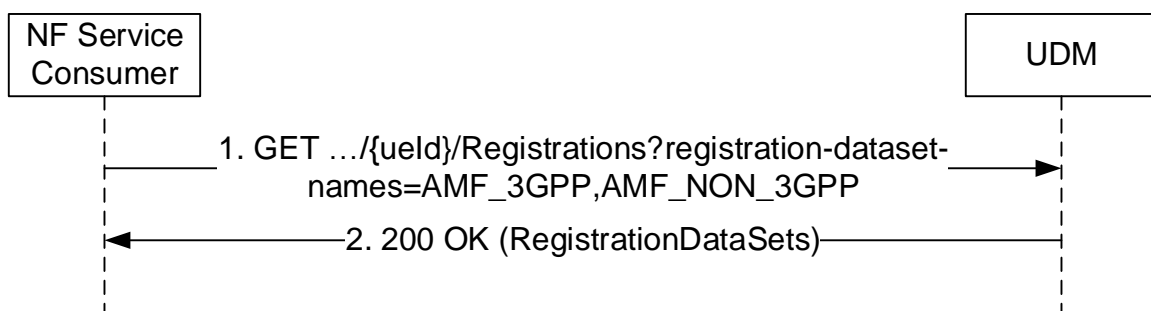


**Figure 5.3.2.5.10-1: Retrieval of Multiple UE Registration Data Sets**

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. When not all requested data sets are available at the UDM, 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.

### 5.3.2.5.11 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.
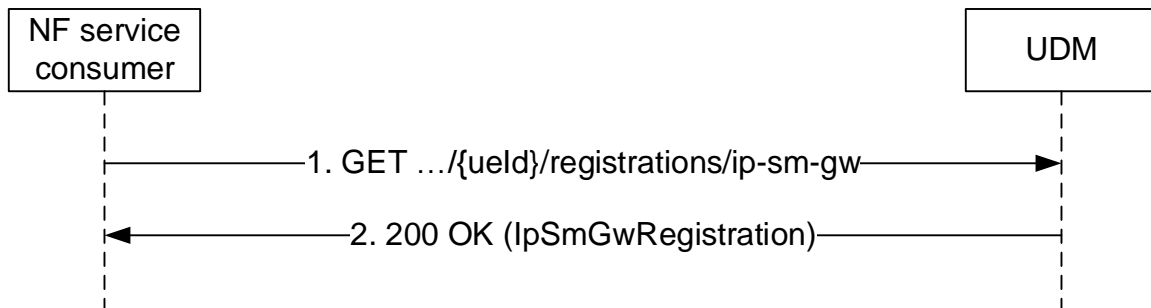


**Figure 5.3.2.5.11-1: Requesting a UE's IP-SM-GW Registration Information**

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.

### 5.3.2.5.12 NwdafRegistration Information Retrieval

Figure 5.3.2.5.12-1 shows a scenario where the NF service consumer (e.g. NWDAF) sends a request to the UDM to retrieve the UE's NwdafRegistration Information. The request contains the UE's identity (/{ueId}), which shall be a SUPI, the type of the requested information (/registrations/nwdaf-registrations) and query parameters (analyticsIds, supported-features).
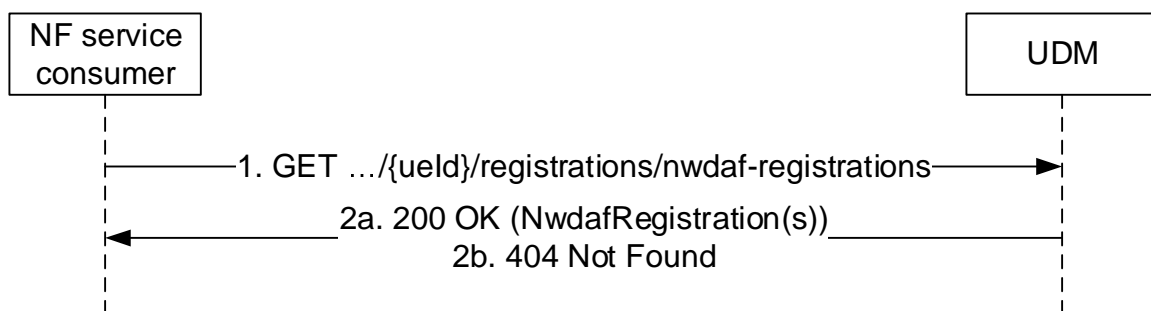


**Figure 5.3.2.5.12-1: Requesting a UE's NwdafRegistration Information**

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

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

NOTE: if there are multiple NwdafRegsitration for the same UE, all matched NwdafRegistration(s) will be returned.

2b. If there is no valid NwdafRegistration 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.

### 5.3.2.6 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

- Update a parameter (e.g. analyticsId(s)) in the NWDAF registration

- Update a parameter (e.g. PGW FQDN) in the SMF registration

#### 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).
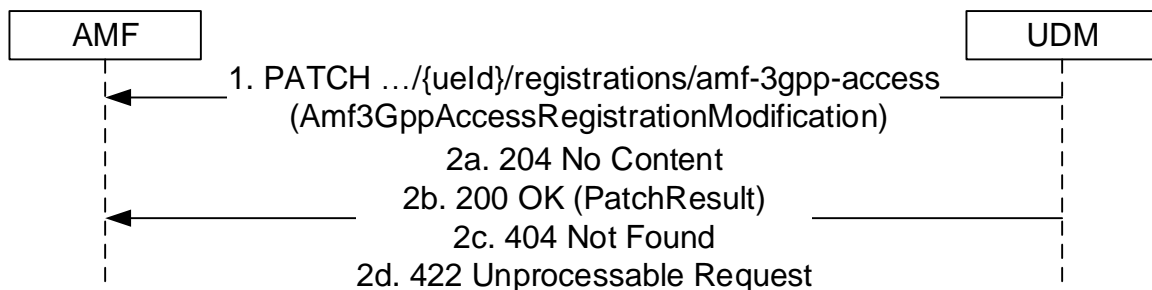


**Figure 5.3.2.6.2-1: AMF registration parameter update for 3GPP access**

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

   If the AMF needs to modify the backupAmfInfo, the AMF shall include the IE in the PATCH request. The modified backupAmfInfo is only applicable to this UE in 3GPP access.

2a. If all the modification instructions in the PATCH request have been implemented, the UDM shall respond with "204 No Content" response.

2b. 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 "200 OK" with the response body containing PatchResult.

2c. 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).

2d. If the resource exists, but the requesting AMF is not the one currently registered for the UE, HTTP status code "422 Unprocessable Entity" 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).
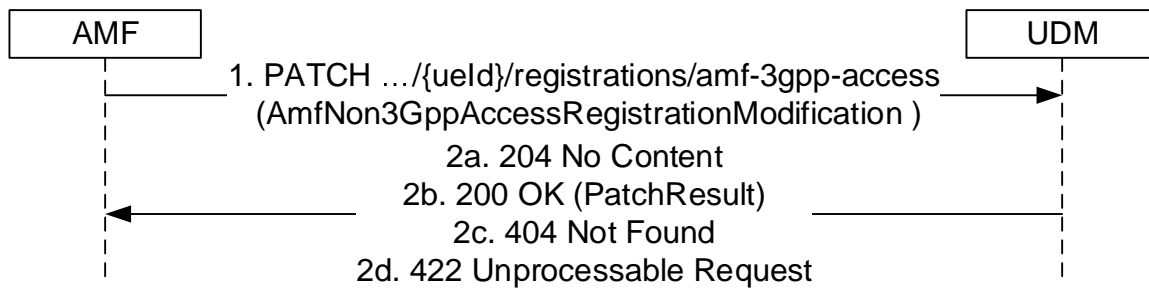
**Figure 5.3.2.6.3-1: AMF registration parameter update for non-3GPP access**

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

   If the AMF needs to modify the backupAmfInfo, the AMF shall include the IE in the PATCH request. The modified backupAmfInfo is only applicable to this UE in non-3GPP access.

2a. If all the modification instructions in the PATCH request have been implemented, the UDM shall respond with "204 No Content" response.

2b. 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 "200 OK" with the response body containing PatchResult.

2c. 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).

2d. If the resource exists, but the requesting AMF is not the one currently registered for the UE, HTTP status code "422 Unprocessable Entity" 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.

### 5.3.2.6.4 Update A Parameter (e.g. analyticsId(s)) in the NWDAF Registration

Figure 5.3.2.6.4-1 shows a scenario where the NWDAF sends a request to the UDM to update a parameter within the NwdafRegistration resource. The request contains the UE's identity (/{ueId}) which shall be a SUPI, the NWDAF's registration identity (/{nwdafRegistrationId}) and an instruction to modify a parameter (e.g. analyticsId(s)).
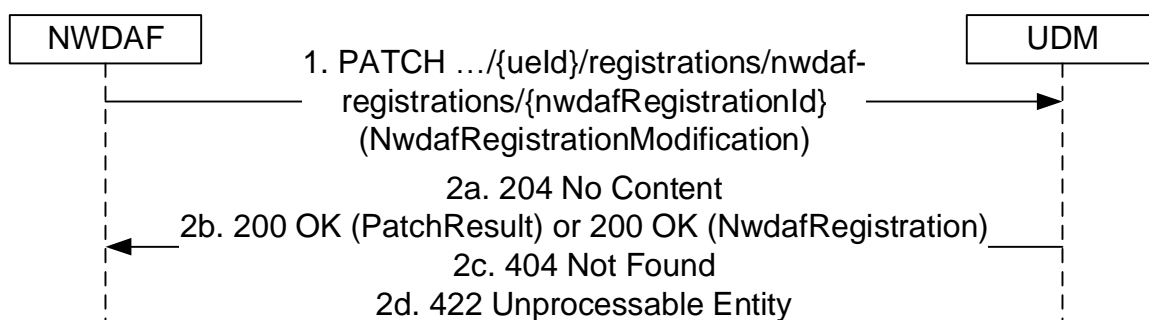


**Figure 5.3.2.6.4-1: NWDAF registration parameter update**

1. The NWDAF sends a PATCH request to the resource representing the UE's NWDAF registration.

2a. If all the modification instructions in the PATCH request have been implemented, the UDM shall respond with "204 No Content" response.

2b. If some of the modification instructions in the PATCH request have been discarded:

- the UDM shall respond with "200 OK" with the response body containing PatchResult, if the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature number; or

- the UDM shall respond with "200 OK" with the response body containing NwdafRegistration, if the NF service consumer does not support the "PatchReport" feature.

2c. 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).

2d. If the resource exists, but the requesting NWDAF is not the one currently registered for the UE, HTTP status code "422 Unprocessable Entity" 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.

### 5.3.2.6.5 Update A Parameter (e.g. PGW FQDN) in the SMF Registration

Figure 5.3.2.6.5-1 shows a scenario where the SMF sends a request to the UDM to update a parameter within the SmfRegistration resource (see also clause 4.11.5.2 of 3GPP TS 23.502 [3]). The request contains the UE's identity (/{ueId}) which shall be a SUPI and an instruction to modify a parameter (e.g. PGW FQDN).
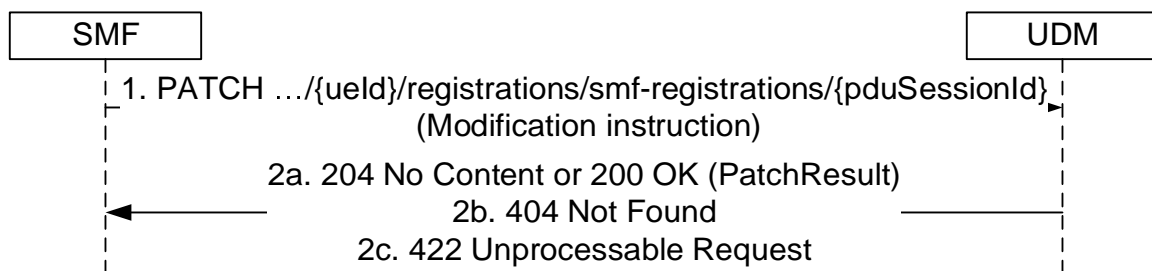


**Figure 5.3.2.6.5-1: SMF registration parameter update**

1. The SMF sends a PATCH request to the resource representing the UE's SMF registration .../{ueId}/registrations/smf-registrations/{pduSessionId}.

2a. On success, the UDM responds with "204 No Content" or "200 OK" shall be returned; in the latter case, the payload body of the PATCH response shall contain the PatchResult indicating that some of the modification instructions in the PATCH request have been discarded.

2b. If the resource does not exist, 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 SMF is not the one currently registered for the UE, HTTP status code "422 Unprocessable Entity" 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 pcscfRestorationCallbackUri URI for P-CSCF restoration as received by the UDM during registration, and P-CSCF Restoration Indication.
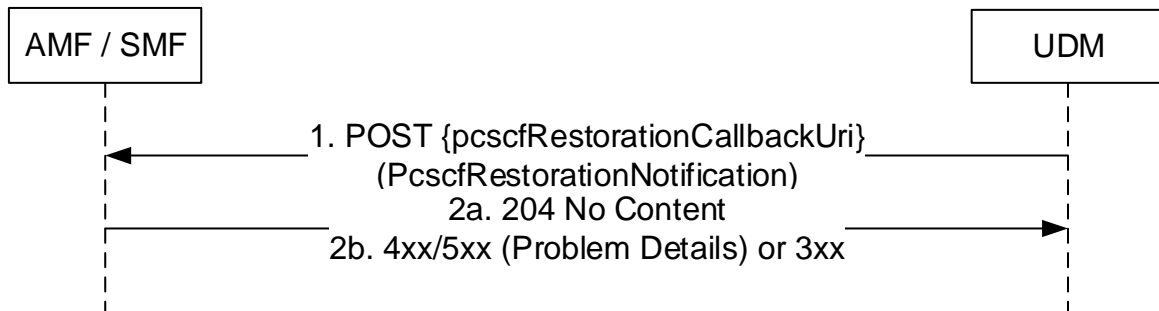


**Figure 5.3.2.7.2-1: UDM initiated P-CSCF Restoration**

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

2a. On success, the AMF or SMF responds with "204 No Content".

2b. On failure or redirection, one of the appropriate HTTP status code listed in Table 6.2.5.3-3 shall be returned. For a 4xx/5xx response, the message body may contain appropriate additional error information.

### 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.
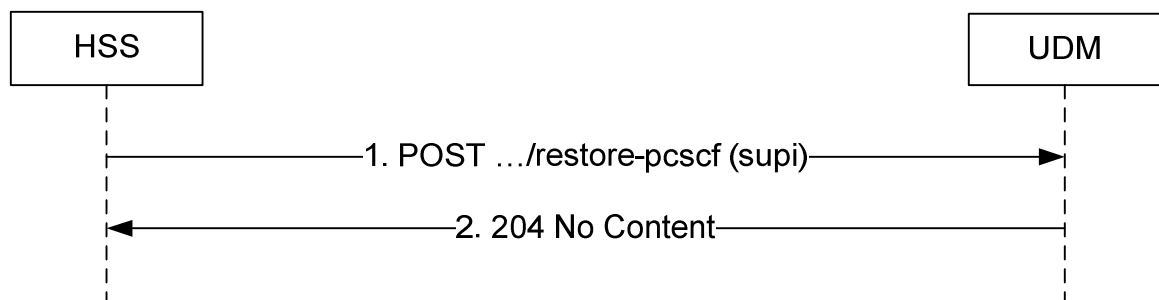


**Figure 5.3.2.8.2-1: P-CSCF-RestorationTrigger**

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.
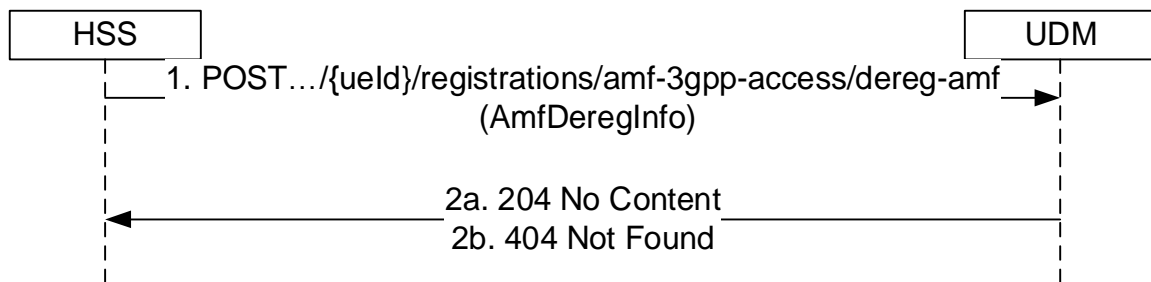


**Figure 5.3.2.9.2-1: AMF-Deregistration**

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.
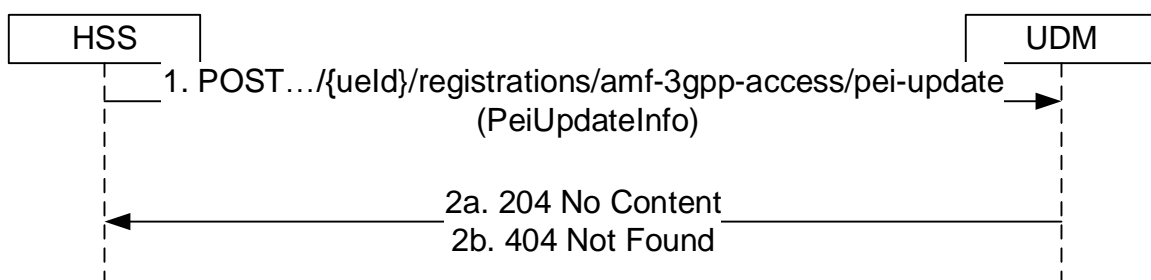


**Figure 5.3.2.10.2-1: PEI Update**

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 the UDM updating the stored pei attribute in e.g. 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.

### 5.3.2.11 Roaming Information Update

#### 5.3.2.11.1 General

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

- Roaming Information Update

#### 5.3.2.11.2 Roaming Information Update

Figure 5.3.2.11.2-1 shows a scenario where the HSS sends a request to the UDM to update the Roaming Information Update in the 3GPP Access Registration context. The request contains the UE's identity which shall be an IMSI.
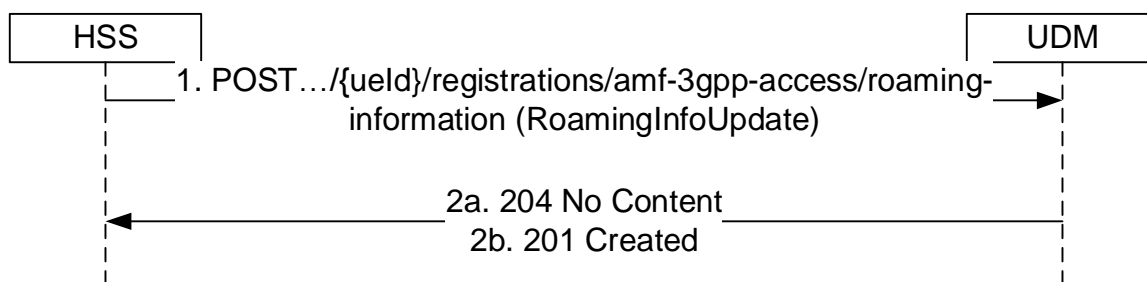


**Figure 5.3.2.11.2-1: Roaming Information Update**

1. The HSS sends a POST request to the resource representing the UE's Roaming information to update or create the Roaming Information.

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

2b. If the resource does not exist (there is no previous Roaming Information Update stored in UDM for the user, UDM stores the received Roaming Information Update and responds with HTTP Status Code "201 created" with the created Roaming Information Update.

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.

### 5.3.2.12 DataRestorationNotification

#### 5.3.2.12.1 General

The following procedure using the DataRestorationNotification service operation is supported:

- UDR-initiated Data Restoration

### 5.3.2.12.2 UDR-initiated Data Restoration

Figure 5.3.2.12.2-1 shows a scenario where the UDM notifies the NF Service Consumer (e.g., a registered AMF, SMF, SMSF) about the need to restore subscription-data due to a potential data-loss event occurred at the UDR. The request contains identities representing those UEs potentially affected by such event.
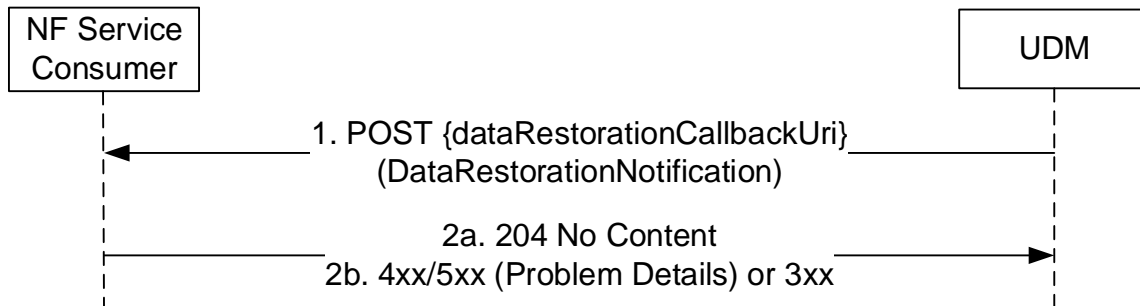


**Figure 5.3.2.12.2-1: UDR-initiated Data Restoration**

1.  The UDM (after receiving a notification from UDR about a potential data-loss event) sends a POST request to the dataRestorationCallbackUri; such callback URI may be provided by the NF service consumer during the registration, or dynamically discovered by UDM by querying the NRF for the NF Profile of the NF Service Consumer.

2a. On success, the NF Service Consumer responds with "204 No Content".

2b. On failure or redirection, one of the appropriate HTTP status codes listed in Table 6.2.5.3-3 shall be returned. For a 4xx/5xx response, the message body may contain appropriate additional error information.

## 5.3.2.13 SendRoutingInfoForSM

### 5.3.2.13.1 General

The following procedure using the SendRoutingInfoForSM service operation is supported:

-   Successful Mobile Terminated short message transfer as defined in 3GPP TS 23.540 [66] clause 5.1.2, clause 5.1.3 and clause 5.1.4.

-   Unsuccessful Mobile Terminated short message transfer as defined in 3GPP TS 23.540 [66] clause 5.1.5, clause 5.1.6 and clause 5.1.9.

-   GPSI-to-Subscription-Network resolution as defined in 3GPP TS 23.540 [66] clause 5.1.7.

### 5.3.2.13.2 Send Routing Information For SM

Figure 5.3.2.13.2-1 shows a scenario where the NF consumer (e.g. SMS-GMSC, HSS…) sends a request to the UDM to retrieve the addressing information for SMS delivery, e.g. addressing of the available SMSF nodes registered in the UDM.
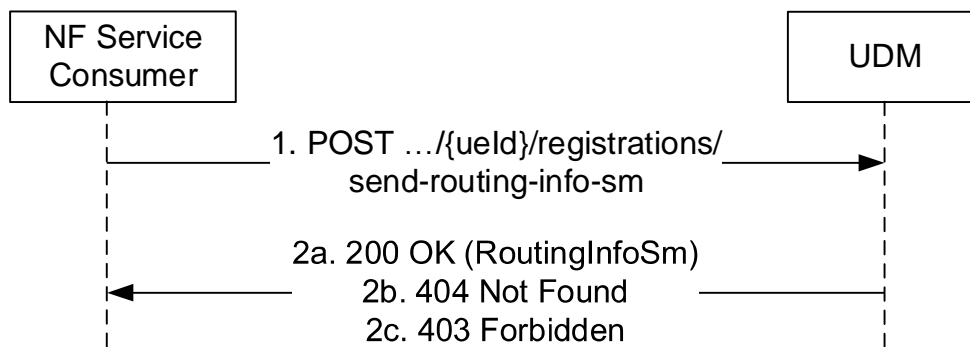
**Figure 5.3.2.13.2-1: Send Routing Info For SM**

1. The NF Service Consumer sends a POST request (custom method: send-routing-info-sm) to the UDM. The request URI contains the UE's identity ({ueId}). The request body may contain a list of features of the Nudm_UECM API supported by the NF Service Consumer, if any; otherwise, the request body may contain an empty JSON object.

2a. The UDM responds with "200 OK" with the message body containing a RoutingInfoSm data structure, including the addressing info of the nodes that are currently available to be used for sending SMS to the recipient UE, if any.

2b. If there is no node at UDM currently available to be used for sending SMS to the recipient UE, then the UDM responds with "404 Not Found" with the message body containing a ProblemDetails object, with a cause code indicating "ABSENT_SUBSCRIBER_SM".

2c. If the UE does not have required subscription data for SMS service or SMS service is barred, the UDM responds with HTTP status code "403 Forbidden", with the reponse body including a ProblemDetails object containing an application error indicating "SERVICE_NOT_PROVISIONED" or "SERVICE_NOT_ALLOWED".

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

- GetProseAv

- GetGbaAv

- Notification

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 and 3GPP TS 33.535 [55] clause 6.1. 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.

The Nudm_UEAuthentication service is also used by the AUSF to request UDM to retrieve the Authentication Vectors for 5G ProSe by means of GetProseAv service operation. See 3GPP TS 33.503 [64] clause 7.4.

The Nudm_UEAuthentication service is also used by the GBA's BSF to request UDM to generate the GBA authentication vector by means of GetGbaAv service operation. See 3GPP TS 33.220 [61] clause N.2.2.

### 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.
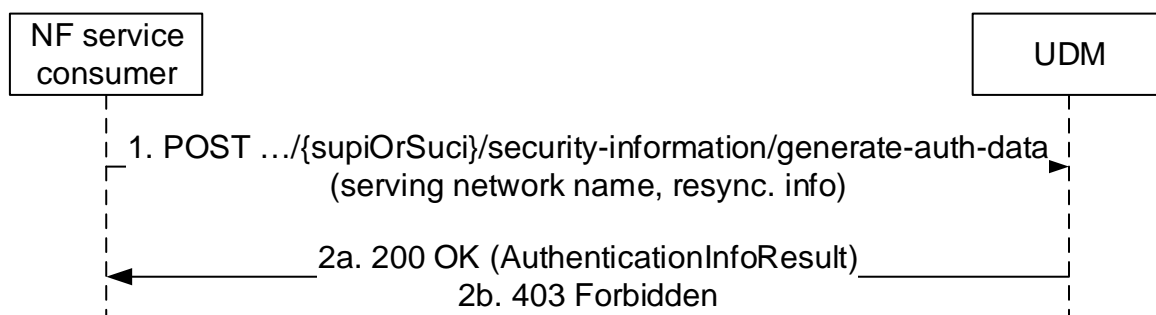


**Figure 5.4.2.2.2-1: NF service consumer requesting authentication information**

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 / deriving AKMA key after primary authentication), the AUSF shall preserve the Kausf and related information (e.g. SUPI) after the completion of the primary authentication. If the UDM decides that the primary authentication by an AAA server in a Credentials Holder is required, the AUSF shall perform the authentication with the AAA Server. In case the UDM receives an anonymous SUCI that contains the realm part, the UDM authorizes the UE based on realm part of SUCI, and send anonymous SUPI and the indicator to indicate to the AUSF to run primary authentication with an external Credentials holder (see 3GPP TS 33.501 [6], clause I.2.2). If the Default Credentials Server (DCS) provides UDM with the information of a Provisioning Server (PVS FQDN(s) and/or IP address(es)), the UDM provides the PVS info to the AUSF.

2b. If the operation cannot be authorized due to e.g UE does not have required subscription 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, UDM receives an anonymous SUCI that does not contain the realm part, 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.
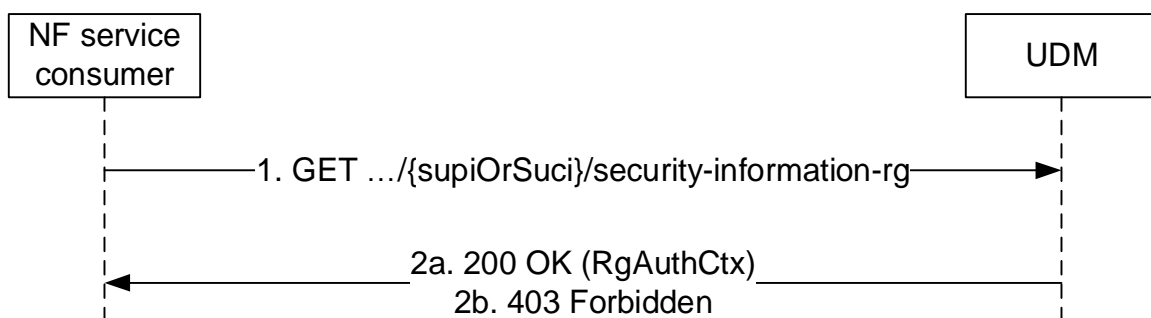


**Figure 5.4.2.2.3-1: NF service consumer requesting authentication information for FN-RG**

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).
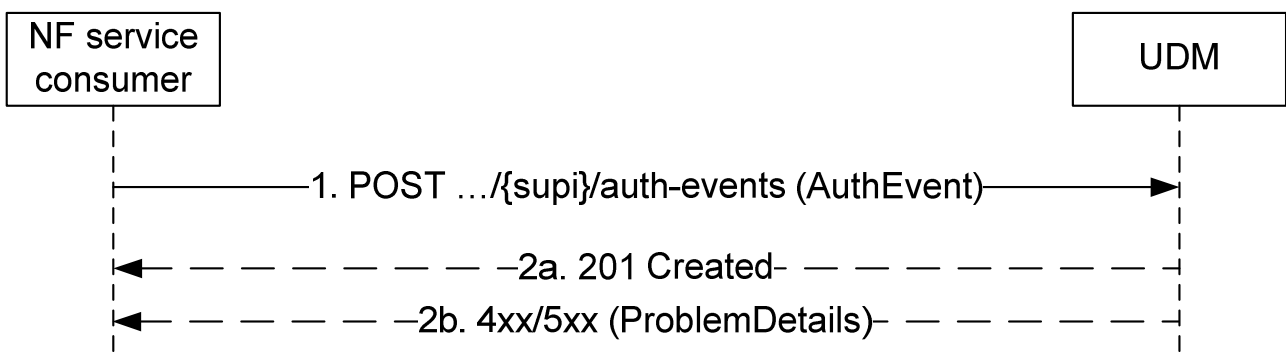


**Figure 5.4.2.3.2-1: NF service consumer confirms UE authentication**

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.
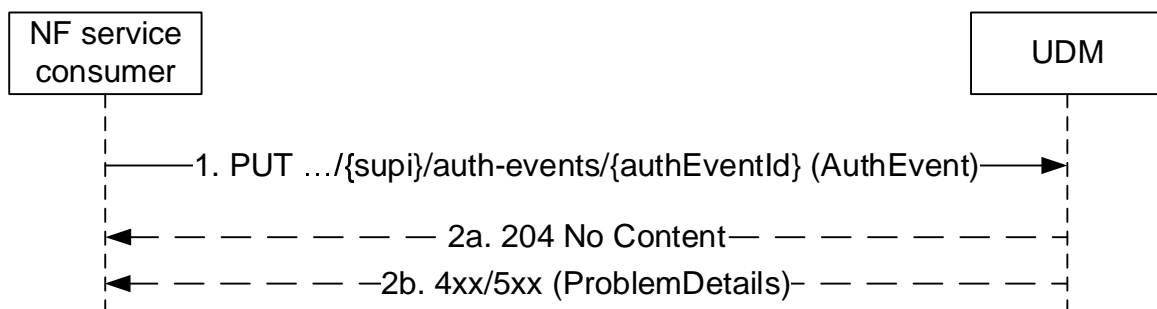


**Figure 5.4.2.3.3-1: NF service consumer removes the authentication result**

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.
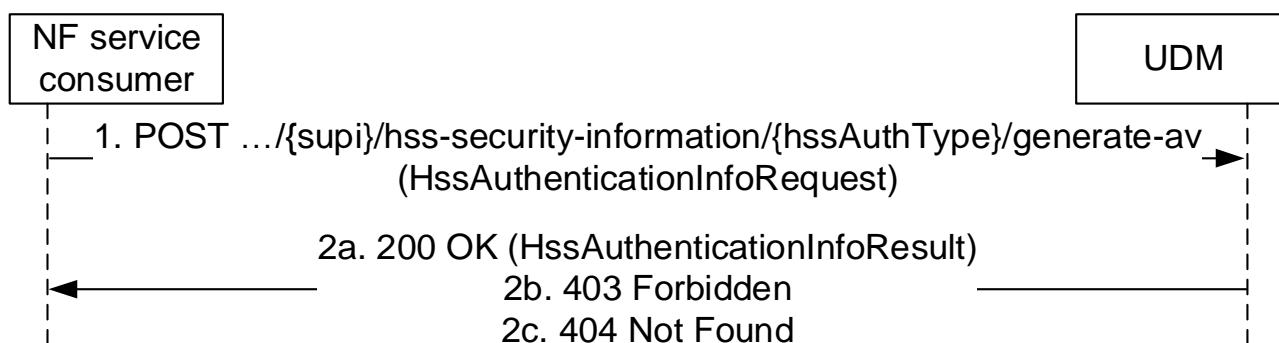


**Figure 5.4.2.4.2-1: NF service consumer requesting authentication vector(s)**

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.

## 5.4.2.5 GetGbaAv

### 5.4.2.5.1 General

The following procedure using the GetGbaAv service operation is supported:

- GBA Authentication Vector Retrieval

#### 5.4.2.5.2 GBA Authentication Vector Retrieval

Figure 5.4.2.5.2-1 shows a scenario where the NF service consumer (GBA's BSF) retrieves authentication vector(s) for the UE from the UDM (see also 3GPP TS 33.220 [61]). The request contains the UE's identity (SUPI), the authentication method and may contain resynchronization info.

~~~
┌─────────────┐                                                        ┌─────────────┐
│ NF service  │                                                        │    UDM      │
│ consumer    │                                                        │             │
└─────────────┘                                                        └─────────────┘
      │         1. POST …/{supi}/gba-security-information/generate-av          │
      │──────────────────(GbaAuthenticationInfoRequest)─────────────────────▶ │
      │                                                                        │
      │              2a. 200 OK (GbaAuthenticationInfoResult)                  │
      │                      2b. 403 Forbidden                                 │
      │◀─────────────────────2c. 403 Not Found──────────────────────          │
      │                                                                        │
~~~
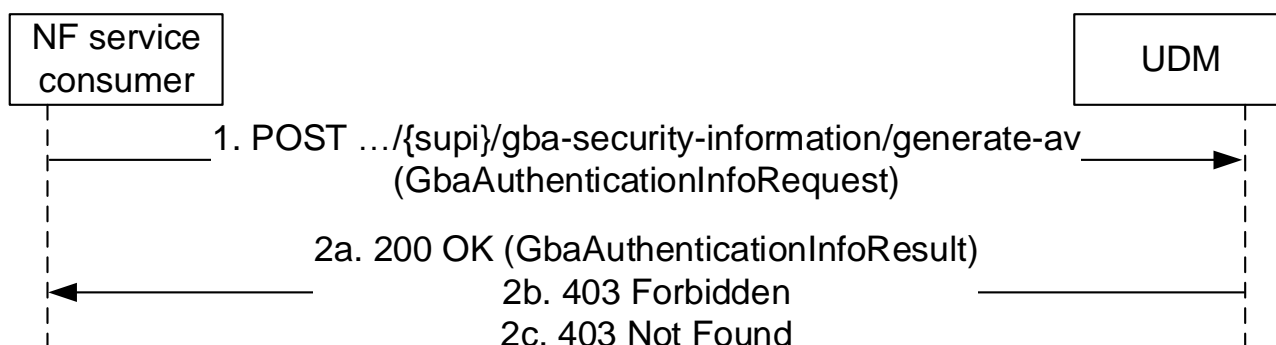
**Figure 5.4.2.5.2-1: NF service consumer requesting authentication vector(s)**

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

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.

### 5.4.2.6 GetProseAv

#### 5.4.2.6.1 General

The following procedure using the GetProseAv service operation:

- ProSe Authentication Vector Retrieval

#### 5.4.2.6.2 ProSe Authentication Vector Retrieval

Figure 5.4.2.6.2-1 shows a scenario where the NF service consumer (AUSF) retrieves ProSe authentication vector(s) for the 5G ProSe Remote UE from the UDM (see also 3GPP TS 33.503 [64] clause 7.4). The request contains the UE's identity (supi or suci), Relay Service Code, and may contain resynchronization info.
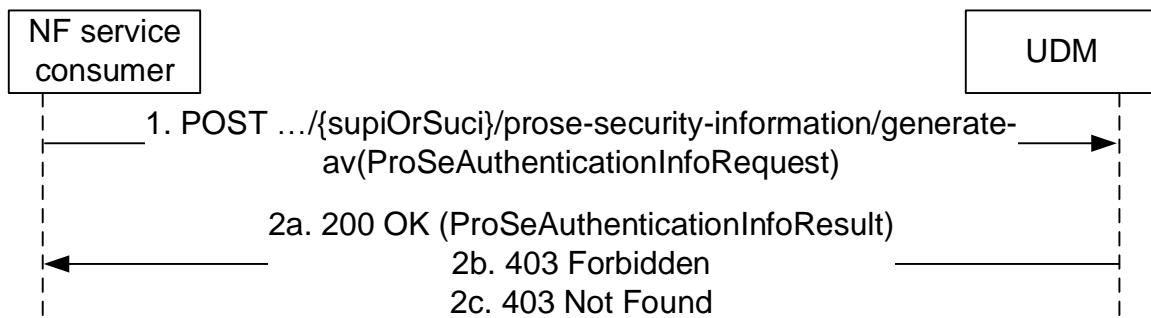
**Figure 5.4.2.6.2-1: NF service consumer requesting authentication vector(s)**

1. The NF service consumer sends a POST request to the UDM.

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.

### 5.4.2.7 Notification

#### 5.4.2.7.1 General

The following procedures using the Notification service operation are supported:

- UDR-initiated Data Restoration Notification

#### 5.4.2.7.2 UDR-initiated Data Restoration Notification

Figure 5.4.2.7.2-1 shows a scenario where the UDM notifies the NF Service Consumer (e.g. AUSF) about the need to restore data (e.g. confirmation of successful authentication events) due to a potential data-loss event occurred at the UDR. The request contains identities representing those UEs potentially affected by such event.
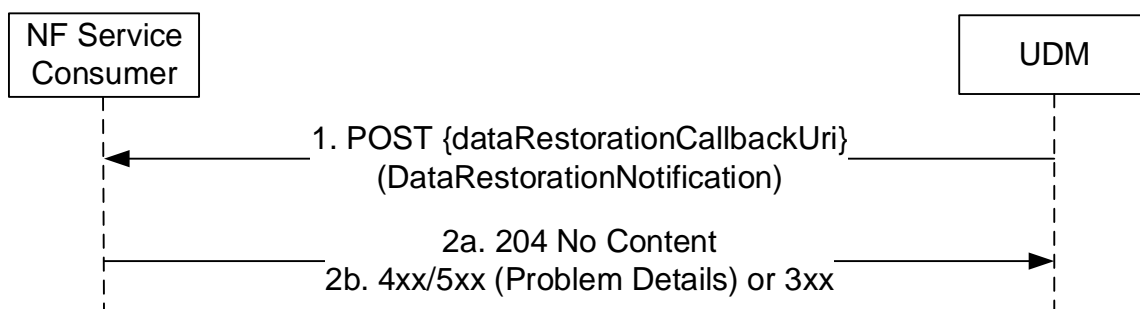


**Figure 5.4.2.7.2-1: UDR-initiated Data Restoration**

1. The UDM (after receiving a notification from UDR about a potential data-loss event) sends a POST request to the dataRestorationCallbackUri; such callback URI may be provided by the NF service consumer during the confirmation of a successful authentication event, or dynamically discovered by UDM by querying the NRF for the NF Profile of the NF Service Consumer.

2a. On success, the NF Service Consumer responds with "204 No Content".

2b. On failure or redirection, one of the appropriate HTTP status codes listed in Table 6.3.5.2-3 shall be returned. For a 4xx/5xx response, the message body may contain appropriate additional error information.

# 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.
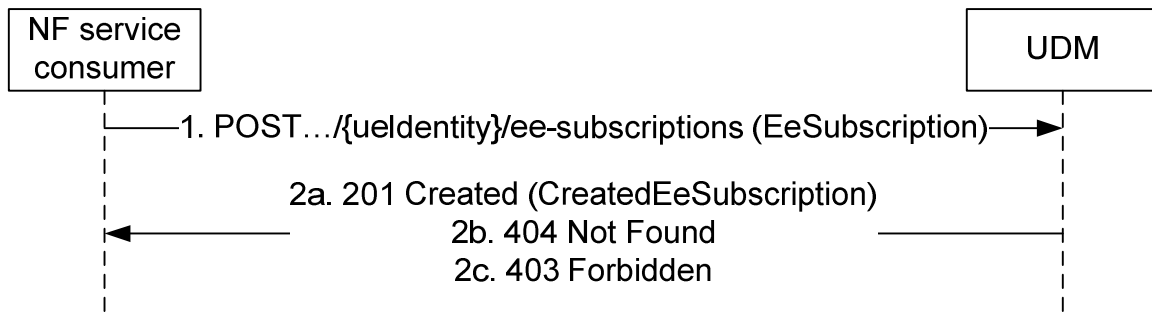
**Figure 5.5.2.2.2-1: NF service consumer subscribes to notifications**

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 or for the group of UEs or Any UE which is indicated in the Resource URI variable ueIdentity; 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).

   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).

   The response, based on operator policy, may contain the expiry time, as determined by the UDM, after which the subscription becomes invalid. Before the subscription is going to expire, if the NF Service Consumer wants to keep receiving notifications, it shall modify the subscription in the UDM with a new expiry time. 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 and set to true in the request, the response shall include the indication on whether the subscription was also successful in EPC domain. If the subscription also applies to the EPC domain, the only the Event Types below shall apply to the EPC domain,

- The event type "LOSS_OF_CONNECTIVITY", it shall be map to event type "LOSS_OF_CONNECTIVITY" on Nhss

- The event type "UE_REACHABILITY_FOR_DATA" and the reportCfg in reachabilityForDataCfg set to "DIRECT_REPORT", it shall be mapped to event type "UE_REACHABILITY_FOR_DATA" on Nhss

- The event type "LOCATION_REPORTING", and dddTrafficDes or Dnn is not included in the request, it shall be mapped to event type "LOCATION_REPORTING" on Nhss

- The event type "COMMUNICATION_FAILURE", it shall be mapped to event type "COMMUNICATION_FAILURE" on Nhss

- The event type "AVAILABILITY_AFTER_DDN_FAILURE", it shall be mapped to event type "AVAILABILITY_AFTER_DDN_FAILURE" on Nhss

- The event type "PDN_CONNECTIVITY_STATUS", it shall be mapped to event type "PDN_CONNECTIVITY_STATUS" on Nhss

- The event type "UE_REACHABILITY_FOR_SMS" and reachabilityForSmsCfg set to "REACHABILITY_FOR_SMS_OVER_NAS", it shall be mapped to event type "UE_REACHABILITY_FOR_SMS" on Nhss

- The event type "UE_MEMORY_AVAILABLE_FOR_SMS", it shall be mapped to event type " UE_MEMORY_AVAILABLE_FOR_SMS " on Nhss

If some of the requested monitoring configurations fails, the response may include the failedMonitoringConfigs to indicate the failed cause of the failed monitoring configurations.

If some of the requested monitoring configurations fails in the EPC domain or the EE subscription fails in the EPC domain, the response may include the failedMoniConfigsEPC to indicate the failed cause of the failed monitoring configurations or the failed cause of the EE subscription in the EPC domain.

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 [62]). 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.
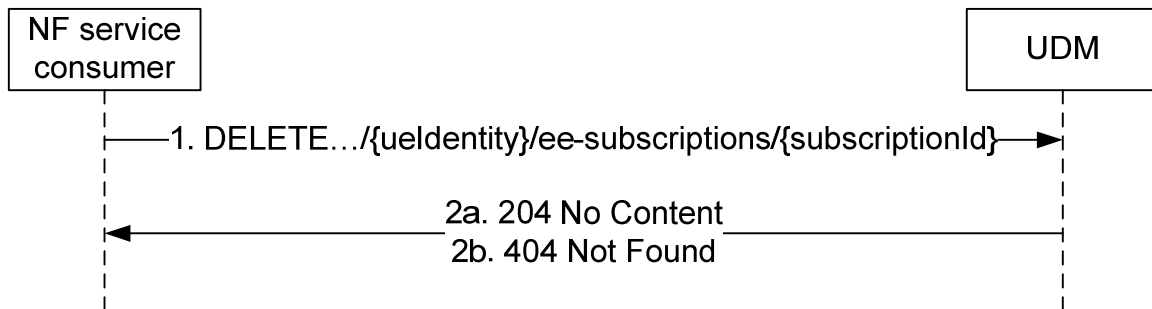


**Figure 5.5.2.3.2-1: NF service consumer unsubscribes to notifications**

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

- Monitoring Revocation Notification

- UDR-initiated Data Restoration 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).
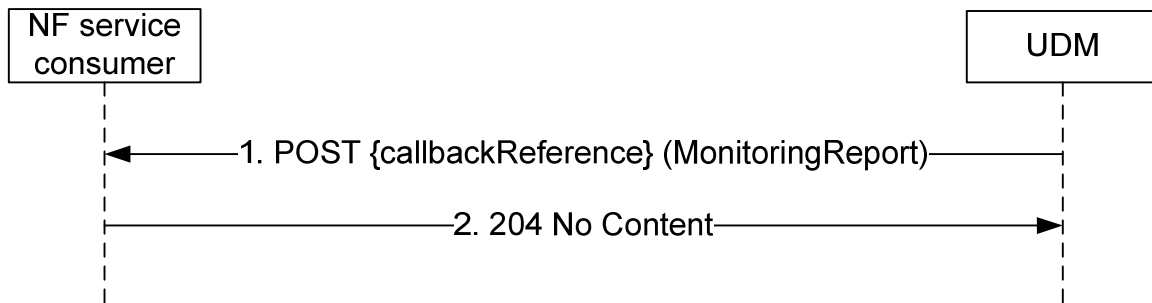
**Figure 5.5.2.4.2-1: Event Occurrence Notification**

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.

### 5.5.2.4.3 Monitoring Revocation Notification

Figure 5.5.2.4.3-1 shows a scenario where the UDM notifies the NF service consumer (that has subscribed to receive such notification) about revocation of the monitoring events due to some reasons (e.g. the revocation of the authorisation on AF or MTC Provider for certain events of the UE, or group member UE(s) are removed from a group subscription). The request contains the secondCallbackRef URI as previously received in the EeSubscription (see clause 6.4.6.2.2).
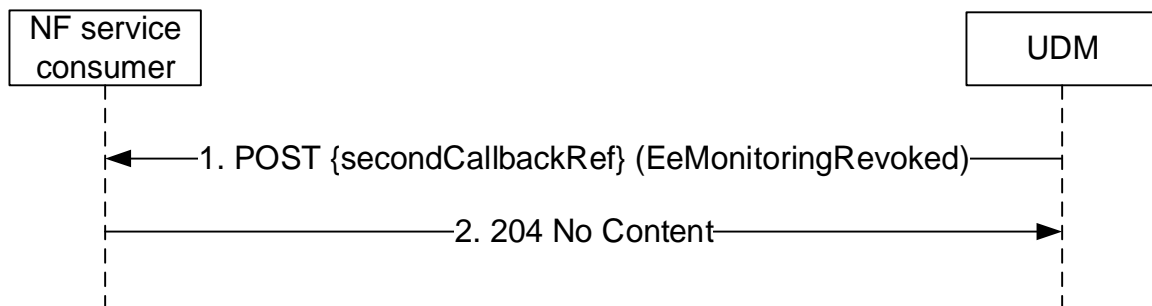


**Figure 5.5.2.4.3-1: Monitoring Revocation Notification**

1. The UDM sends a POST request to the secondCallbackRef as provided by the NF service consumer during the subscription, the request shall include the revoked monitoring events due to some reasons (e.g. the revocation of the authorisation on AF or MTC Provider for certain events of the UE).

   If the revocation is triggered by network initiated explicit event notification subscription cancel procedure (see clause 4.15.3.2.11 of 3GPP TS 23.502 [3]), the request body shall contain either:

   - a list of group member UE(s) that are excluded from the group subscription and the revocation cause shall be set to "EXCLUDED_FROM_GROUP", or

   - a GPSI which is not longer associated to an individual subscription and the revocation cause shall be set to "GPSI_REMOVED".

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.

### 5.5.2.4.4 UDR-initiated Data Restoration

Figure 5.5.2.4.4-1 shows a scenario where the UDM notifies the NF Service Consumer (e.g. a NEF) about the need to restore subscription-data due to a potential data-loss event occurred at the UDR. The request contains identities representing those UEs potentially affected by such event.
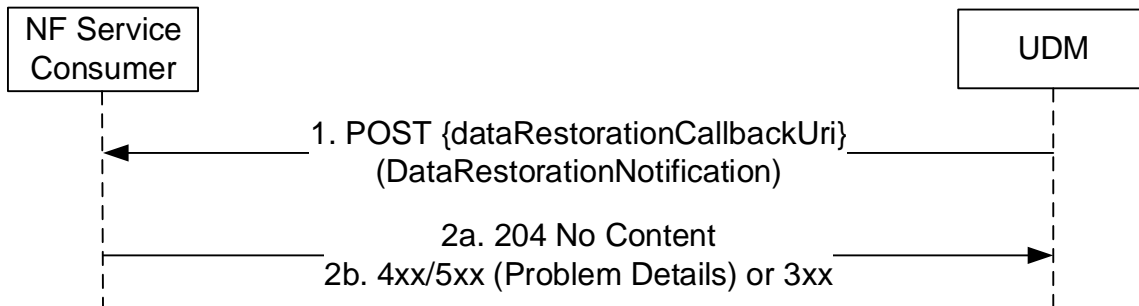


**Figure 5.5.2.4.4-1: UDR-initiated Data Restoration**

1. The UDM (after receiving a notification from UDR about a potential data-loss event) sends a POST request to the dataRestorationCallbackUri; such callback URI may be provided by the NF service consumer during the registration, or dynamically discovered by UDM by querying the NRF for the NF Profile of the NF Service Consumer.

2a. On success, the NF Service Consumer responds with "204 No Content".

2b. On failure or redirection, one of the appropriate HTTP status codes listed in Table 6.4.5.4-3 shall be returned. For a 4xx/5xx response, the message body may contain appropriate additional error information.

## 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

- Remove or add group member UE(s) for a group subscription

### 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.
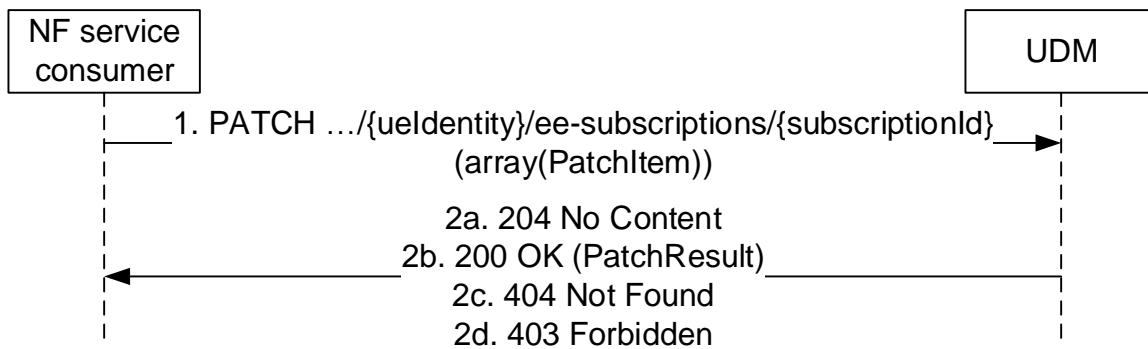
**Figure 5.5.2.5.2-1: NF service consumer updates subscription**

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, and all the modification instructions in the PATCH request have been implemented, the UDM shall respond with "204 No Content".

2b. On success, the request is accepted, but some of the modification instructions in the PATCH request have been discarded, the UDM shall respond with "200 OK" including PatchResult to indicate the failed modifications.

2c. 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).

2d. 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.

### 5.5.2.5.3          Remove or add group member UE(s) for a group subscription

The service operation is invoked by a NF Service Consumer, e.g. NEF, towards the UDM, to remove or add group member UE(s) for the group subscription.

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.
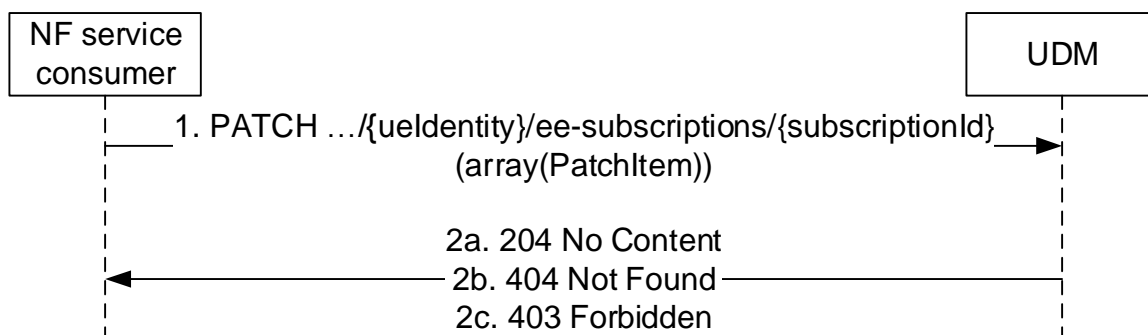


**Figure 5.5.2.5.3-1: NF service consumer updates subscription**

1. The NF service consumer (e.g. NEF) shall send a PATCH request to the resource representing a group subscription and the request body shall contain a PatchItem with the JSON pointer to the "/excludeGpsiList" or the "/includeGpsiList" object in the subscription.

2a. On success, the request is accepted, and all the modification instructions in the PATCH request have been implemented, 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

- Parameter Provisioning Data Entry per AF update

- 5G-MBS-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.
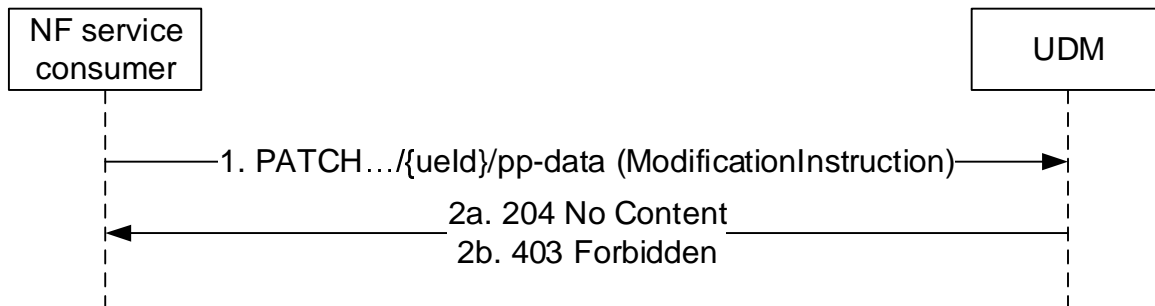


**Figure 5.6.2.2.2-1: NF service consumer updates subscription data**

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.
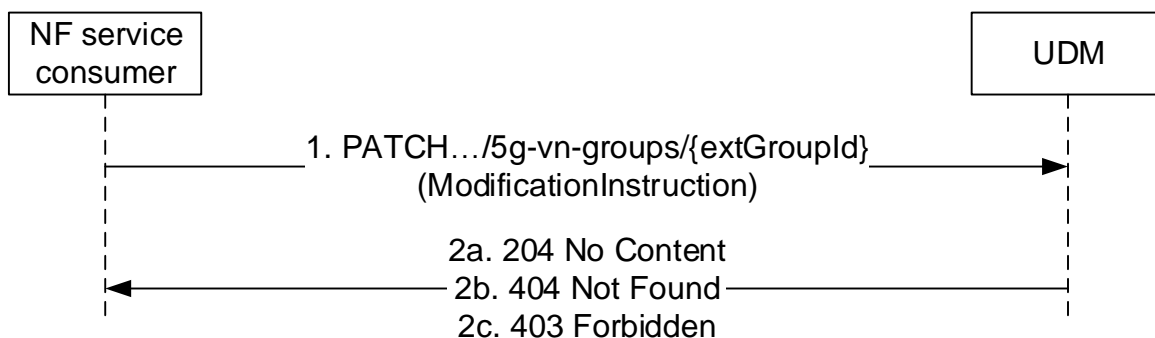


**Figure 5.6.2.2.3-1: NF service consumer modifies a 5G VN Group**

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.
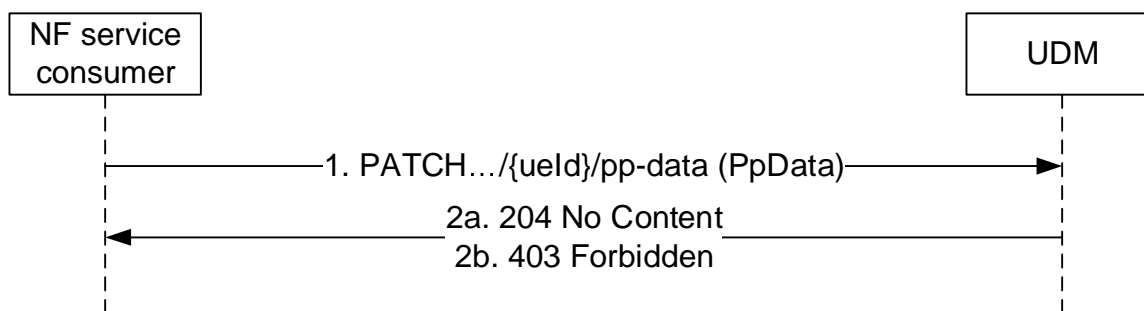


**Figure 5.6.2.2.4-1: NF service consumer updates SoR Information for a UE**

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 (i.e. new list of preferred PLMN/access technology combinations, the SOR-CMCI, if any, and the "Store the SOR-CMCI in the ME" indicator, if any, or a secured packet for a UE) 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.

### 5.6.2.2.5 Parameter Provisioning Data Entry per AF update

Figure 5.6.2.2.5-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to update the Parameter Provisioning Data entry for a certain AF, which will influence the 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 NF consumer shall send a PUT request towards the resource URI of an existing Parameter Provisioning Data entry for the AF

(.../{ueId}/pp-data-store/{afInstanceId}) with the new value in the request body. The URI variants ueId and afInstanceId shall take values as specified in Table 6.5.3.4.2-1.
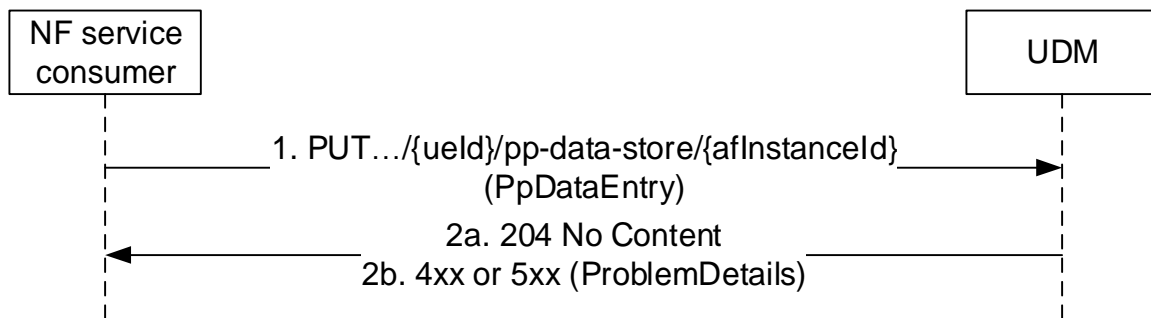


**Figure 5.6.2.2.5-1: NF service consumer updates a Parameter Provisioning Data Entry per AF**

1. The NF service consumer (e.g. NEF) sends a PUT request to the resource that represents an existing Parameter Provisioning Data entry for the AF identified by the afInstnaceId. The request body shall contain a PpDataEntry object representing the new value of the resource.

   The UDM shall check whether the AF is allowed to perform this operation for the UE. If MTC Provider information is received in the request, the UDM shall check whether the MTC Provider is allowed to perform this operation for the UE; otherwise, the UDM shall skip the MTC provider 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 PUT response body as specified in table 6.5.3.4.3.1-3.

### 5.6.2.2.6          5G-MBS-Group modification

Figure 5.6.2.2.6-1 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.
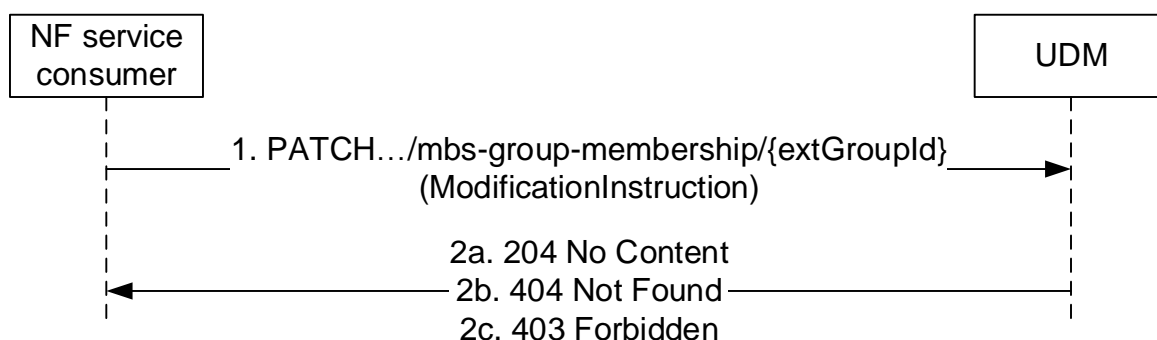


**Figure 5.6.2.2.6-1: NF service consumer modifies a 5G-MBS-Group**

1. The NF service consumer sends a PATCH request to the resource that represents a 5G MBS Group.

   If AF ID are received in the request, the UDM shall check whether the AF is allowed to perform this operation for the UE; otherwise, the UDM shall skip the 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 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.

### 5.6.2.3          Create

#### 5.6.2.3.1          General

The following procedures using the Create service operation are supported:

-    5G-VN-Group creation

-    Parameter Provisioning Data Entry per AF creation

-    5G-MBS-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.
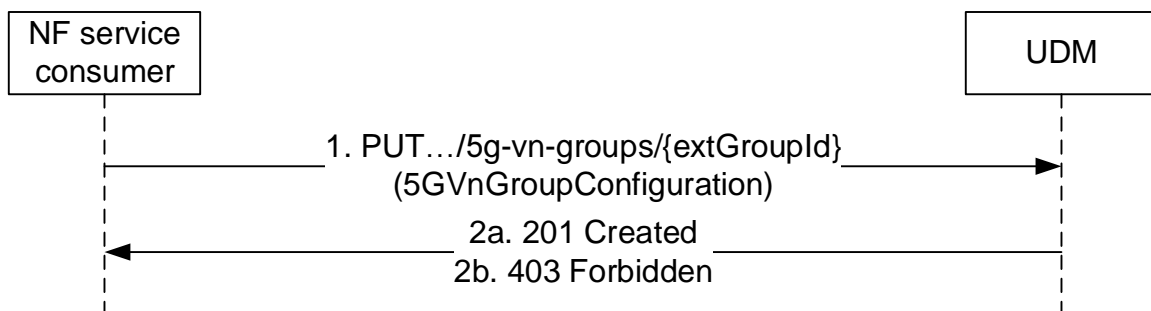


**Figure 5.6.2.3.2-1: NF service consumer creates a 5G-VN-Group**

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.

#### 5.6.2.3.3          Parameter Provisioning Data Entry per AF creation

Figure 5.6.2.2.3-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to create the Parameter Provisioning Data entry for a certain AF, which will influence the 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 NF consumer shall send a PUT request towards the resource URI of new Parameter Provisioning Data entry for the AF (.../{ueId}/pp-

data-store/{afInstanceId}) with the new value in the request body. The URI variants ueId and afInstanceId shall take values as specified in Table 6.5.3.4.2-1.
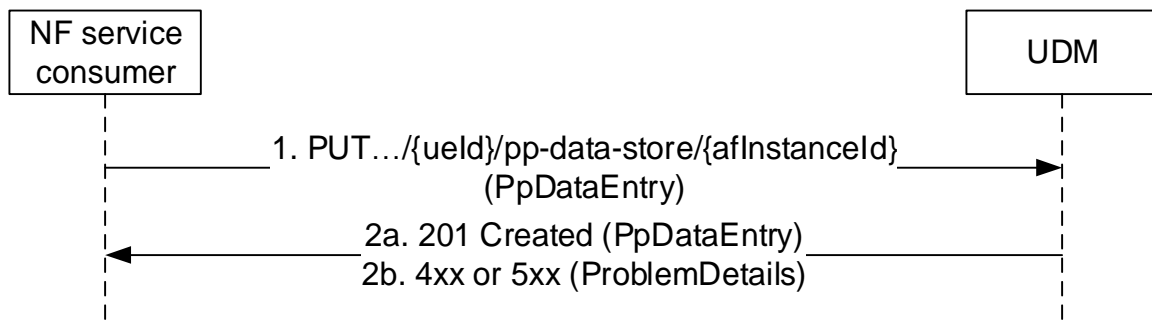


**Figure 5.6.2.3.3-1: NF service consumer creates a Parameter Provisioning Data Entry per AF**

1. The NF service consumer (e.g. NEF) sends a PUT request to the resource that represents the new Parameter Provisioning Data entry for the AF identified by the afInstnaceId. The request body shall contain a PpDataEntry object representing the value of the new resource.

   The UDM shall check whether the AF is allowed to perform this operation for the UE. If MTC Provider information is received in the request, the UDM shall check whether the MTC Provider is allowed to perform this operation for the UE; otherwise, the UDM shall skip the MTC provider authorization check.

2a. The UDM responds with "201 Created" and the response body shall contain a PpDataEntry object representing the new created resource.

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 creation 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 PUT response body as specified in table 6.5.3.4.3.1-3.

## 5.6.2.3.4 5G-MBS-Group creation

Figure 5.6.2.3.4-1 shows a scenario where the NF service consumer sends a request to the UDM to create a 5G MBS Group. The request contains the group's external identifier and the group configuration.
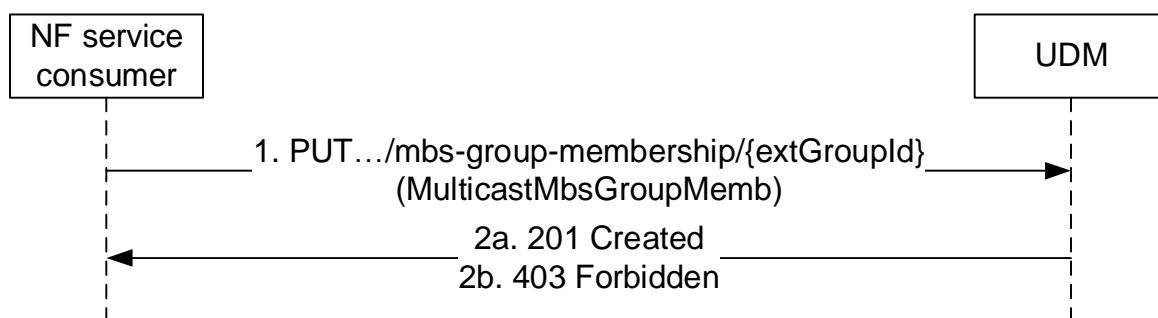


**Figure 5.6.2.3.4-1: NF service consumer creates a 5G-MBS-Group**

1. The NF service consumer sends a PUT request to the resource .../mbs-group-membership/{extGroupId}, to create a 5G MBS Group as present in the message body.

   If AF ID are received in the request, the UDM shall check whether the AF is allowed to perform this operation for the UE; otherwise, the UDM shall skip the AF authorization check.

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

2b. If the creation can't be accepted (e.g. 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

- Parameter Provisioning Data Entry per AF deletion

- 5G-MBS-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.
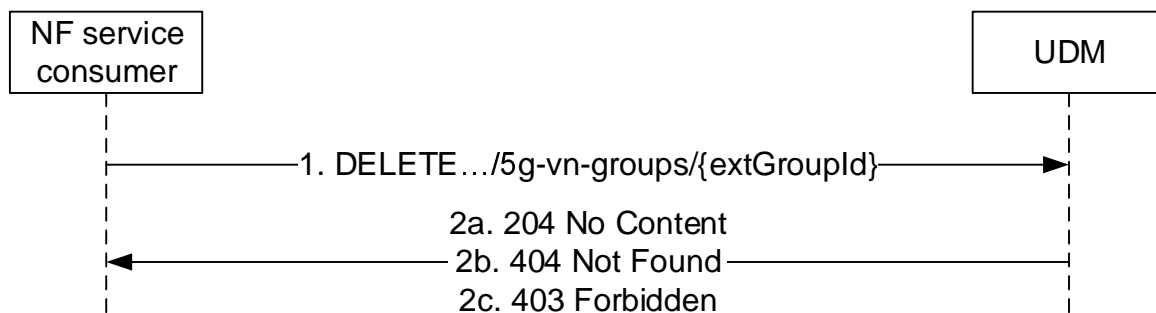


**Figure 5.6.2.4.2-1: NF service consumer deletes a 5G-VN-Group**

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.

#### 5.6.2.4.3 Parameter Provisioning Data Entry per AF deletion

Figure 5.6.2.4.3-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to delete a Parameter Provisioning Data Entry for a certain AF. The NF consumer shall send a DELETE request towards the

resource URI of an existing Parameter Provisioning Data entry for the AF (.../{ueId}/pp-data-store/{afInstanceId}). The URI variants ueId and afInstanceId shall take values as specified in Table 6.5.3.4.2-1.
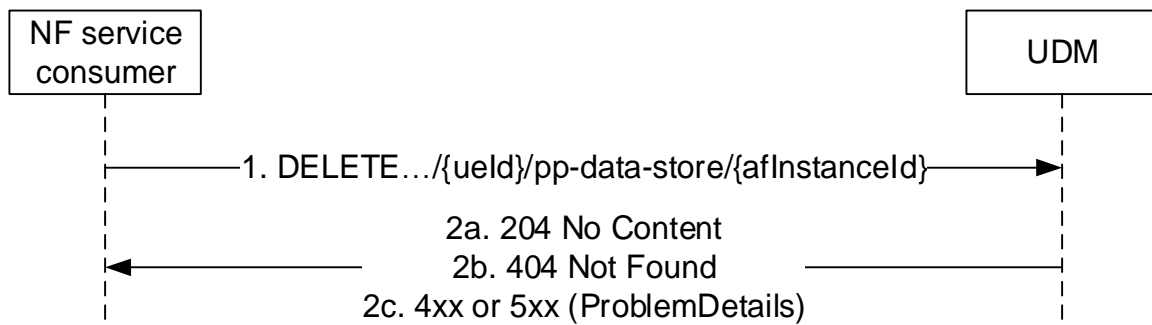


**Figure 5.6.2.4.3-1: NF service consumer deletes a Parameter Provisioning Data Entry per AF**

1. The NF service consumer sends a DELETE request to the resource ... /{ueId}/pp-data-store/{afInstanceId}, to delete the Parameter Provisioning Data Entry for the AF identified by afInstanceId.

   The UDM shall check whether the AF is allowed to perform this operation for the UE. If MTC Provider information is received in the request, the UDM shall check whether the MTC Provider is allowed to perform this operation for the UE; otherwise, the UDM shall skip the MTC provider authorization check.

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

2b. If the Parameter Provisioning Data Entry for the AF 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 as specified in table 6.5.3.4.3.2-3.

### 5.6.2.4.4 5G-MBS-Group deletion

Figure 5.6.2.4.4-1 shows a scenario where the NF service consumer sends a request to the UDM to delete a 5G MBS Group. The request contains the group's external identifier.
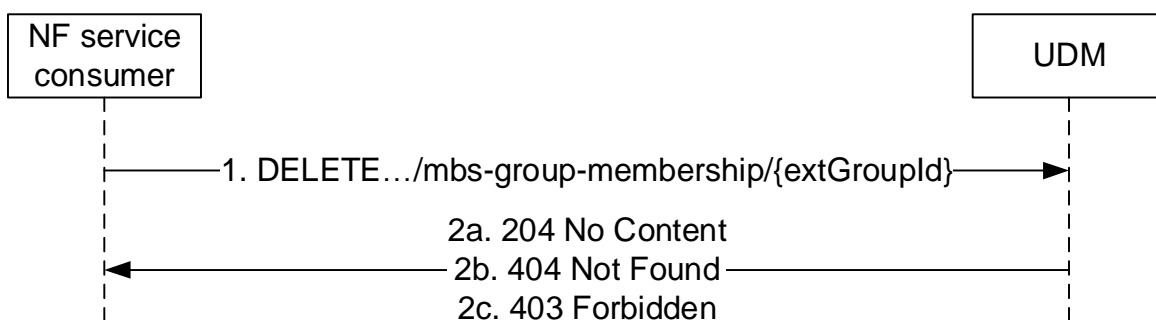


**Figure 5.6.2.4.4-1: NF service consumer deletes a 5G-MBS-Group**

1. The NF service consumer sends a DELETE request to the resource .../mbs-group-membership/{extGroupId}, to delete the 5G MBS Group identified by the external group id.

   If AF ID are received in the request, the UDM shall check whether the AF is allowed to perform this operation for the UE; otherwise, the UDM shall skip the 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 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

- Parameter Provisioning Data Entry per AF get

- 5G-MBS-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.
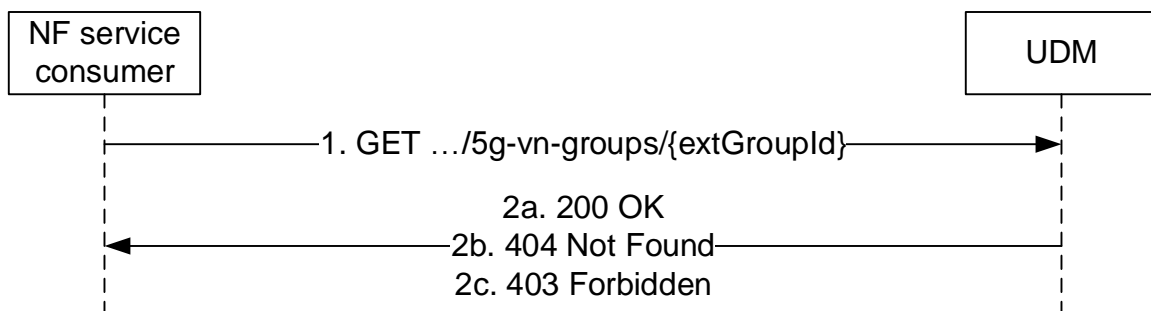


**Figure 5.6.2.5.2-1: NF service consumer gets 5G-VN-Group**

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.

#### 5.6.2.5.3 Parameter Provisioning Data Entry per AF get

Figure 5.6.2.5.3-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to get a Parameter Provisioning Data Entry for a certain AF. The NF consumer shall send a GET request towards the resource URI of an existing Parameter Provisioning Data entry for the AF (.../{ueId}/pp-data-store/{afInstanceId}). The URI variants ueId and afInstanceId shall take values as specified in Table 6.5.3.4.2-1.
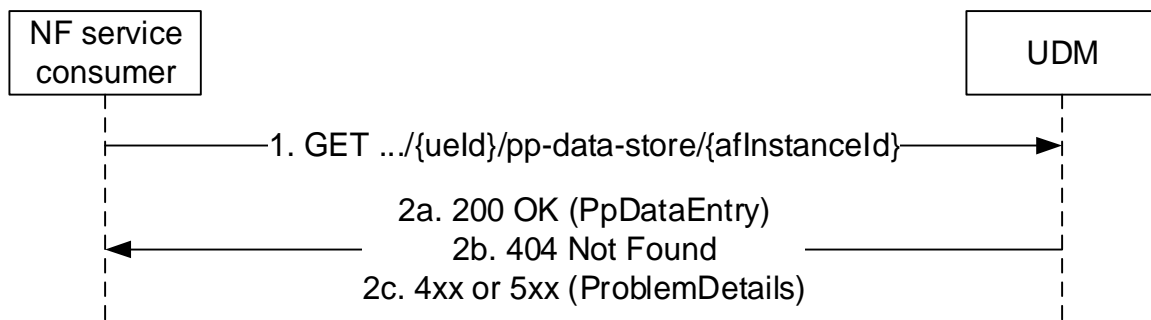
**Figure 5.6.2.5.3-1: NF service consumer gets a Parameter Provisioning Data Entry per AF**

1. The NF service consumer sends a GET request to the resource .../{ueId}/pp-data-store/{afInstanceId}, to get the Parameter Provisioning Data Entry for the AF identified by afInstanceId.

   The UDM shall check whether the AF is allowed to perform this operation for the UE. If MTC Provider information is received in the request, the UDM shall check whether the MTC Provider is allowed to perform this operation for the UE; otherwise, the UDM shall skip the MTC provider authorization check.

2a. On success, the UDM responds with "200 OK" with the Parameter Provisioning Data Entry for the AF.

2b. If the Parameter Provisioning Data Entry for the AF 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 GET response body as specified in table 6.5.3.4.3.3-3.

### 5.6.2.5.4 5G-MBS-Group get

Figure 5.6.2.5.4-1 shows a scenario where the NF service consumer sends a request to the UDM to get 5G MBS Group. The request contains the group's external identifier.
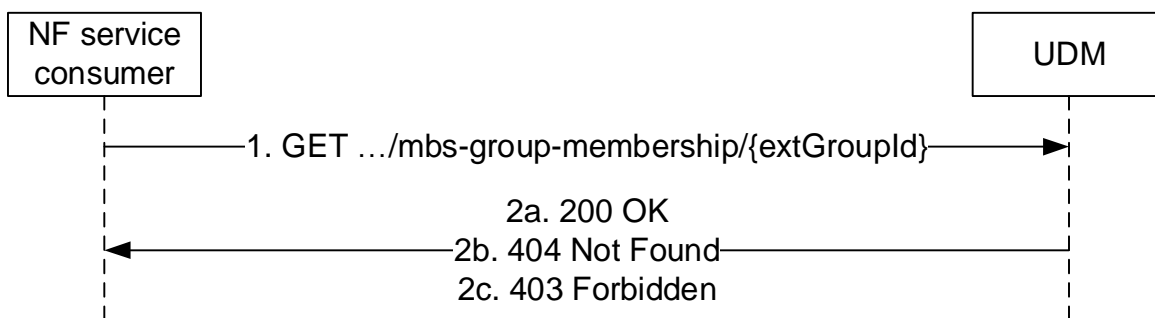


**Figure 5.6.2.5.4-1: NF service consumer gets 5G-MBS-Group**

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

2a. On success, the UDM responds with "200 Ok" with the MBS 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).
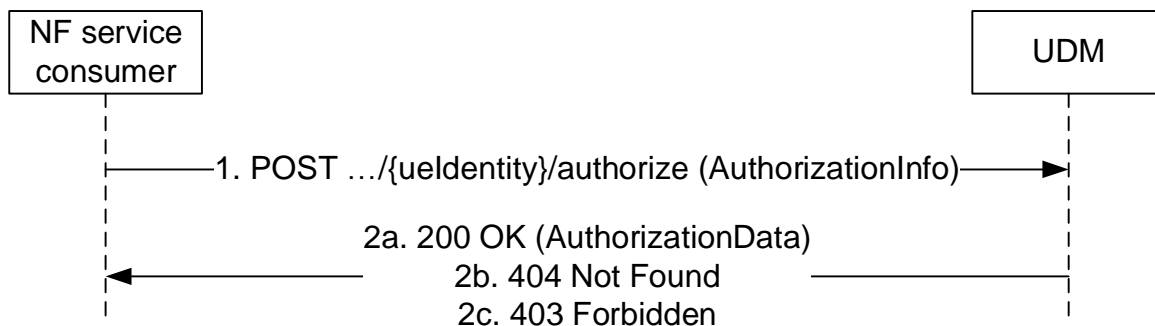


**Figure 5.7.2.2.2-1: Requesting a UE's NIDD Authorization Data**

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 authUpdateCallbackUri URI as previously received by the UDM during NIDD Authorization Data Retrieval.
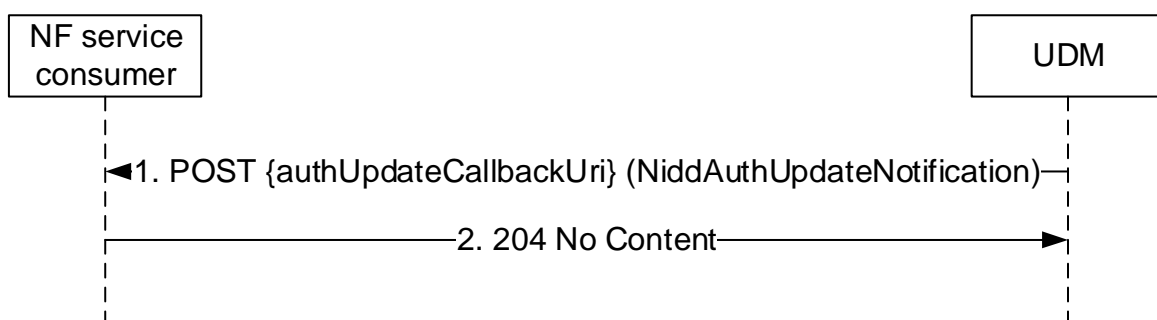


**Figure 5.7.2.3.2-1: Requesting a UE's NIDD Authorization Data**

1. The UDM sends a POST request to the authUpdateCallbackUri 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).
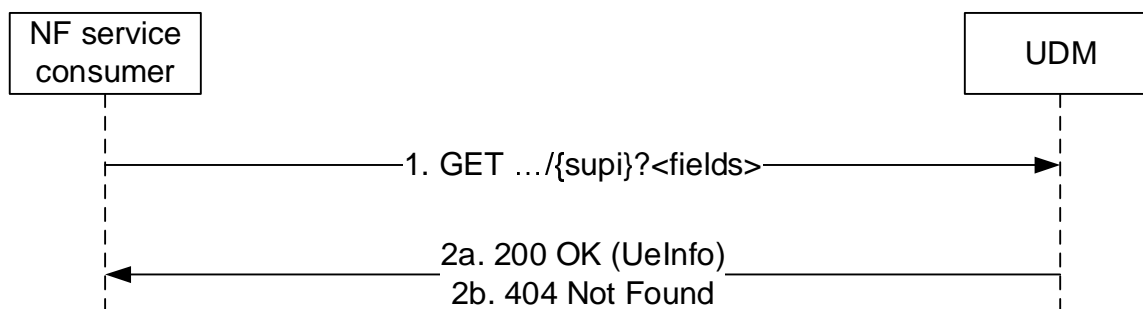


**Figure 5.8.2.2.2-1: NF service consumer requesting domain selection information**

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)
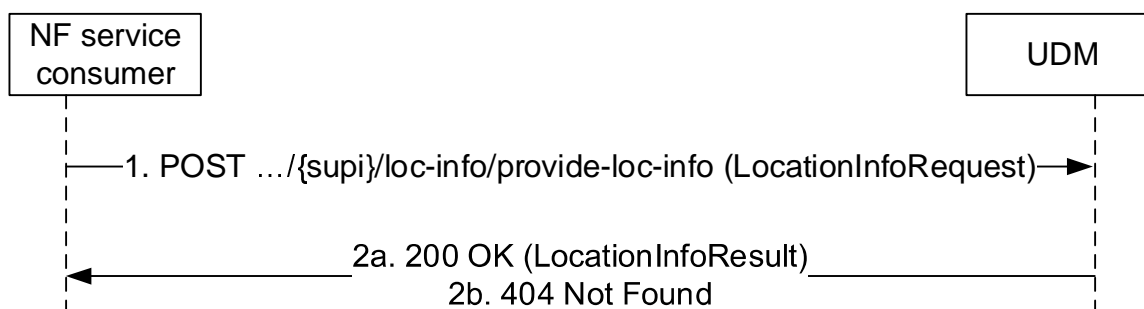


**Figure 5.8.2.3.2-1: NF service consumer requesting domain selection information**

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.

## 5.9 Nudm_ServiceSpecificAuthorization Service

### 5.9.1 Service Description

See 3GPP TS 23.501 [2] table 7.2.5-1.

### 5.9.2 Service Operations

#### 5.9.2.1 Introduction

For the Nudm_ServiceSpecificAuthorization service the following service operations are defined:

- Create

- UpdateNotify

- Remove

The Nudm_ServiceSpecificAuthorization Service is used by Consumer NFs (e.g. NEF) to retrieve the UE's authorization for a specific service relevant to the consumer NF from the UDM by means of the Create service operation.

It is also used by the Consumer NFs (e.g. NEF) that have previously received the service specific authorization result, to get notified by means of the UpdateNotify service operation when the authorization for a specific service is revoked.

It is also used by the Consumer NFs (NEF) that have previously received the service specific authorization result, to request UDM to remove the UE's authorization for a specific service relevant to the consumer NF in the UDM by means of the Remove service operation.

### 5.9.2.2 Create

#### 5.9.2.2.1 General

The following procedures using the Create service operation are supported:

- Service Specific Authorization Data Retrieval

#### 5.9.2.2.2 Service Specific Authorization Data Retrieval

Figure 5.9.2.2.2-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to receive the service specific authorization for the service parameters for an individual UE or a group of UEs (see also 3GPP TS 23.502 [3] figure 4.15.6.7a-1). The request contains the UE's identity (/{ueIdentity}), service type, and service parameters (ServiceSpecificAuthorizationInfo) associated with the UE's identity. The response from UDM may contain the authorization result (AuthorizationData).
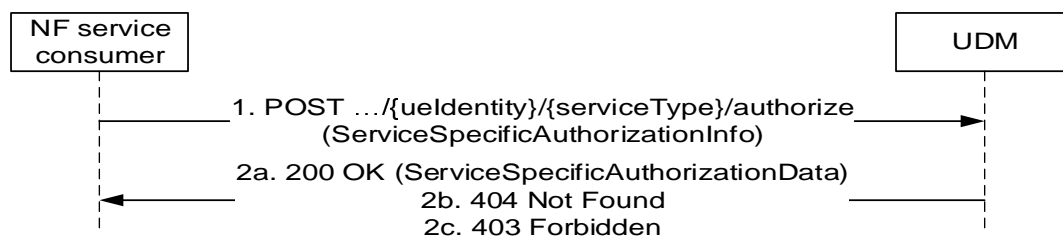


**Figure 5.9.2.2.2-1: Requesting a UE's Authorization Data for a specific service**

1. The NF service consumer (e.g. NEF) sends a POST request to invoke "authorize" custom method on the resource representing the subscribed information for service identified by the service type of a UE or a group of UEs. The payload of the request shall be an object of "ServiceSpecificAuthorizationInfo" which should contain the callback URI and may contain S-NSSAI, DNN, MTC Provider Information, AF 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. If S-NSSAI, DNN and service type received in the request are allowed or is part of the UE's subscription data or group data (for a request targeting a group), UDM shall respond successfully with "200 OK" HTTP response. The message body shall include the ServiceSpecificAuthorizationData object containing the SUPI of the UE (or the Internal Group Identifier mapped from External Group ID if the request is targeting a group) and the Service Specific Authorization Id.

2b. If there is no valid AuthorizationData for the UE Identity or unknown 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 S-NSSAI and/or DNN are not authorized for the service type according to the UE's subscription (including group data associated to the 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 POST response body.

## 5.9.2.3 UpdateNotify

### 5.9.2.3.1 General

The following procedures using the UpdateNotify service operation are supported:

- Service Specific Authorization Data Update Notification

### 5.9.2.3.2 Service Specific Authorization Data Update Notification

Figure 5.9.2.3.2-1 shows a scenario where the UDM notifies the NF service consumer (that has subscribed during Service Specific Authorization Data Retrieval to receive such notification) about authorization revoke or update of subscription data associated to the UE or group of UE (see also 3GPP TS 23.502 [3] figure 4.15.6.7a-2). The request contains the authUpdateCallbackUri URI as previously received by the UDM during Service Specific Authorization Data Retrieval.
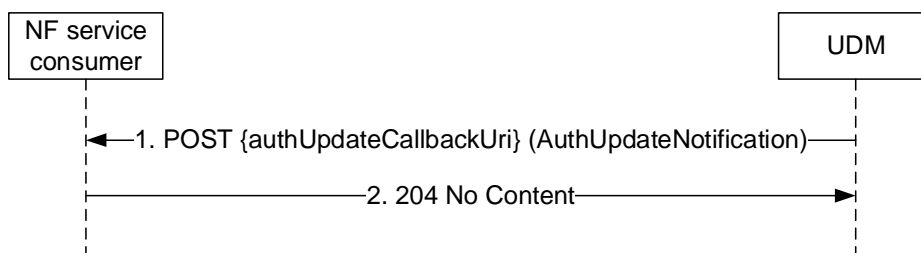


**Figure 5.9.2.3.2-1: Update UE's service specific authorization data**

1. The UDM sends a POST request to the updNotifyCallbackUri (as provided by the NF service consumer during Service Specific Authorization Result Retrieval) when the UEs subscription data (or group data associated to the UE) is modified so that the authorization of UEs association with the service type (and S-NSSAI, DNN if requested) is changed. When the authorization becomes invalid, the request body may include the cause indicating the reason why the authorization is invalid. The request body may also contain the MTC provider Information and the AF ID.

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.

## 5.9.2.3 Remove

### 5.9.2.3.1 General

The following procedures using the Remove service operation are supported:

- Service Specific Authorization Data Removal.

### 5.9.2.3.2 Service Specific Authorization Data Removal

Figure 5.9.2.3.2-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDM to remove the service specific authorization for the service parameters for an individual UE or a group of UEs (see also 3GPP TS 23.502 [3] clause 4.15.6.7). The request contains the UE's identity (/{ueIdentity}), service type, and service parameters (ServiceSpecificAuthorizationRemoveData).
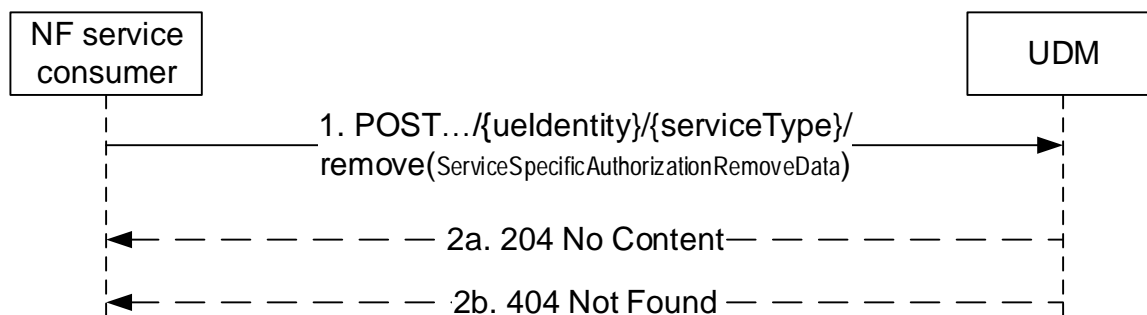


**Figure 5.9.2.3.2-1: Service Specific Authorization Data Removal**

1.  The NF service consumer (e.g. NEF) sends a POST request to invoke "remove" custom method on the resource representing the UE's subscribed information for service identified by the service type. The payload of the request shall be an object of "ServiceSpecificAuthorizationRemoveData" which contains the Service Specific Authorization Id previously received from UDM via Create Operation (see clause 5.9.2.2.2).

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

2b. If the indicated authorization to be removed cannot be found at UDM, the UDM shall return "404 Not Found" with cause IE set to the application error "AUTHORIZATION_NOT_FOUND".

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

## 5.10 Nudm_ReportSMDeliveryStatus Service

## 5.10.1 Service Description

See 3GPP TS 23.540 [66].

## 5.10.2 Service Operations

### 5.10.2.1 Introduction

For the Nudm_ReportSMDeliveryStatus service the following service operations are defined:

-   Request

The N Nudm_ReportSMDeliveryStatus Service is used by Consumer NFs (SMS-GMSC, IP-SM-GW) to report the SM-Delivery Status to UDM by means of the Request service operation.

### 5.10.2.2 Request

#### 5.10.2.2.1 General

The following procedures using the Request service operation are supported:

-   Report the SM-Delivery Status

### 5.10.2.2.2 Report the SM-Delivery Status

Figure 5.10.2.2.2-1 shows a scenario where the NF service consumer (e.g. SMS-GMSC, IP-SM-GW) sends a request to the UDM to report the SM-Delivery Status (see also 3GPP TS 23.540 [66]). The request contains the UE's identity which shall be an GPSI.
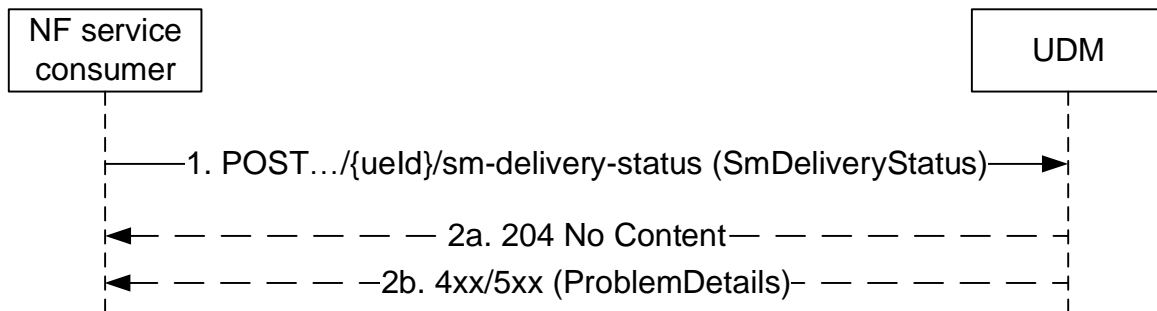


**Figure 5.10.2.2.2-1: Report the SM-Delivery Status**

1. The NF service consumer sends a POST request to the resource representing the SM-Delivery status.

2a. On success, "204 No Content" shall be returned.

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

## 5.11 Nudm_UEIdentifier Service

## 5.11.1 Service Description

See 3GPP TS 33.503 [64].

## 5.11.2 Service Operations

### 5.11.2.1 Introduction

For the Nudm_UEIdentifier service the following service operations are defined:

- Deconceal

The N Nudm_UEIdentifier Service is used by Consumer NF (i.e. the 5G PKMF) to de-conceal the SUCI of the 5G ProSe Remote UE to the SUPI.

### 5.11.2.2 Deconceal

Figure 5.11.2.2-1 shows a scenario where the NF service consumer (i.e., the 5G PKMF) sends a request to the UDM to de-conceal the SUCI of the 5G ProSe Remote UE to the SUPI (see also 3GPP TS 33.503 [64]).
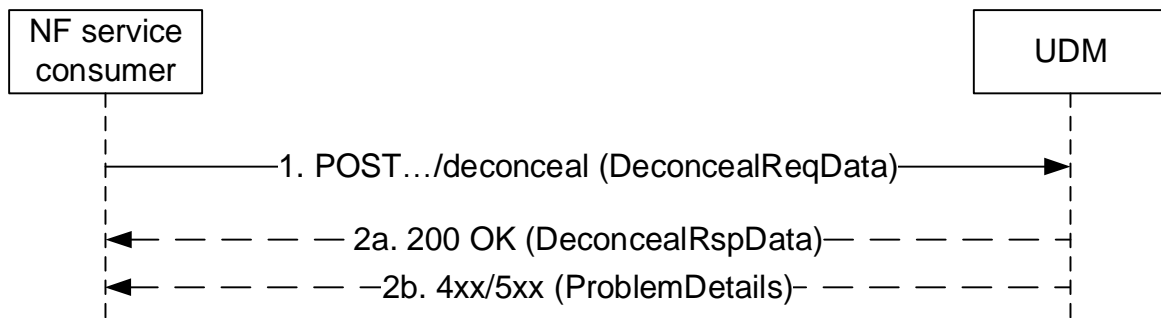
**Figure 5.11.2.2-1: Deconceal SUCI to SUPI**

1. The NF service consumer sends a POST request to the resource representing the deconceal custom operation. The request body shall contain the SUCI to be de-concealed.

2a. On success, "200 OK" shall be returned. The response body shall contain the SUPI de-concealed from the input SUCI.

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

# 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

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

Figure 6.1.3.1-1 depicts the resource URIs structure for the Nudm-SDM API.

{apiRoot}/nudm-sdm/v2

```
{apiRoot}/nudm-sdm/v2
    /{supi}
        /nssai
        /am-data
                                    /sor-ack
        /smf-select-data
                                    /upu-ack
        /ue-context-in-amf-data
                                    /subscribed-snssais-ack
        /ue-context-in-smf-data
                                    /cag-ack
        /ue-context-in-smsf-data
                                    /update-sor
        /trace-data
                                    /ecr-data
        /sm-data
        /sms-data
        /sms-mng-data
        /lcs-mo-data
        /v2x-data
        /lcs-bca-data
        /prose-data
        /mbs-data
        /uc-data
    /{ueId}
        /id-translation-result
        /lcs-privacy-data
        /sdm-subscriptions
                /{subscriptionId}
    /shared-data
        /{sharedDataId}
    /shared-data-subscriptions
        /{subscriptionId}
    /group-data
        /group-identifiers
    /multiple-identifiers
```

**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 multiple data sets from 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 |
| AccessAndMobilitySubscription Data (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 |
| EnhancedCoverageRestriction Data | /{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 |
| SessionManagementSubscripti onData (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 |
| SMSManagementSubscription Data (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 |
| LcsMobileOriginatedSubscripti onData (Document) | /{supi}/lcs-mo-data | GET | Retrieve the UE's LCS Mobile Originated subscription data |
| LcsBroadcastAssistanceSubsc riptionData (Document) | /{supi}/lcs-bca-data | GET | Retrieve the UE's LCS Broadcast Assistance subscription data |
| ProseSubscriptionData (Document) | /{supi}/prose-data | GET | Retrieve the UE's ProSe subscription data |
| V2xSubscriptionData (Document) | /{supi}/v2x-data | GET | Retrieve the UE's V2X subscription data |
| MbsSubscriptionData (Document) | /{supi}/mbs-data | GET | Retrieve the UE's 5MBS subscription data |
| UcSubscriptionData (Document) | /{supi}/uc-data | GET | Retrieve the UE's User Consent 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 |
| MultipleIdentifiers (Document) | /multiple-identifiers | GET | Retrieve SUPIs belong to the GPSIs. |

## 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 23.502 [3] 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 | PlmnIdNid | O | 0..1 | Identity of the PLMN or SNPN serving the UE |
| disaster-roaming-ind | boolean | O | 0..1 | Disaster Roaming Indicator (see 3GPP TS 23.502 [3]). When present, this IE shall be set as follows: - true: Disaster Roaming service is applied; - false (default): Disaster Roaming service is not applied. |

If "plmn-id" is included, UDM shall return the Subscribed S-NSSAIs which the UE is subscribed to use in the PLMN or SNPN 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:<br>- USER_NOT_FOUND<br>- 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, 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)<br>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.<br><br>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::<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate one of the following application errors:<br>- UNSUPPORTED_RESOURCE_URI<br><br>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>/{ueId}/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)<br>    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:<br>- USER_NOT_FOUND<br>- 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 | C | 0..1 | 200 OK | Upon partial success, if any of the requested modifications have not been accepted, but the server has set different values than those requested by the client, in any of the attributes of the resource, the modified SdmSubscription shall be returned including the accepted values, e.g. UDM shall return the list of monitored resource Uri successfully subscribed and/or the confirmed expiry time.<br>Also, upon partial success, if the NF service consumer does not support the "PatchReport" feature, the UDM shall return an SdmSubscription object in the response. (NOTE 2) |
| PatchResult | C | 0..1 | 200 OK | Upon partial success, if the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature, and in case some of the requested modifications are discarded while the rest of the modification instructions are fully accepted, UDM may return the execution report instead of the whole SdmSubscription. (NOTE 2) |
| n/a | | | 204 No Content | Upon success, an empty response body shall be returned. (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- USER_NOT_FOUND<br>- 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.<br><br>The "cause" attribute may be used to indicate one of the following application errors:<br>- 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: One of SdmSubscription or PatchResult shall be returned. | | | | |

## 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)<br>    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 | PlmnIdNid | O | 0..1 | PLMN identity of the PLMN serving the UE |
| adjacent-plmns | array(PlmnId) | O | 1..N | PLMN identities of PLMNs adjacent to the PLMN serving the UE. If present the GET response may contain adjacentPlmnRestrictions for the indicated PLMNs. |
| disaster-roaming-ind | boolean | O | 0..1 | Disaster Roaming Indicator (see 3GPP TS 23.502 [3]). When present, this IE shall be set as follows:<br>-    true: Disaster Roaming service is applied;<br>-    false (default): Disaster Roaming service is not applied. |

If "plmn-id" is included, UDM shall return the Access and Mobility Data for the SUPI associated to the PLMN or SNPN 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 |
|-----------|---|-------------|----------------|-------------|
| AccessAndMobility SubscriptionData | 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:<br>- USER_NOT_FOUND<br>- 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:<br>- 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 | PlmnIdNid | O | 0..1 | Identity of the PLMN or SNPN serving the UE |
| disaster-roaming-ind | boolean | O | 0..1 | Disaster Roaming Indicator (see 3GPP TS 23.502 [3]). When present, this IE shall be set as follows:<br>- true: Disaster Roaming service is applied;<br>- false (default): Disaster Roaming service is not applied. |

If "plmn-id" is included, UDM shall return the SMF Selection Subscription Data for the SUPI associated to the PLMN or SNPN 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:<br>- USER_NOT_FOUND<br>- 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:<br>- USER_NOT_FOUND<br>- 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 |
| 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 | PlmnIdNid | O | 0..1 | Identity of the PLMN or SNPN 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 or SNPN 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 |
|-----------|---|-------------|----------------|-------------|
| SmSubsData | M | 1 | 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:<br>- USER_NOT_FOUND<br>- 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)<br>        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 | PlmnIdNid | C | 0..1 | if absent, H-PLMN ID is used as default<br>shall be present if identifying an SNPN |
| 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:<br>- USER_NOT_FOUND<br>- 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 | PlmnIdNid | C | 0..1 | if absent, H-PLMN ID is used as default shall be present if identifying an SNPN |
| 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 | PlmnIdNid | 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 |
|---|---|---|---|---|
| SubscriptionData Sets | 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:<br>- USER_NOT_FOUND<br>- 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 or GPSI. It is queried by the NEF for GPSI to SUPI translation or SUPI to GPSI translation. See 3GPP TS 23.502 [3] clauses 4.13.2.2, 4.13.7.2 and 4.15.6.8.

### 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)<br>    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 |
| af-id | string | O | 0..1 | AF Identifier, see 3GPP TS 23.502 [3] clause 4.13.2.2 and clause 4.13.7.2<br><br>If not present, additional authorization on AF indentifier is not required (see 3GPP TS 23.502 [3] clause 4.15.6.8) |
| app-port-id | AppPortId | C | 0..1 | Indicates the Application port identity, see 3GPP TS 23.501 [2] clause 4.4.7 or 3GPP TS 23.502 [3] clause 4.13.7.2.<br>This attribute shall be present if ueId is a SUPI in Resource URI variables and if the application port identity is available. |
| af-service-id | string | C | 0..1 | Indicates the Application Service Identifier, see 3GPP TS 23.502 [3] clause 4.15.z.<br>This attribute shall be present if ueid is a SUPI in Resouce URI variables and if the application service identifier is available. |
| mtc-provider-info | MtcProviderInformation | C | 0..1 | Indicates the information of MTC Service Provider and/or MTC Application.<br>This attribute shall be present if ueid is a SUPI in Resource URI variables and if the MTC provider information is available. |
| requested-gpsi-type | GpsiType | C | 0..1 | Indicates the requested GPSI type, and it may be included when the ueId variable in the resource URI is a SUPI.<br><br>If the ueId variable in the resource URI is a GPSI, this parameter should not be included (i.e., in that case, the UDM returns the GPSI type that was not used in ueId, if available). |

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:<br>- USER_NOT_FOUND<br>- DATA_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AF_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 6.1.3.12.3.1-4: 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:<br>- 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)<br>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 | PlmnIdNid | O | 0..1 | Identity of the PLMN or SNPN serving the UE |

If "plmn-id" is included, UDM shall return the Trace Data for the SUPI associated to the PLMN or SNPN 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:<br>- USER_NOT_FOUND<br>- 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 | 0..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:<br>- 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.<br><br>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:<br>- UNSUPPORTED_RESOURCE_URI<br><br>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.<br><br>The "cause" attribute may be used to indicate one of the following application errors::<br>- 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 | C | 0..1 | 200 OK | Upon partial success, if any of the requested modifications have not been accepted, but the server has set different values than those requested by the client, in any of the attributes of the resource,the modified SdmSubscription shall be returned including the accepted values, e.g. UDM shall return the list of monitored resource Uri successfully subscribed and/or the confirmed expiry time.<br>Also, upon partial success, if the NF service consumer does not support the "PatchReport" feature, the UDM shall return an SdmSubscription object in the response.<br>(NOTE 2) |
| PatchResult | C | 0..1 | 200 OK | Upon partial success, if the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature, and in case some of the requested modifications are discarded while the rest of the modification instructions are fully accepted, UDM may return the execution report instead of the whole SdmSubscription. (NOTE 2) |
| n/a | | | 204 No Content | Upon success, an empty response body shall be returned. (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | The resource corresponding to the SubscriptionId can't be found.<br><br>The "cause" attribute may be used to indicate one of the following application errors:<br>- 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.<br><br>The "cause" attribute may be used to indicate one of the following application errors:<br>- 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: One of SdmSubscription or PatchResult shall be returned. | | | | |

## 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:<br>- USER_NOT_FOUND<br>- 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:<br>- 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.

It is also queried by the TSCTSF for the SUPI(s) 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 |
| af-id | string | O | 0..1 | AF Identifier, see 3GPP TS 23.502 [3] clause 4.13.2.2 and clause 4.13.7.2<br><br>If not present, additional authorization on AF indentifier is not required (see 3GPP TS 23.502 [3] clause 4.15.6.8) |
| 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.<br><br>When present, it shall be set as following:<br>- true: UE identifiers are required<br>- false (default): UE identifiers are not required |
| NOTE: Either ext-group-id or 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:<br>- GROUP_IDENTIFIER_NOT_FOUND<br>- DATA_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AF_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 6.1.3.20.3.1-4: 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:<br>- 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:<br>- 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)<br>    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:<br>- USER_NOT_FOUND<br>- 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:<br>- USER_NOT_FOUND<br>- 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:<br>- USER_NOT_FOUND<br>- 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:<br>- USER_NOT_FOUND<br>- 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)<br>          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:<br>- USER_NOT_FOUND<br>- 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)<br>     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 | PlmnIdNid | O | 0..1 | Identity of the PLMN or SNPN 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 or SNPN 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 6.1.3.28.3.1-2 and the response data structures and response codes specified in table 6.1.3.28.3.1-3.

**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:<br>- USER_NOT_FOUND<br>- 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 |
|---|---|---|---|---|
| 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 6.1.3.29.3.1-2 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:<br>- 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. | | | | |

### 6.1.3.30          Resource: ProseSubscriptionData (Document)

#### 6.1.3.30.1          Description

This resource represents the subscribed ProSe Data for a UE. It is queried by the 5G DDNMF, 5G PKMF, PAnF.

#### 6.1.3.30.2          Resource Definition

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

This resource shall support the resource URI variables defined in table 6.1.3.30.2-1.

**Table 6.1.3.30.2-1: 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)<br>        pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

#### 6.1.3.30.3          Resource Standard Methods

##### 6.1.3.30.3.1          GET

This method shall support the URI query parameters specified in table 6.1.3.30.3.1-1.

**Table 6.1.3.30.3.1-1: 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 ProSe Data for the UE identified by the supi.

This method shall support the request data structures specified in table 6.1.3.30.3.1-2 and the response data structures and response codes specified in table 6.1.3.30.3.1-3.

**Table 6.1.3.30.3.1-2: Data structures supported by the GET Request Body on this resource**

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

**Table 6.1.3.30.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| ProseSubscription Data | M | 1 | 200 OK | Upon success, a response body containing the ProSe 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:<br>- USER_NOT_FOUND<br>- 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. | | | | |

### 6.1.3.31 Resource: MbsSubscriptionData (Document)

#### 6.1.3.31.1 Description

This resource represents the subscribed 5MBS Data for a UE as defined in clause 6.4.2 of 3GPP TS 23.247 [59]. It is queried by the SMF.

#### 6.1.3.31.2 Resource Definition

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

This resource shall support the resource URI variables defined in table 6.1.3.31.2-1.

**Table 6.1.3.31.2-1: 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)<br>    pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

#### 6.1.3.31.3 Resource Standard Methods

##### 6.1.3.31.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.31.3.1-1.

**Table 6.1.3.31.3.1-1: 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 5MBS Subscription Data for the UE identified by the supi.

This method shall support the request data structures specified in table 6.1.3.31.3.1-2 and the response data structures and response codes specified in table 6.1.3.31.3.1-3.

**Table 6.1.3.31.3.1-2: Data structures supported by the GET Request Body on this resource**

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

**Table 6.1.3.31.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| MbsSubscriptionData | M | 1 | 200 OK | Upon success, a response body containing the 5MBS 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:<br>- USER_NOT_FOUND<br>- 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. | | | | |

### 6.1.3.32 Resource: UcSubscriptionData (Document)

#### 6.1.3.32.1 Description

This resource represents the subscribed User Consent Data for a UE as defined in Annex V.2 of 3GPP TS 33.501 [6], clause 5.1.3 of 3GPP TS 33.558 [63] and clause 6.2 of 3GPP TS 23.288 [35]. It is queried by the NWDAF, DCCF, NEF and trusted AF (e.g. EES).

#### 6.1.3.32.2 Resource Definition

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

This resource shall support the resource URI variables defined in table 6.1.3.32.2-1.

**Table 6.1.3.32.2-1: 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)<br>    pattern: See pattern of type Supi in 3GPP TS 29.571 [7] |

#### 6.1.3.32.3 Resource Standard Methods

##### 6.1.3.32.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.32.3.1-1.

**Table 6.1.3.32.3.1-1: 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 |
| uc-purpose | UcPurpose | O | 0..1 | Contains a user consent purpose.<br>See clause 6.1.6.3.20. |

UDM shall return the User Consent Subscription Data for the UE identified by the supi.

This method shall support the request data structures specified in table 6.1.3.32.3.1-2 and the response data structures and response codes specified in table 6.1.3.32.3.1-3.

**Table 6.1.3.32.3.1-2: Data structures supported by the GET Request Body on this resource**

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

**Table 6.1.3.32.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| UcSubscriptionData | M | 1 | 200 OK | Upon success, a response body containing the User Consent 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:<br>- USER_NOT_FOUND<br>- 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. | | | | |

## 6.1.3.33 Resource: MultipleIdentifiers (Document)

### 6.1.3.33.1 Description

This resource represents the Multiple Identifiers handled by UDM. It is queried by the TSCTSF for translation from list of GPSIs to the list of SUPIs.

### 6.1.3.33.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/multiple-identifiers

This resource shall support the resource URI variables defined in table 6.1.3.33.2-1.

**Table 6.1.3.33.2-1: Resource URI variables for this resource**

| Name | Data type | Definition |
|---|---|---|
| apiRoot | string | See clause 6.1.1 |

### 6.1.3.33.3 Resource Standard Methods

#### 6.1.3.33.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.33.3.1-1.

**Table 6.1.3.33.3.1-1: 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 |
| gpsi-list | array(Gpsi) | M | 1..N | List of GPSIs. |

This method shall support the request data structures specified in table 6.1.3.33.3.1-2 and the response data structures and response codes specified in table 6.1.3.33.3.1-3.

**Table 6.1.3.33.3.1-2: Data structures supported by the GET Request Body on this resource**

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

**Table 6.1.3.33.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| UeIdentifiers | M | 1 | 200 OK | Upon success, a response body containing the list of UE 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:<br>- USER_NOT_FOUND<br>- 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 6.1.3.33.3.1-4: 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 6.1.3.33.3.1-5: 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 |

## 6.1.4     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 3GPP TS 29.500 [4] / 3GPP TS 29.501 [5].

**Table 6.1.5.1-1: Notifications overview**

| Notification | Resource URI | HTTP method or custom operation | Description (service operation) |
|---|---|---|---|
| Data Change Notification | {callbackReference} | POST | |
| Data Restoration Notification | {dataRestorationCallbackUri} | 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 |

### 6.1.5.3     Data Restoration Notification

The POST method shall be used to inform the NF Service Consumer about a potential data-loss event occurred at the UDR, and the callback URI may be provided during the creation of an SDM subscription, or dynamically discovered by UDM by querying NRF for a default notification URI.

Resource URI: {dataRestorationCallbackUri}

Support of URI query parameters is specified in table 6.1.5.3-1.

**Table 6.1.5.3-1: 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 6.1.5.3-2 and of response data structures and response codes is specified in table 6.1.5.3-3.

**Table 6.1.5.3-2: Data structures supported by the POST Request Body**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| DataRestorationNotification | M | 1 | Contains identifiers representing those UEs potentially affected by a data-loss event at the UDR. |

**Table 6.1.5.3-3: 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. |
| NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

**Table 6.1.5.3-4: 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 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 6.1.5.3-5: 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 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 | |
| ContextInfo | 6.1.6.2.69 | Contains the HTTP Headers received by the NFs |
| 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 |
| PlmnRestriction | 6.1.6.2.74 | |
| ProseSubscriptionData | 6.1.6.2.76 | ProSe Subscription Data |
| AerialUeSubscriptionInfo | 6.1.6.2.78 | Aerial UE Subscription Information |
| SmSubsData | 6.1.6.2.79 | |
| ExtendedSmSubsData | 6.1.6.2.80 | |
| AmfInfo | 6.1.6.2.81 | AMF information |
| ProSeAllowedPlmn | 6.1.6.2.82 | Contains the allowed PLMN information for ProSe Service |
| ImmediateReport | 6.1.6.2.83 | UDM SDM Immediate Report |
| MbsSubscriptionData | 6.1.6.2.84 | 5MBS Subscription Data |
| UcSubscriptionData | 6.1.6.2.85 | User Consent Subscription Data |
| UeContextInSmfDataSubFilter | 6.1.6.2.86 | UE Context In Smf Data Subscription Filter |
| UeIdentifiers | 6.1.6.2.87 | List of UE identifiers |
| SupiInfo | 6.1.6.2.88 | List of the SUPIs |
| 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 | |
| CodeWordInd | 6.1.6.3.14 | |
| MdtUserConsent | 6.1.6.3.15 | MDT User Consent |
| SharedDataTreatmentInstruction | 6.1.6.3.16 | |
| GpsiType | 6.1.6.3.17 | Type of GPSI (MSISDN or External-ID) |
| SorTransparentContainer | 6.1.6.3.2 | |
| AerialUeIndication | 6.1.6.3.18 | Indication on whether Aerial service for UE is allowed or not. |
| UpuTransparentContainer | 6.1.6.3.2 | |
| ProseDirectAllowed | 6.1.6.3.19 | Contains the ProSe Services that can be authorised by the given PLMN identity. |
| UcPurpose | 6.1.6.3.20 | Purpose of the user consent |
| UserConsent | 6.1.6.3.21 | 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:<br>- DnnConfigurations; see clause 6.1.6.2.8;<br>- EpsIwkPgws; see clause 6.2.6.2.2;<br>- 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] | |
| AmbrRm | 3GPP TS 29.571 [7] | |
| SliceMbrRm | 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] | |
| RfspIndexRm | 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:<br>- 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 | |
| DataRestorationNotification | 6.2.6.2.25 | Contains identities representing those UEs potentially affected by a data-loss event at the UDR |
| 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] | |
| Fqdn | 3GPP TS 29.571 [7] | Fully Qualified Domain Name |
| NefId | 3GPP TS 29.510 [19] | |
| PatchResult | 3GPP TS 29.571 [7] | |
| NrV2xAuth | 3GPP TS 29.571 [7] | |
| LteV2xAuth | 3GPP TS 29.571 [7] | |
| ProseServiceAuth | 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] | |
| NfGroupId | 3GPP TS 29.571 [7] | |
| EcsServerAddr | 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 |
| SpatialValidityCond | 3GPP TS 29.571 [7] | |
| AccessType | 3GPP TS 29.571 [7] | Access Type |
| NsSrg | 3GPP TS 29.571 [7] | NSSRG value |
| MbsSessionId | 3GPP TS 29.571 [7] | 5MBS Session Id |
| RoamingRestrictions | 3GPP TS 29.571 [7] | Roaming Restrictions related information |
| PlmnIdNid | 3GPP TS 29.571 [7] | |

## 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 1) (NOTE 2) (NOTE 3) (NOTE 4) | |
| singleNssais | array(Snssai) | O | 1..N | List of non default Single Nssais. (NOTE 1) (NOTE 3) | |
| 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.<br>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, Nsac, Nssrg |
| suppressNssrgInd | boolean | O | 0..1 | Indicates whether the AMF shall provide all subscribed S-NSSAIs to the UE not indicating support of subscription-based restrictions to simultaneous registration of network slices, even if these S-NSSAIs do not share a common NSSRG.<br><br>true: indicates that the AMF shall provide all subscribed S-NSSAIs to the UE not indicating support of subscription-based restrictions to simultaneous registration of network slices. false: indicates that the AMF does not need to provide all subscribed S-NSSAIs to the UE not indicating support of subscription-based restrictions to simultaneous registration of network slices. | Nssrg |
| NOTE 1: 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.<br>The total number of subscribed S-NSSAIs (including default S-NSSAIs and non-default S-NSSAIs) shall not exceed 16. | | | | | |
| NOTE 2: If NSSRG information is present in the subscription data, the default S-NSSAIs, if more than one is present, are associated with the same NSSRG values as defined in clause 5.15.12 of 3GPP TS 23.501 [2]. | | | | | |
| NOTE 3: If NSSRG information is present, at least one NSSRG shall be associated with each of the S-NSSAIs in the subscription information. | | | | | |
| NOTE 4: If the use case requires the UE to remain reachable at all times with at least one slice, it is recommended that at least one default S-NSSAI is not subject to network slice admission control, to avoid registration rejection in the case of no requested NSSAI was provided or none of the S-NSSAIs in the requested NSSAI was allowed (e.g. due to exceeding the maximum number of UEs configured for that S-NSSAI) as specified in clause 4.2.11.2 of 3GPP TS 23.502 [3]. | | | | | |

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.<br>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.<br>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.<br>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.<br>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.<br>The URI shall take the form of either an absolute URI or an absolute-path reference as defined in IETF RFC 3986 [31].<br>See NOTE 3.<br>Monitored Resource URIs should not contain query parameters. Instead, attributes within the SdmSubscription (e.g. singleNssai, dnn, plmnId) may be used for filtering. Received query parameters may be ignored by the UDM. | |
| 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.<br>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.<br>When present, this IE shall contain the Network Identifier only, or Wildcard DNN.<br>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).<br><br>It shall be present if the NF Instance is located in a different PLMN than the UDM.<br><br>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.<br><br>When present, this IE shall be set as following:<br>- true: immediate report is required<br>- false (default) immediate report is not required | ImmediateReport |
| report | ImmediateReport | C | 0..1 | This IE shall be present in Subscribe response, if the immediateReport attribute is set to "true" in Subscribe request.<br><br>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<br>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.<br>Shall be absent on Nudm and may be present on Nudr. | |
| nfChangeFilter | boolean | O | 0..1 | It may be present when monitoredResourceUris is related to the ue-context-in-amf-data and ue-context-in-smf-data.<br>If present, it indicates the consumer NF wants notification when NF is changed in the ue-context-in-amf-data and ue-context-in-smf-data. | ENA |
| 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:<br>- true: the subscription is unique<br>- false: the subscription is not unique | LimitedSubscriptions |
| resetIds | array(string) | O | 1..N | May be present in subscribe response messages.<br>The NF service consumer may decide to re-subscribe at the UDM when receiving a data restoration notification containing a matching resetId. | |
| ueConSmfDataSubFilter | UeContextInSmfDataSubFilter | O | 0..1 | This IE may be present to receive the notification on changes for information in UeContextInSmfData related to specific PDU sessions. | UeConSmfDataSubFilter |
| dataRestorationCallbackUri | Uri | O | 0..1 | If present, it contains the URI where notifications about UDR-initiated data restoration shall be sent by UDM. | |

| udrRestartInd | boolean | O | 0..1 | May be present in request messages from the UDM consumers to the UDM.<br>If present:<br>- true: indicates that the registration message sent by the UDM consumer is due to a re-synchronization event, motivated by a previous reception at the UDM consumer of a Data Restoration Notification from the UDM<br>- false (or absent): indicates that this is a normal request message (i.e., not motivated by a data restoration notification event) | |
|---|---|---|---|---|---|
| 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).<br>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".<br>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".<br>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).<br>This attribute is only applicable to the Nudm interface and shall not be included over the Nudr interface. | |
| hssGroupId | NfGroupId | O | 0..1 | Identity of the HSS group associated with the subscription, which may be used by the UDM in discovering the HSS; see 3GPP TS 29.510 [19]. This attribute may be included if the coreNetworkTypeRestrictions does not indicate a value of "EPC".<br>This attribute is only applicable to the Nudr interface and shall not be included over the Nudm 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) Contains unique items | |
| forbiddenAreas | array(Area) | O | 0..N | List of forbidden areas in 5GS (NOTE 6, NOTE 7) | |
| serviceAreaRestriction | ServiceAreaRestriction | O | 0..1 | Subscribed Service Area Restriction (NOTE 7) | |
| 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.<br>    - 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.<br>    - 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.<br><br>This attribute may be present on Nudr interface and shall be absent on UDM interface.<br><br>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.<br>    - When set to true: it indicates that the UDM shall retrieve SoR information from the SOR-AF.<br>    - When set to false or absent: it indicates that the retrieval of SorInfo from the SOR-AF is not required.<br><br>This attribute may be present on Nudr interface and shall be absent on Nudm interface.<br><br>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;<br>    - 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;<br>    - 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.<br><br>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".<br><br>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. | |
| routingIndicator | string | O | 0..1 | This IE may be sent in Nudm_SDM notification as defined in 3GPP TS 23.502 Clause 4.20.2, if UE Parameter Update was sent for Routing Indicator Update, but without requesting the UE to re-register. | |
| 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 List | ExpectedUeBeha viourData | 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) Contains unique items | |
| secondaryRatRestricti ons | 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) Contains unique items | |
| edrxParametersList | array(EdrxParam eters) | 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(PtwParame ters) | 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. | |
| adjacentPlmnRestrictio ns | map(PlmnRestric tion) | O | 1..N | A map (list of key-value pairs where PlmnId converted to string serves as key; see 3GPP TS 29.571 [7]) of PlmnRestrictions for adjacent PLMNs | |
| wirelineForbiddenArea s | array(WirelineAre a) | O | 0..N | List of forbidden areas for 5G-BRG/5G-CRG/FN-CRG (NOTE 6, NOTE 7) | |
| wirelineServiceAreaRe striction | WirelineServiceA reaRestriction | O | 0..1 | Subscribed Service Area Restriction for 5G-BRG/5G-CRG/FN-CRG (NOTE 7) | |
| pcfSelectionAssistanc eInfos | array(PcfSelectio nAssistanceInfo) | C | 1..N | List of combination of DNN and S-NSSAI that indicates that the same PCF needs to be selected by the AMF. (NOTE 5) | |
| aerialUeSubInfo | AerialUeSubscrip tionInfo | O | 0..1 | This IE shall contain the subscribed Aerial UE Subscription Information when present. | |
| roamingRestrictions | RoamingRestricti ons | O | 0..1 | This IE is used by Nudr_DataRepository API starting with 3GPP Rel-17 and onwards (see Table 5.2.3.3.1-3 in 3GPP TS 29.505 [10]). If present, this IE contains information on the roaming restrictions. If this IE is absent e.g. if the UDR is not provisioned with the serving PLMN ID, then the UDM may use the UE's home subscribed profile as the default profile to handle the roaming and SNPN scenarios. | |
| remoteProvInd | boolean | O | 0..1 | Indicates whether the UE is allowed only for Remote Provisioning as specified in clause 5.30.2.10.3.2 of 3GPP TS 23.501 [2]. UE subscription either allows, or does not allow the UE to access the PLMN as the Onboarding Network using PLMN credentials. - false (default), or the attribute is absent: indicates that the UE is not restricted to the Onboarding only; - true: indicates that the UE is allowed only for the Onboarding. | |
| 3gppChargingCharact eristics | 3GppChargingCh aracteristics | O | 0..1 | Subscribed charging characteristics data associated to the subscription. | |

| NOTE 1: | AccessAndMobilitySubscriptionData can be UE-individual data or shared data. |
|---------|----------------------------------------------------------------------------|
| | UE-individual data take precedence over shared data unless treatment instructions associated to the shared data indicate otherwise. |
| | E.g.: When an attribute of type array is present but empty within UE-Individual data and present (with any cardinality) in shared data and no treatment instructions are applicable, 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 and no treatment instructions are applicable, 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. |
| NOTE 5: | If multiple PDU sessions to one DNN and S-NSSAI are established in EPS, the AMF shall select the same PCF by configuration or by using existing method, e.g. same PCF selection in usage monitoring. |
| NOTE 6: | When UE is only permitted in a small area, i.e. the UE is forbidden in most of TAIs in the PLMN, AreaCode (e.g. "All TAIs except xxx") may be used to avoid provisoning and transferring large number of TAIs. AeraCode may be used otherwise. |
| NOTE 7: | AreaCode for VPLMN(s) may be provisioned under agreement between operators. |

### 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.<br>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 |
| hssGroupId | NfGroupId | O | 0..1 | Identity of the HSS group associated with the subscription, which may be used by the UDM in discovering the HSS; see 3GPP TS 29.510 [19].<br><br>May be present on the Nudr interface if there is DNN interworking with EPC and shall not be included over the Nudm interface. | |
| 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 unless treatment instructions associated to the shared data indicate otherwise. | | | | |

### 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: <br> true: The DNN is the default DNN (NOTE); <br> false: The DNN is not the default DNN; <br> 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: <br> true: Allowed; <br> false: Not allowed; <br> If this attribute is absent it means not allowed. |
| iwkEpsInd | IwkEpsInd | O | 0..1 | Indicates whether interworking with EPS is subscribed: <br> true: Subscribed; <br> false: Not subscribed; <br> 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". <br> 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. <br> true: Used; <br> false: Not used; <br> 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. <br> true: Required; <br> false: Not required; <br> 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;<br>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).<br>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). | |
| expectedUeBehavioursList | 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].<br>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]).<br>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. | |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.1.8 | |
| 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 unless treatment instructions indicate otherwise.<br>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:<br>true: Subscribed;<br>false: Not subscribed;<br>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.<br>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:<br>true: Allowed;<br>false: Not allowed;<br>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.<br>true: Allowed;<br>false (default): Not allowed;<br>If this attribute is absent it means this DNN does not allow ATSSS. |
| secondaryAuth | boolean | O | 0..1 | Indicates whether DN-AAA based secondary authentication and authorization is needed.<br>true: required.<br>false: not required.<br>If absent, it indicates that DN-AAA based secondary authentication is not required by subscription data, but it still may be required by local policies at the SMF.<br>(NOTE 2) |
| uavSecondaryAuth | boolean | O | 0..1 | Indicates whether SBI-based secondary authentication and authorization for Uncrewed Aerial Vehicles (UAV) is needed.<br>true: required.<br>false or absent: not required. |

| 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. (NOTE 2) |
|---|---|---|---|---|
| dnAaaAddress | IpAddress | O | 0..1 | The IP address of the DN-AAA server used for secondary authentication and authorization. (NOTE 2) |
| additionalDnAaaAddresses | array(IpAddress) | O | 1..N | Additional IP addresses of the DN-AAA server used for secondary authentication and authorization. (NOTE 2) |
| dnAaaFqdn | Fqdn | O | 0..1 | The FQDN of the 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]. |
| ipv4Index | IpIndex | O | 0..1 | Indicates the "IP Index" (i.e. information that identifies an address pool or an external server) to be sent to the SMF for allocation of an IPv4 address to the UE, for this DNN configuration. |
| ipv6Index | IpIndex | O | 0..1 | Indicates the "IP Index" (i.e. information that identifies an address pool or an external server) to be sent to the SMF for allocation of an IPv6 address to the UE, for this DNN configuration. |
| ecsAddrConfigInfo | EcsAddrConfigInfo | O | 0..1 | ECS Address Configuration Information Parameters. See 3GPP TS 23.502 [3] |
| additionalEcsAddrConfigInfos | array(EcsAddrConfigInfo) | O | 1..N | This IE may be present when ecsAddrConfigInfo IE is present. When present, this IE shall contain the additional ECS Address Configuration Information Parameters. See 3GPP TS 23.548 [60] |
| sharedEcsAddrConfigInfoId | SharedDataId | O | 0..1 | Identifier of shared data indicating an ECS Configuration Information. |
| additionalSharedEcsAddrConfigInfoIds | array(SharedDataId) | O | 1..N | This IE may be present when sharedEcsAddrConfigInfoId IE is present. When present, this IE shall contain the identifiers of shared data indicating the additional ECS Address Configuration Information. |
| easDiscoveryAuthorized | boolean | O | 0..1 | Indicates whether the UE is authorized to use 5GC assisted EAS discovery via EASDF. true: Authorized; false (default): Not authorized; See 3GPP TS 23.548 [60] |
| onboardingInd | boolean | O | 0..1 | Indicates whether the UE is allowed to use this DNN for onboarding. UE subscription allows, or does not allow the UE to access the PLMN as the Onboarding Network using PLMN credentials (see clause 5.30.2.10.4.4 in 3GPP TS 23.501 [2]). - false (default): not restricted to onboarding only; - true: allowed for onboarding only. |

| aerialUeInd | AerialUeIndication | O | 0..1 | This IE shall indicate Aerial service for the UE is allowed or not allowed. |
| subscribedMaxIpv6PrefixSize | integer | O | 0..1 | maximum size of the IPv6 prefix that may be allocated for the PDU Session. See 3GPP TS 23.316 [37] clause 4.6.2.3. |
| 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. If both FQDN and IP addresses are provided, the IP addresses should be preferred to target the DN-AAA server. | | | | |

## 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 | C | 0..1 | Default session type, shall be present unless the VnGroupData is supported. |
| 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. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.1.8 |

### 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 moSmsSubscribed 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 SubcriptionDataSets**

| 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 | SmSubsData | O | 0..1 | 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 |
| proseData | ProseSubscriptionData | O | 0..1 | ProSe Service Subscription Data |
| mbsData | MbsSubscriptionData | O | 0..1 | 5MBS Subscription Data |
| ucData | UcSubscriptionData | O | 0..1 | User Consent 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 |
| NOTE: | If sdmSubscription contains nfChangeFilter flag, then the UDM shall suppress the change notification for the pgwInfo and emergencyInfo: | | | |

### 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. |
| additionalSupis | array(Supi) | O | 1..N | May be present when ueId is a GPSI in resource URI variables and more than one SUPIs matching the retrieval request have been received from the UDR. |
| additionalGpsis | array(Gpsi) | O | 1..N | May be present when ueId is a SUPI in Resource URI variables and more than one GPSIs matching the retrieval request have been received from the UDR. |
| NOTE: | When the UDM receives an array of more than one SUPIs from the UDR, the supi attribute shall convey the first received array element and the additionalSupis attribute shall convey subsequent received array elements.<br>When the UDM receives an array of more than one GPSIs from the UDR, the gpsi attribute shall convey the first received array element and the additionalGpsis attribute shall convey subsequent received array elements. | | | |

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 |
| smsfSetId | NfSetId | C | 0..1 | NF Set Id of SMSF Set the registered SMSF instance belongs to; it shall be present if provided in SMSF registration procedure (see clauses 5.3.2.2.5 and 5.3.2.2.6) |

6.1.6.2.25        Type: AcknowledgeInfo

**Table 6.1.6.2.25: Definition of type AcknowledgeInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| sorMacIue | SorMac | C | 0..1 | Shall be present when the Acknowledgement is sent to acknowledge receipt of SorInfo. Shall be absent when sorTransparentContainer is present. | |
| upuMacIue | UpuMac | C | 0..1 | Shall be present when the Acknowledgement is sent to acknowledge receipt of UpuInfo. Shall be absent when upuTransparentContainer is present. | |
| 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. | |
| sorTransparentContainer | SorTransparentContainer | C | 0..1 | This attribute contains SoR transparent container as received from UE, encoded as defined in clause 6.1.6.3.2 and shall be present when sent to acknowledge receipt of SorInfo, if the UDM supports receiving SoR Transparent Container. | sorTransparentSupport |
| 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 and sorTransparentContainer are absent. | |
| upuTransparentContainer | UpuTransparentContainer | C | 0..1 | This attribute contains UE Parameter Update transparent container as received from UE, encoded as defined in clause 6.1.6.3.2 and shall be present when sent to acknowledge receipt of UpuInfo, if the UDM supports receiving UE Parameter Update Transparent Container. | upuTransparentSupport |

6.1.6.2.26 Type: SorInfo

**Table 6.1.6.2.26: Definition of type SorInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| ackInd | AckInd | M | 1 | Contains the indication on whether an acknowledgement from UE is to be requested to the UE.<br>If sorTransparentContainer is present, the AMF should ignore the value of ackInd on Nudm. | |
| 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. Shall be absent when sorTransparentContainer is present. | |
| 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.<br>Shall be absent when sorTransparentContainer is present. | |
| 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.<br>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.<br>This attribute shall be present when SorInfo is sent within PpData.<br>Shall be absent when sorTransparentContainer is present. | |
| provisioningTime | DateTime | M | 1 | Point in time of SorInfo provisioning at the UDR or SOR-AF. | |
| sorTransparentContainer | SorTransparentContainer | C | 0..1 | This attribute contains protected SoR transparent container encoded as defined in clause 6.1.6.3.2 and shall be present when sent on Nudm, if NF Consumer (e.g. AMF) supports receiving SoR information encoded as transparent containers. Shall be absent when sent on Nudr or within PpData. | sorTransparentSupport |
| sorCmci | SorCmci | O | 0..1 | When present, provides the SOR-CMCI values as defined in 3GPP TS 24.501 [27]<br><br>This attribute may be present on Nudr, Nsoraf, PpData. Shall be absent on Nudm (since the content on Nudm is provided within sorTransparentContainer) | |

| storeSorCmciInMe | Boolean | O | 0..1 | When present, indicates "Store the SOR-CMCI in the ME", i.e. whether to instruct UE to store SOR-CMCI in the ME as defined in 3GPP TS 23.122 [14] and 3GPP TS 24.501 [27].<br><br>- True: Indicates to store the SOR-CMCI in the ME<br>- False or absent: Indicates storing the SOR-CMCI in the ME is not required<br><br>This attribute may be present on Nudr, Nsoraf, PpData. Shall be absent on Nudm (since the content on Nudm is provided within sorTransparentContainer) | |
| --- | --- | --- | --- | --- | --- |
| usimSupportOfSorCmci | Boolean | O | 0..1 | When present, indicates "USIM support of SOR-CMCI" based on pre-configuration.<br><br>- True: Indicates that USIM supports SOR-CMCI<br>- False or absent: Indicates that USIM does not support SOR-CMCI<br><br>This attribute may be present on Nudr. Shall be absent on Nudm (since the content on Nudm is provided within sorTransparentContainer) | |

### 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 | Applicability |
|---|---|---|---|---|---|
| haredDataId | SharedDataId | M | 1 | Identifier of the shared data | |
| haredAmData | AccessAndMobilitySubscriptionData | O | 0..1 | Shared Access and Mobility Subscription Data sharedAmData shall not contain upuInfo, sorInfo, stnSr or cMsisdn. | |
| haredSmsSubsData | SmsSubscriptionData | O | 0..1 | Shared SMS Subscription Data | |
| haredSmsMngSubsData | SmsManagementSubscriptionData | O | 0..1 | Shared SMS Management Subscription Data | |
| haredDnnConfigurations | map(DnnConfiguration) | O | 1..N | A map of shared DNN configuration (list of key-value pairs where DNN, or optionally the Wildcard DNN, serves as key) | |
| haredTraceData | TraceData | O | 0..1 | Shared Trace Data | |
| haredSnssaiInfos | map(SnssaiInfo) | O | 1..N | A map of Shared Snssai Info (list of key-value pairs where singleNssai converted to string serves as key; see 3GPP TS 29.571 [7]) | |
| haredVnGroupDatas | 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). | |
| reatmentInstructions | map(SharedDataTreatmentInstruction) | O | 1..N | A map of SharedDataTreatmentInstructions (list of key-value pairs where a JSON pointer pointing to an attribute within the SharedData serves as key) | SharedDataTreatment |
| haredSmSubsData | SessionManagementSubscriptionData | O | 0..1 | Shared Session Management Subscription Data | SharedSmSubsData |
| haredEcsAddrConfigInfo | EcsAddrConfigInfo | O | 0..1 | Shared ECS Address Configuration Information | |

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 as default treatment unless the feature SharedDataTreatment is supported and the SharedData contains treatment instructions different from the default treatment.

#### 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 | Fqdn | M | 1 | FQDN of the PGW in the "PGW-C+SMF" (NOTE) |
| pgwIpAddr | IpAddress | O | 0..1 | IP Address of the PGW in 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 |
| pcfId | NfInstanceId | C | 0..1 | This IE shall be present if the PCF Selection Assistance Info is received from the UDM. When present, it indicates the PCF identifier serving the PDU Session/PDN Connection that should be selected by the AMF. |
| registrationTime | DateTime | O | 0..1 | Time of PGW-C+SMF Registration (i.e. point in time when the HSS received SWx-SAR with SA_TYPE=REGISTRATION). May be present when used on Nhss within UeContextInPgwData. |
| NOTE: This IE may contain an empty string when the PGW Information is mapped from HSS and PGW FQDN is not registered in HSS. | | | | |

#### 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.<br>The URI shall take the form of either an absolute URI or an absolute-path reference as defined in IETF RFC 3986 [31].<br>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 | Fqdn | C | 0..1 | FQDN of the PGW-C+SMF for emergency session; either pgwFqdn or ipAddress shall be present. (NOTE) |
| pgwIpAddress | IpAddress | C | 0..1 | IP address of the PGW-C+SMF for emergency session (NOTE) |
| smfInstanceId | NfInstanceId | O | 0..1 | NF Instance Id of the SMF for emergency session (NOTE) |
| epdgInd | boolean | O | 0..1 | If present, it indicates whether access is from ePDG or not.<br>true: access is from ePDG.<br>false or absent: access is not from ePDG. |
| plmnId | PlmnId | O | 0..1 | PLMN where the PGW-C+SMF is located |
| NOTE: If the AMF fails to contact the SMF/PGW based on the provided information (pgwFqdn/pgwIpAddress/smfInstanceId) when needed, the AMF should use a locally configured SMF instance ID or SMF set ID for the SMF/PGW for emergency services. | | | | |

### 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 | Applicability |
|---|---|---|---|---|---|
| upuDataList | array(UpuData) | C | 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, and/or Disaster Roaming Enabled Indication, and/or the indication of 'applicability of "lists of PLMN(s) to be used in disaster condition" provided by a VPLMN' are included on Nudr. Shall be absent when the NF Consumer (e.g. AMF) supports receiving UE Parameters Update information encoded as transparent containers, and the upuTransparentContainer attribute is present. | |
| upuRegInd | UpuRegInd | C | 0..1 | Contains the indication of whether the re-registration is requested. Shall be absent when the NF Consumer (e.g. AMF) supports receiving UE Parameters Update information encoded as transparent containers, and the upuTransparentContainer attribute is present. | |
| upuAckInd | UpuAckInd | C | 0..1 | Contains the indication of whether the acknowledgement from UE is needed. Shall be absent when the NF Consumer (e.g. AMF) supports receiving UE Parameters Update information encoded as transparent containers, and the upuTransparentContainer attribute is present. | |
| upuMacIausf | UpuMac | C | 0..1 | Contains the UPU-MAC-I$_{AUSF}$. Shall be present when UpuInfo is sent within AccessAndMobilitySubscriptionData on Nudm, and shall be absent when sent on Nudr. Shall be absent when the NF Consumer (e.g. AMF) supports receiving UE Parameters Update information encoded as transparent containers, and the upuTransparentContainer attribute is present. | |
| counterUpu | CounterUpu | C | 0..1 | Contains the Counter$_{UPU}$. Shall be present when UpuInfo is sent within AccessAndMobilitySubscriptionData on Nudm, and shall be absent when sent on Nudr. Shall be absent when the NF Consumer (e.g. AMF) supports receiving UE Parameters Update information encoded as transparent containers, and the upuTransparentContainer attribute is present. | |
| provisioningTime | DateTime | M | 1 | Point in time of provisioning of UPU by the UDR. | |
| upuTransparentContainer | UpuTransparentContainer | C | 0..1 | This attribute contains protected UE Parameters Update transparent container encoded as defined in clause 6.1.6.3.2 and shall be present when sent on Nudm, if NF Consumer (e.g. AMF) supports receiving UE Parameters Update information encoded as transparent containers. Shall be absent when sent on Nudr or within PpData. | upuTransparentSupport |

#### 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<br><br>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).<br><br>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.<br><br>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 | Applicability |
|---|---|---|---|---|---|
| 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 | Nssaa |
| subscribedUeSliceMbr | SliceMbrRm | O | 0..1 | Indicates the subscribed UE-Slice-MBR for an S-NSSAI if the access type is 3GPP access. | Nsac |
| subscribedNsSrgList | array(NsSrg) | O | 1..N | Indicates the subscribed Network Slice Silumtaneous Group values for an S-NSSAI. (NOTE 1) | Nssrg |
| NOTE 1:   If the NF consumer does not support the Nssrg feature, the subset of the Subscribed S-NSSAIs as defined in clause 5.15.12 of 3GPP TS 23.501 [2], may be included without providing the subscribedNsSrgList information. i.e. UDM may send default S-NSSAIs and subscribed S-NSSAIs sharing all the NSSRGs of the Default S-NSSAIs as part of the subscription information. | | | | | |

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 | 0..1 | Indicates the receiving port of application in the receving device or AF. |
| originatorPort | Uint16 | O | 0..1 | Indicates the sending port of application in sending device. |

When this data type is used as a key of a map structure, it shall be formatted as a string, according to the following rules:

- The string shall consist of the decimal value of "destinationPort" attribute, followed by the separator character ":" (COLON, U+003A), followed by the decimal value of "originatorPort" attribute

- Each decimal value shall consist of 1 to 5 decimal digits, and no leading zeros shall be allowed

- If any of the attributes is absent, the character "-" (HYPHEN-MINUS, U+002D) shall be used as the value of such attribute

EXAMPLES:

1) JSON object:

    { "destinationPort": 8000, "originatorPort": 4000 }

   shall be formatted as "8000:4000"

2) JSON object:

    { "destinationPort": 0765 }

   shall be formatted as "765:-"

### 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:<br>- Location is disallowed<br>- Location is allowed |
| validTimePeriod | ValidTimePeriod | O | 0..1 | If present, indicate Time period during which the Location Privacy Indication is valid.<br>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],<br>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<br>If absent, indicates there is no start time, and it shall be valid immediately.<br>(NOTE 1) |
| endTime | DateTime | O | 0..1 | If present, indicates the end time.<br>If absent, indicates there is no end time.<br>(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 |
| moAssistanceDataTypes | LcsBroadcastAssistanceTypesData | O | 0..1 | A list of one or more types of location assistance data that may be provided to the UE in the MO-LR procedure. |

### 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.<br>true: Enhanced Coverage Mode A is restricted.<br>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.<br>true: Enhanced Coverage Mode B is restricted.<br>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. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.1.8 |

### 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.<br><br>Only the following values are allowed:<br><br>"EUTRA"<br>"NBIOT"<br>"LTE-M"<br>"NR"<br>"NR_REDCAP" |
| 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]).<br>Pattern: '^([0-1]{4})$' |
| extendedPtwValue | string | C | 0..1 | This IE shall be applied only when the operation mode is set to NR-N1 mode.<br>It shall indicate RAT specific Subscribed Paging Time Window length value, it shall be encoded as a string of octet 4 in the "Extended DRX parameters" IE (see Figure 10.5.5.32 of 3GPP TS 24.008 [46]).<br><br>Pattern: '^([0-1]{8})$'<br><br>When this IE is present, the value set in ptwValue attribute shall be omitted. |
| NOTE: The relationship between values of operationMode and ptwValue/extendedPtwValue 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".<br><br>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 |
|---|---|---|---|---|
| allowedGeographic Area | array(GeographicA rea) | O | 1..N | Indicates Geographical area where positioning is allowed (see 3GPP TS 23.273 [38] clause 5.4.2.2.3). |
| privacyCheckRelat edAction | PrivacyCheckRelat edAction | 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".<br><br>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] |
| requestHeaders | array(string) | O | 1..N | Headers sent by the UDM to NFs (e.g.AMF). May be present when ContextInfo is stored by the UDM in UDR as part of AmfSubscriptionInfo. 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 | Applicability |
|---|---|---|---|---|---|
| epsInterworkingInfo | EpsInterworkingInfo | O | 0..1 | This IE contains the associations between APN/DNN and PGW-C+SMF selected by the AMF for EPS interworking. | |
| amfInfo | array(AmfInfo) | O | 0..2 | This IE shall contain the list of AmfInfo. | ENA |
| NOTE: If sdmSubscription contains nfChangeFilter flag, then the UDM shall suppress the change notification for the epsInterworkingInfo | | | | | |

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 |
|----------------|-----------|---|-------------|-------------|

| locationAssistanceTy pe | 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.<br><br>The bits are ordered as following in the bitmap:<br>- first octet is the right-most octet. E.g. in "0x0123", "first octet" would be "0x23" and "second octet" would be "0x01"<br><br>- 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"<br><br>The mapping of the bits to the positioning SIB types is as follows:<br><br>-- bit 8 in the first octet maps to positioning SIB Type 1-1<br>-- bit 7 in the first octet maps to positioning SIB Type 1-2<br>-- bit 6 in the first octet maps to positioning SIB Type 1-3<br>-- bit 5 in the first octet maps to positioning SIB Type 1-4<br>-- bit 4 in the first octet maps to positioning SIB Type 1-5<br>-- bit 3 in the first octet maps to positioning SIB Type 1-6<br>-- bit 2 in the first octet maps to positioning SIB Type 1-7<br>-- bit 1 in the first octet maps to positioning SIB Type 1-8<br><br>-- bit 8 in the second octet maps to positioning SIB Type 2-1<br>-- bit 7 in the second octet maps to positioning SIB Type 2-2<br>-- bit 6 in the second octet maps to positioning SIB Type 2-3<br>-- bit 5 in the second octet maps to positioning SIB Type 2-4<br>-- bit 4 in the second octet maps to positioning SIB Type 2-5<br>-- bit 3 in the second octet maps to positioning SIB Type 2-6<br>-- bit 2 in the second octet maps to positioning SIB Type 2-7<br>-- bit 1 in the second octet maps to positioning SIB Type 2-8<br><br>-- bit 8 in the third octet maps to positioning SIB Type 2-9<br>-- bit 7 in the third octet maps to positioning SIB Type 2-10<br>-- bit 6 in the third octet maps to positioning SIB Type 2-11<br>-- bit 5 in the third octet maps to positioning SIB Type 2-12<br>-- bit 4 in the third octet maps to positioning SIB Type 2-13<br>-- bit 3 in the third octet maps to positioning SIB Type 2-14<br>-- 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. |
| NOTE: The mapping of posSibType to assistance data element is further described in clause 7.2 of 3GPP TS 37.355 [56]. | | | | |

### 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 |

### 6.1.6.2.74        Type: PlmnRestriction

#### Table 6.1.6.2.74-1: Definition of type PlmnRestriction

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| ratRestrictions | array(RatType) | O | 0..N | List of RAT Types that are restricted in 5GC and EPC; see 3GPP TS 29.571 [7]<br>Contains unique items | |
| 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.<br>The use of the value "5GC" is deprecated on Nudm and shall be discarded by the receiving AMF. | |
| 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]<br>Contains unique items | |
| 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]<br>Contains unique items | |

### 6.1.6.2.75        Type: PcfSelectionAssistanceInfo

#### Table 6.1.6.2.75-1: Definition of type PcfSelectionAssistanceInfo

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| dnn | Dnn | M | 1 | Identifies a DNN. |
| singleNssai | Snssai | M | 1 | Identifies a S-NSSAI. |

### 6.1.6.2.76        Type: ProseSubscriptionData

#### Table 6.1.6.2.76-1: Definition of type ProseSubscriptionData

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| proseServiceAuth | ProseServiceAuth | O | 0..1 | Indicates whether the UE is authorized to use ProSe related services. |
| nrUePc5Ambr | BitRate | O | 0..1 | Indicates the AMBR of UE's NR sidelink (i.e. PC5) communication for ProSe services. |
| proseAllowedPlmn | array(ProSeAllowedPlmn) | O | 1..N | Contains a list of the ProSeAllowedPlmn which contain the PLMN identities where the Prose services are authorised to use and the authorised Prose services on these given PLMNs. |

### 6.1.6.2.77        Type: IpIndex

#### Table 6.1.6.2.77-1: Definition of type IpIndex as a list of non-exclusive alternatives

| Data Type | Cardinality | Description |
|---|---|---|
| integer | 1 | IP Index expressed as an integer value |
| string | 1 | IP Index expressed as a string |

### 6.1.6.2.78 Type: AerialUeSubscriptionInfo

**Table 6.1.6.2.78-1: Definition of type AerialUeSubscriptionInfo**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| aerialUeInd | AerialUeIndication | M | 1 | This UE shall indicate Aerial service for the UE is allowed or not allowed. | |
| 3gppUavId | Gpsi | C | 0..1 | When present, this IE shall contain the 3GPP UAV ID, it is encoded as GPSI in the format of External Identifier. <br><br> If aerialUeInd indicates "AERIAL_UE_ALLOWED", this IE shall be present. | |

### 6.1.6.2.79 Type: SmSubsData

**Table 6.1.6.2.79-1: Definition of type SmSubsData as a list of alternatives**

| Data type | Cardinality | Description | Applicability |
|---|---|---|---|
| array(SessionManagementSubscriptionData) | 1..N | Individual Session Management Subscription Data. | |
| ExtendedSmSubsData | 1 | Extended Session Management Subscription Data. | SharedSmSubsData |

### 6.1.6.2.80 Type: ExtendedSmSubsData

**Table 6.1.6.2.80-1: Definition of type ExtendedSmSubsData**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| individualSmSubsData | array(SessionManagementSubscriptionData) | O | 1..N | individual Session Management Subscription Data (NOTE 1) | SharedSmSubsData |
| sharedSmSubsDataIds | array(SharedDataId) | M | 1..N | Identifier of shared data | SharedSmSubsData |
| NOTE 1: A given UE-individual SessionManagementSubscriptionData (within individualSmSubsData) may clash with a shared SessionManagementSubscriptionData (i.e. both have the same singleNssai value). In this case the clashing attributes of the UE-individual SessionManagementSubscriptionData take precedence unless treatment instructions indicate otherwise. | | | | | |

### 6.1.6.2.81 Type: AmfInfo

**Table 6.1.6.2.81-1: Definition of type UeContextInAmfData**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| amfInstanceId | NfInstanceId | M | 1 | The identity the AMF uses to register in the NRF |
| guami | Guami | M | 1 | This IE shall contain the serving AMF's GUAMI. |
| accessType | AccessType | M | 1 | This IE shall contain the access type |

### 6.1.6.2.82 Type: ProSeAllowedPlmn

**Table 6.1.6.2.82-1: Definition of type ProSeAllowedPlmn**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| visitedPlmn | PlmnId | M | 1 | This IE shall contain the PLMN identity where the UE is authorised for 5G ProSe services. |
| proseDirectAllowed | array(ProseDirect Allowed) | O | 1..N | When present, this IE contains the 5G ProSe Direct services are authorised to use in the PLMN indicated by visitedPlmn for the UE.<br><br>If this IE is absent, it indicates that all the 5G ProSe Direct services are authorised to use in the PLMN indicated by visitedPlmn for the UE. |

### 6.1.6.2.83 Type: ImmediateReport

**Table 6.1.6.2.83-1: Definition of type ImmediateReport as a list of alternatives**

| Data type | Cardinality | Description | Applicability |
|---|---|---|---|
| SubscriptionDataSets | 1 | UE based subscription data sets that to be monitored in SdmSubscription. | |
| array(SharedData) | 1..N | Shared subscription data sets that to be monitored in SdmSubscription. | |

### 6.1.6.2.84 Type: MbsSubscriptionData

**Table 6.1.6.2.84-1: Definition of type MbsSubscriptionData**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| mbsAllowed | boolean | C | 0..1 | This IE indicates whether the UE is authorized to receive multicast MBS session data.<br><br>When present, this IE shall be set as following:<br>- true: the UE is authorized to receive multicast MBS session data<br>- false (default): UE is not authorized to receive multicast MBS session data |
| mbsSessionIdList | array(MbsSessio nId) | C | 1..N | This IE shall be present if available and the mbsAllowed attribute is set to "true".<br>If present, this IE identifies the MBS Session(s) that the UE is allowed to join. |

### 6.1.6.2.85 Type: UcSubscriptionData

**Table 6.1.6.2.85-1: Definition of type UcSubscriptionData**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| userConsentPerPurp oseList | map(UserConsen t) | O | 1..N | A map user consent (list of key-value pairs where UcPurpose serves as key; see clause 6.1.6.3.20). |

#### 6.1.6.2.86 Type: UeContextInSmfDataSubFilter

**Table 6.1.6.2.86-1: Definition of type UeContextInSmfDataSubFilter**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| dnnList | array(Dnn) | C | 1..N | This IE shall be present to get the pduSesion and pgwInfo in UeContextInSmfData for specific DNN(s).<br><br>When present, the UDM shall notify the changes of pduSesion and pgwInfo in UeContextInSmfData for the indicated DNN(s).<br><br>When this IE is not present, the UDM will not notify changes of pduSesion and pgwInfo. |
| snssaiList | array(Snssai) | O | 1..N | This IE may be present when dnnList IE is present.<br><br>When present, the UDM shall notify the changes of pduSesion and pgwInfo in UeContextInSmfData for the DNN(s) that are associated the indicated S-NSSAIs(s). |
| emergencyInd | boolean | C | 0..1 | This IE shall be present and set to value "true" for changes on the emergencyInfo in UeContextInSmfData.<br><br>When present, this IE shall indicate whether the UDM shall notify the changes on emergencyInfo in UeContextInSmfData:<br>- true: changes on emergencyInfo to be notified<br>- false (default) changes on emergencyInfo not to be notified. |

#### 6.1.6.2.87 Type: UeIdentifiers

**Table 6.1.6.2.87-1: Definition of type UeIdentifiers**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ueIdList | map(SupiInfo) | C | 1..N | A map (list of key-value pairs where Gpsi serves as key; see 3GPP TS 29.571 [7]) of arrays of Supi. |

#### 6.1.6.2.88 Type: SupiInfo

**Table 6.1.6.2.88-1: Definition of type SupiInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| supiList | array(Supi) | M | 0..N | This IE shall indicate a list of SUPIs that is associated with the GPSI.<br>An empty array shall be returned if there is no SUPIs associated with the GPSI. |

### 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.<br><br>Example:<br>The charging characteristic 0x123A shall be encoded as "123A". See also 3GPP TS 32.256 [67] Annex A |
| 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.<br>    pattern: "^[0-9]{5,6}-.+$" |
| IwkEpsInd | boolean | Indicates whether Interworking with EPS is supported |
| SecuredPacket | string | Indicates the secured packet as specified in 3GPP TS 24.501 [27]. It is encoded using base64 and represented as a String.<br>Format: byte |
| UpuRegInd | boolean | true indicates that re-registration is requested after the successful UE parameters update. |
| ExtGroupId | string | String containing a External Group ID.<br>Pattern: "^extgroupid-[^@]+@[^@]+$" |
| 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) |
| SorTransparentContainer | Bytes | String with format "byte" as defined in OpenAPI Specification [14], i.e. base64-encoded characters, encoding the "SOR transparent container" IE as specified in clause 9.11.3.51 of 3GPP TS 24.501 [27] (starting from octet 1). |
| UpuTransparentContainer | Bytes | String with format "byte" as defined in OpenAPI Specification [14], i.e. base64-encoded characters, encoding the "UE Parameters Update transparent container" IE as specified in clause 9.11.3.53A of 3GPP TS 24.501 [27] (starting from octet 1). |
| SorCmci | Bytes | String with format "byte" as defined in OpenAPI Specification [14], i.e. base64-encoded characters, encoding the "SOR-CMCI " IE as specified in figure 9.11.3.51.7 of 3GPP TS 24.501 [27] (starting from octet 1). |

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 |
| "PROSE" | ProSe Service Subscription Data |
| "UC" | User Consent Data |
| "MBS" | 5MBS 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 PduSessionContinuityInd**

| 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, i.e. EUTRAN connected to EPC |
| "NB_S1" | NB-S1 mode, i.e. EUTRAN NB-IoT connected to EPC |
| "WB_N1" | WB-N1 mode, i.e. EUTRAN connected to 5GC |
| "NB_N1" | NB-N1 mode, i.e. EUTRAN NB-IoT connected to 5GC |
| "NR_N1" | NR-N1 mode, i.e. NR connected to 5GC |
| "NR_N1_REDCAP" | NR-N1 mode for RedCAP UE, i.e. NR connected to 5GC for a RedCAP UE |

### 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. |

6.1.6.3.16 Enumeration: SharedDataTreatmentInstruction

**Table 6.1.6.3.16-1: Enumeration SharedDataTreatmentInstruction**

| Enumeration value | Description |
|---|---|
| "USE_IF_NO_CLASH" | If the attribute is not present in the individual data (no clash), the value of the shared data attribute shall be used. Otherwise the individual data takes precedence. (default) |
| "OVERWRITE" | The value of the shared data attribute shall be used (even when clashing with individual data).<br>If the shared data attribute is absent, the value of the individual attribute (if any) shall not be used, i.e. the attribute shall be handled as being absent. |
| "MAX" | If no clash (i.e. individual data is absent) the shared data attribute value shall be used. Otherwise the higher value shall be used. (NOTE) |
| "MIN" | If no clash (i.e. individual data is absent) the shared data attribute value shall be used. Otherwise the lower value shall be used. (NOTE) |
| NOTE: Treatment instructions "MIN" and "MAX" are applicable to attributes that can take numeric values. ||

6.1.6.3.17 Enumeration: GpsiType

**Table 6.1.6.3.17-1: Enumeration GpsiType**

| Enumeration value | Description |
|---|---|
| "MSISDN" | GPSI type of MSISDN |
| "EXT_ID" | GPSI type of external identity |
| "EXT_GROUP_ID" | GPSI type of external group identity |

6.1.6.3.18 Enumeration: AerialUeIndication

**Table 6.1.6.3.18-1: Enumeration AerialUeIndication**

| Enumeration value | Description |
|---|---|
| "AERIAL_UE_ALLOWED" | Aerial service for the UE is allowed. |
| "AERIAL_UE_NOT_ALLOWED" | Aerial service for the UE is not allowed. |

### 6.1.6.3.19 Enumeration: ProseDirectAllowed

**Table 6.1.6.3.19-1: Enumeration ProseDirectAllowed**

| Enumeration value | Description |
|---|---|
| "ANNOUNCE" | It indicates that the user is allowed to announce in the corresponding PLMN for open 5G Direct Discovery Model A. |
| "MONITOR" | It indicates that the user is allowed to monitor in the corresponding PLMN for open 5G Direct Discovery Model A. |
| "RESTRICTD_ANNOUNCE" | It indicates that the user is allowed to announce in the corresponding PLMN for restricted 5G ProSe Direct Discovery Model A. |
| "RESTRICTD_MONITOR" | It indicates that the user is allowed to monitor in the corresponding PLMN for restricted 5G ProSe Direct Discovery Model A. |
| "DISCOVERER" | It indicates that the user is allowed to perform discoverer operation in the corresponding PLMN for restricted 5G ProSe Direct Discovery Model B. |
| "DISCOVEREE" | It indicates that the user is allowed to perform discoveree operation in the corresponding PLMN for restricted 5G ProSe Direct Discovery Model B. |
| "BROADCAST" | It indicates that the user is allowed to perform Broadcast mode 5G ProSe Direct Communication for NR PC5 in the corresponding PLMN. |
| "GROUPCAST" | It indicates that the user is allowed to perform Groupcast mode 5G ProSe Direct Communication for NR PC5 in the corresponding PLMN. |
| "UNICAST" | It indicates that the user is allowed to perform Unicast mode 5G ProSe Direct Communication for NR PC5 in the corresponding PLMN. |
| "LAYER2_RELAY" | It indicates that the user is allowed to act as a 5G ProSe Layer-2 UE-to-Network Relay. |
| "LAYER3_RELAY" | It indicates that the user is allowed to act as a 5G ProSe Layer-3 UE-to-Network Relay. |

### 6.1.6.3.20 Enumeration: UcPurpose

**Table 6.1.6.3.20-1: Enumeration UcPurpose**

| Enumeration value | Description |
|---|---|
| "ANALYTICS" | User consent for analytics. |
| "MODEL_TRAINING" | User consent for model training. |
| "NW_CAP_EXPOSURE" | User consent for network capability exposure. |
| "EDGEAPP_UE_LOCATION" | User consent for the manipulation of UE information for the purpose of UE Location retrieval by the EDGEAPP EAS entity. |

### 6.1.6.3.21 Enumeration: UserConsent

**Table 6.1.6.3.21-1: Enumeration UserConsent**

| Enumeration value | Description |
|---|---|
| "CONSENT_NOT_GIVEN" | It shall indicate the user hasn't given his consent. |
| "CONSENT_GIVEN" | It shall indicate the user has given his consent. |

## 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.<br>This error is applicable to all Nudm_SDM GET operations. |
| USER_NOT_FOUND | 404 Not Found | The user does not exist<br>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. |
| 6 | SharedDataTreatment | This feature is an extension to the SharedData feature, i.e. support of SharedDataTreatment requires support of SharedData.<br>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 SharedDataTreatments in the SharedData returned 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 default treatment (i.e. individual data take precedence), or send the shared data which have non-default treatment as individual data. |
| 7 | sorTransparentSupport | This flag indicates NF Consumer (e.g. AMF) support of receiving SoR Transparent Container instead of individual IEs from NF Producer (e.g. UDM). If the NF consumer does not support this feature, the NF Producer shall not include sorTransparentContainer, as defined in clause 6.1.6.2.26.<br>Corresponding flag is also used by UDM to register (in NRF) its support of receiving SoR Transparent Container instead of individual IEs from the NF Consumer (e.g. AMF). If the UDM does not support this feature, the NF Consumer shall not include sorTransparentContainer, as defined in clause 6.1.6.2.25. |
| 8 | Nsac | If the NF consumer does not support this feature, the UDM shall not include network slice admission control related information for S-NSSAI(s) in the message body with "200 OK" response (See clause 5.2.2.2.3). |
| 9 | SharedSmSubsData | If the NF consumer does not support this feature, the UDM shall not take the alternative to include extendedSmSubsData in SmSubsData (clause 6.1.6.2.79). |
| 10 | ENA | Enhanced Network Automation.<br><br>If the UDM supports this feature, the UDM shall apply the nfChangeFilter IE received in the sdmSubscription and send the notifications accordingly (See clause 6.1.6.2.16 and 6.1.6.2.70). |

| 11 | Nssrg | The NF consumer (i.e. AMF) that supports this feature shall support handling of NSSRG information received along with the subscribed S-NSSAIs as defined in clause 5.15.12 of 3GPP TS 23.501 [2]. If the NF consumer does not support this feature, the UDM may select the subset of the compatible Subscribed S-NSSAIs without including any information of Network Slice Simultaneous Registration Group. |
|---|---|---|
| 12 | upuTransparentSupport | This flag indicates NF Consumer (e.g. AMF) support of receiving UE Parameters Update Transparent Container instead of individual IEs from NF Producer (e.g. UDM). If the NF consumer does not support this feature, the NF Producer shall not include upuTransparentContainer, as defined in clause 6.1.6.2.33. Corresponding flag is also used by UDM to register (in NRF) its support of receiving UE Parameters Update Transparent Container instead of individual IEs from the NF Consumer (e.g. AMF). If the UDM does not support this feature, the NF Consumer shall not include upuTransparentContainer, as defined in clause 6.1.6.2.25. |
| 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. |
| 14 | SNPN-ID | Support of SNPN-ID |
| | | This flag indicates whether the NF Consumer (e.g. AMF) or NF producer (UDM) support receiving an SNPN-ID as an extension of the "plmn-id" query parameter, when retrieving Access And Mobility Subscription Data (either by querying the "{supi}" resource or the "{supi}/am-data" resource). |
| | | If the NF Consumer is aware (e.g. from previous interactions) that the UDM does not support this feature, the NF Consumer should not send queries on the Nudm_SDM API including SNPN-ID in the "plmn-id" query parameter. |
| | | Also, if the NF Consumer sent such query to UDM, and the UDM does not indicate support of this feature in the response, the NF Consumer should consider the response as invalid, since the response from UDM would have not considered the presence of the NID component of the SNPN-ID in the "plmn-id" parameter. |
| 15 | UeConSmfDataSubFilter | UE Context in Smf Data Subscription Filter |
| | | If the UDM supports this feature, the UDM shall handle the ueConSmfDataSubFilter IE received in the sdmSubscription and sends the notifications only for changes indicated in the IE. |
| 16 to 18 | | not used in Rel-17 |
| 19 | SNPN-ID-EXT | Extended Support of SNPN-ID |
| | | This flag indicates whether the NF Consumer (e.g. AMF) or NF producer (UDM) support receiving an SNPN-ID as an extension of the "plmn-id" query parameter, when retrieving subscription data other than Access And Mobility Subscription Data. |
| | | If the NF Consumer is aware (e.g. from previous interactions) that the UDM does not support this feature, the NF Consumer should not send queries on the Nudm_SDM API including SNPN-ID in the "plmn-id" query parameter. |
| | | Also, if the NF Consumer sent such query to UDM, and the UDM does not indicate support of this feature in the response, the NF Consumer should consider the response as invalid, since the response from UDM would have not considered the presence of the NID component of the SNPN-ID in the "plmn-id" parameter. |

## 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

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

Figure 6.2.3.1-1 depicts the resource URIs structure for the Nudm_UECM API.

{apiRoot}/nudm-uecm/v1

└── /{ueId}

      └── /registrations

            ├── /amf-3gpp-access

            │     ├── /dereg-amf

            │     ├── /pei-update

            │     └── /roaming-info-update

            ├── /amf-non-3gpp-access

            ├── /smf-registrations

            │     └── /{pduSessionId}

            ├── /smsf-3gpp-access

            ├── /smsf-non-3gpp-access

            ├── /send-routing-info-sm

            ├── /location

            ├── /ip-sm-gw

            └── /nwdaf-registrations

                      └── /{nwdafRegistrationId}
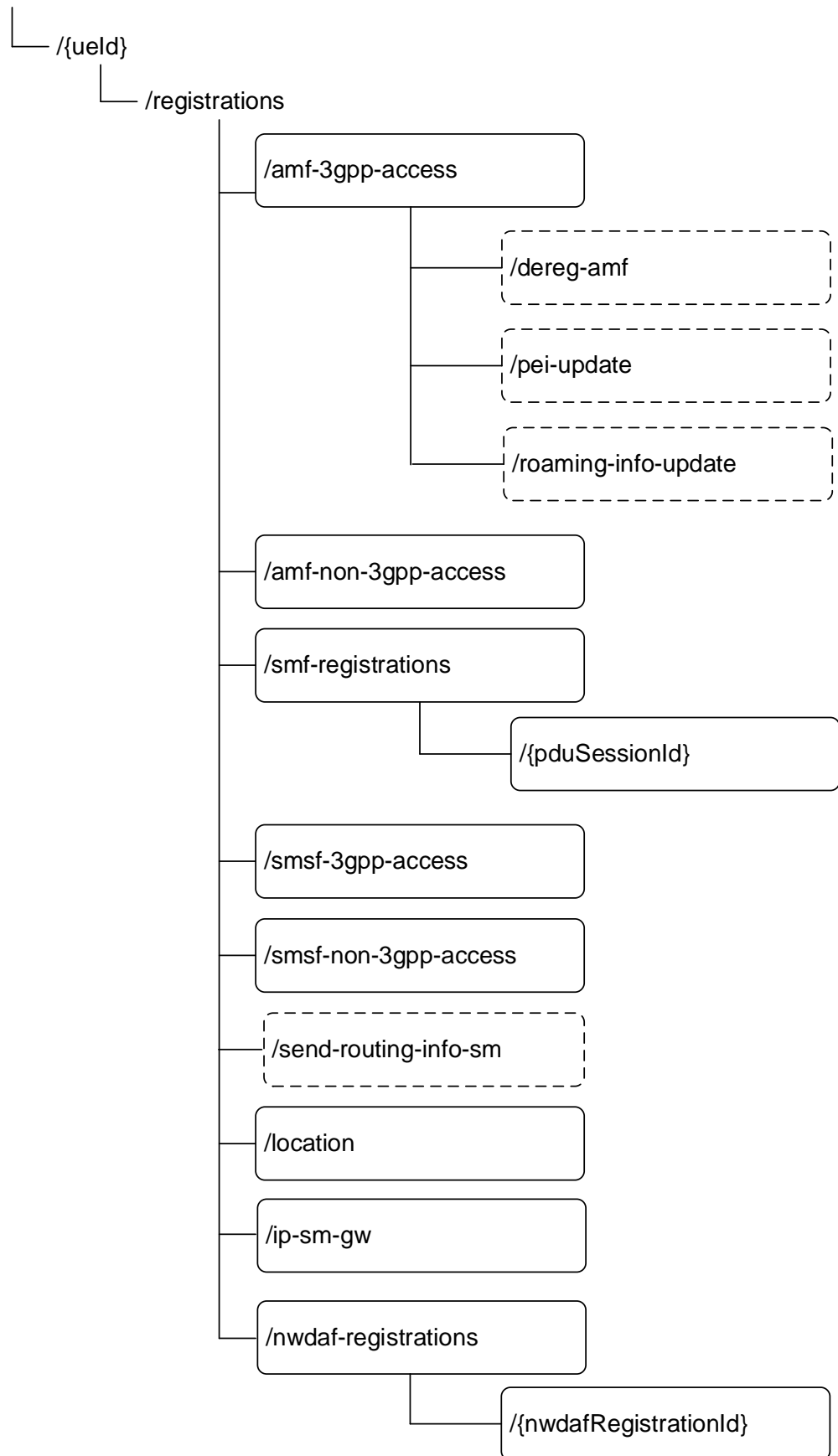
**Figure 6.2.3.1-1: Resource URI structure of the Nudm_UECM API**

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 |
| | /{ueId}/registrations/send-routing-info-sm | send-routing-info-sm (POST) | Retrieve addressing information for SMS delivery |
| 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 |
| | /{ueId}/registrations/amf-3gpp-access/roaming-info-update | roaming-info-update (POST) | Updates the Roaming Information in the AMF 3GPP 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. |
| | | PATCH | Modify the SMF registration |
| Smsf3GppAccessRegistration (Document) | /{ueId}/registrations/smsf-3gpp-access | PUT | Create or Update the SMSF registration |
| | | DELETE | Delete the SMSF registration for 3GPP access |
| | | 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 |
| | | 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 |
| NwdafRegistration (Document) | /{ueId}/registrations/nwdaf-registrations/{nwdafRegistrationId} | PUT | Create an NWDAF registration |
| | | DELETE | Delete an individual NWDAF registration |
| | | PATCH | Modify the NWDAF registration |
| NwdafRegistrations (Store) | /{ueId}/registrations/nwdaf-registrations | GET | Retrieve the NWDAF registration(s) 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 |
|---|---|---|---|
| Amf3GppAccess Registration | 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 |
|---|---|---|---|---|
| Amf3GppAccess Registration | M | 1 | 201 Created | Upon success, a response body containing a representation of the created Individual Amf3GppAccessRegistration resource shall be returned. |
| Amf3GppAccess Registration | 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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- UNKNOWN_5GS_SUBSCRIPTION<br>- NO_PS_SUBSCRIPTION<br>- ROAMING_NOT_ALLOWED<br>- ACCESS_NOT_ALLOWED<br>- RAT_NOT_ALLOWED<br>- REAUTHENTICATION_REQUIRED<br>- SNPN_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 6.2.3.2.3.1-4: 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 |
|---|---|---|---|
| Amf3GppAccess RegistrationModifi cation | 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:<br>- INVALID_GUAMI |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- CONTEXT_NOT_FOUND<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 422 Unprocessable Entity | The "cause" attribute may be used to indicate one of the following application errors:<br>- 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 |
|---|---|---|---|---|
| Amf3GppAccess Registration | 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:<br>- CONTEXT_NOT_FOUND<br>- 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 the stored PEI |
| roaming-info-update | /{ueId}/registrations/amf-3gpp-access/roaming-info-update | POST | Updates the Roaming information 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:<br>- 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 stored PEI . 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:<br>- 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. | | | |

#### 6.2.3.2.4.4 Operation: roaming-info-update

##### 6.2.3.2.4.4.1 Description

The roaming-info-update custom operation is used by the NF service consumer (HSS) to trigger an update of the Roaming Information stored in the 3GPP Registration context. For details see 3GPP TS 23.632 [32].

##### 6.2.3.2.4.4.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.3.2.4.4.2-1 and the response data structure and response codes specified in table 6.2.3.2.4.4.2-2.

**Table 6.2.3.2.4.4.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| RoamingInfoUpdate | M | 1 | Contains the roaming information provided by the NF service consumer. |

**Table 6.2.3.2.4.4.2-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| RoamingInfoUpdate | M | 1 | 201 Created | Upon success, a response body containing a representation of the resource of the created Roaming Information 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 any of the following application errors:<br>- 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)<br>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.<br>    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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- UNKNOWN_5GS_SUBSCRIPTION<br>- NO_PS_SUBSCRIPTION<br>- ROAMING_NOT_ALLOWED<br>- ACCESS_NOT_ALLOWED<br>- RAT_NOT_ALLOWED<br>- 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:<br>- CONTEXT_NOT_FOUND<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 422 Unprocessable Entity | The "cause" attribute may be used to indicate one of the following application errors:<br>- 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:<br>- CONTEXT_NOT_FOUND<br>- 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:<br>- CONTEXT_NOT_FOUND<br>- 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)<br>SUPI (i.e. imsi or nai or gli or gci) is used with the PUT, DELETE and PATCH methods;<br>    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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- ROAMING_NOT_ALLOWED<br>- 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 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:<br>- CONTEXT_NOT_FOUND<br>- 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. | | | | |

### 6.2.3.5.2.4          PATCH

This method shall support the URI query parameters specified in table 6.2.3.5.2.4-1.

**Table 6.2.3.5.2.4-1: 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 6.2.3.5.2.4-2 and the response data structures and response codes specified in table 6.2.3.5.2.4-3.

**Table 6.2.3.5.2.4-2: Data structures supported by the PATCH Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| SmfRegistrationModification | M | 1 | The SMF registration is modified with the received information. |

**Table 6.2.3.5.2.4-3: Data structures supported by the PATCH Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| PatchResult | M | 1 | 200 OK | Upon success, the execution report is returned. (NOTE 2) |
| n/a | | | 204 No Content | Upon success, an empty response body 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:<br>- CONTEXT_NOT_FOUND<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 422 Unprocessable Entity | The "cause" attribute may be used to indicate one of the following application errors:<br>- 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. | | | | |

## 6.2.3.6          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 and DELETE methods; GPSI (i.e. msisdn or extid) is used with the GET method.<br>          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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- UNKNOWN_5GS_SUBSCRIPTION<br>- ACCESS_NOT_ALLOWED<br>- 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 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3. |

**Table 6.2.3.6.3.1-5: Headers supported by the 200 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3. |

**Table 6.2.3.6.3.1-6: Headers supported by the 204 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3. |

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. | | | | |

**Table 6.2.3.6.3.2-4: Headers supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| If-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.1 |

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:<br>- CONTEXT_NOT_FOUND<br>- USER_NOT_FOUND<br>- ABSENT_SUBSCRIBER_SM |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- SERVICE_NOT_ALLOWED<br>- SERVICE_NOT_PROVISIONED |
| 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 and DELETE methods; GPSI (i.e. msisdn or extid) is used with the GET method. <br> 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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- UNKNOWN_5GS_SUBSCRIPTION<br>- ACCESS_NOT_ALLOWED<br>- 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 |
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3. |

**Table 6.2.3.7.3.1-5: Headers supported by the 200 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3. |

**Table 6.2.3.7.3.1-6: Headers supported by the 204 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ETag | string | O | 0..1 | Entity Tag, containing a strong validator, as described in IETF RFC 7232 [25], clause 2.3. |

6.2.3.7.3.2          DELETE

This method shall support the URI query parameters specified in table 6.2.3.7.3.2-1.

**Table 6.2.3.7.3.2-1: 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 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 6.2.3.7.3.2-2: 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 6.2.3.7.3.2-3: 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. | | | | |

**Table 6.2.3.7.3.2-4: Headers supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| If-Match | string | O | 0..1 | Validator for conditional requests, as described in IETF RFC 7232 [25], clause 3.1 |

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:<br>- CONTEXT_NOT_FOUND<br>- USER_NOT_FOUND<br>- ABSENT_SUBSCRIBER_SM |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- SERVICE_NOT_ALLOWED<br>- SERVICE_NOT_PROVISIONED |
| 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: <br> - CONTEXT_NOT_FOUND <br> - 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(Registration DataSetName) | 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 |
|-----------|---|-------------|----------------|-------------|
| RegistrationData Sets | 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 - ABSENT_SUBSCRIBER_SM (applicable to SMSF registration data sets retrieval) |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors for SMSF data sets retrieval: - SERVICE_NOT_ALLOWED - SERVICE_NOT_PROVISIONED |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

### 6.2.3.9.4          Resource Custom Operations

### 6.2.3.9.4.1          Overview

**Table 6.2.3.9.4.1-1: Custom operations**

| Operation Name | Custom operation URI | Mapped HTTP method | Description |
|---|---|---|---|
| send-routing-info-sm | /{ueId}/registrations/send-routing-info-sm | POST | Retrieve addressing information for SMS delivery |

### 6.2.3.9.4.2          Operation: send-routing-info-sm

### 6.2.3.9.4.2.1          Description

The send-routing-info-sm custom operation is used by the NF service consumer (e.g. SMS-GMSC, HSS…) to retrieve addressing information of those nodes (e.g. registered SMSFs) that are currently available for sending terminating SMS to the receipient UE, for both 3GPP and non-3GPP accesses.

### 6.2.3.9.4.2.2          Operation Definition

This operation shall support the request data structures specified in table 6.2.3.9.4.2.2-1 and the response data structure and response codes specified in table 6.2.3.9.4.2.2-2.

**Table 6.2.3.9.4.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| RoutingInfoSmRequest | M | 1 | It may contain supported features, if any, of the NF Service Consumer. |

**Table 6.2.3.9.4.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| RoutingInfoSmResponse | M | 1 | 200 OK | Upon success, a response body containing the Routing Information for SM shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- USER_NOT_FOUND<br>- ABSENT_SUBSCRIBER_SM |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- SERVICE_NOT_ALLOWED<br>- SERVICE_NOT_PROVISIONED |
| NOTE: | The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | |

## 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).<br>    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:<br>- UNKNOWN_5GS_SUBSCRIPTION |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate any of the following application errors:<br>- 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:<br>- USER_NOT_FOUND<br>- CONTEXT_NOT_FOUND |

## 6.2.3.11        Resource: NwdafRegistration (Document)

### 6.2.3.11.1        Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/nwdaf-registrations/{nwdafRegistrationId}

This resource shall support the resource URI variables defined in table 6.2.3.11.1-1.

**Table 6.2.3.11.1-1: 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; <br>     pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |
| nwdafRegistrationId | string | nwdafRegistrationId could be the NfInstanceId, the combination of NfSetId and NfInstance ID or other identifier forms of the NWDAF. NWDAF implementation shall secure the global uniqueness of this resource ID. |

#### 6.2.3.11.2 Resource Standard Methods

##### 6.2.3.11.2.1 PUT

This method shall support the URI query parameters specified in table 6.2.3.11.2.1-1.

**Table 6.2.3.11.2.1-1: 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 6.2.3.11.2.1-2 and the response data structures and response codes specified in table 6.2.3.11.2.1-3.

**Table 6.2.3.11.2.1-2: Data structures supported by the PUT Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| NwdafRegistration | M | 1 | The registration that is to be created |

**Table 6.2.3.11.2.1-3: Data structures supported by the PUT Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
| NwdafRegistration | M | 1 | 201 Created | Upon success, a response body containing a representation of the created Individual NwdafRegistration resource shall be returned. |
| NwdafRegistration | M | 1 | 200 OK | Upon success, a response body containing a representation of the updated Individual NwdafRegistration resource shall be returned. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- UNKNOWN_5GS_SUBSCRIPTION |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

##### 6.2.3.11.2.2 DELETE

This method shall support the URI query parameters specified in table 6.2.3.11.2.2-1.

**Table 6.2.3.11.2.2-1: 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 6.2.3.11.2.2-2 and the response data structures and response codes specified in table 6.2.3.11.2.2-3.

**Table 6.2.3.11.2.2-2: 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 6.2.3.11.2.2-3: 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. | | | | |

6.2.3.11.2.3 PATCH

This method shall support the URI query parameters specified in table 6.2.3.11.2.4-1.

**Table 6.2.3.11.2.4-1: 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 [8] clause 6.6 |

This method shall support the request data structures specified in table 6.2.3.11.2.4-2 and the response data structures and response codes specified in table 6.2.3.11.2.4-3.

**Table 6.2.3.11.2.4-2: Data structures supported by the PATCH Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| NwdafRegistrationModification | M | 1 | The NWDAF registration is modified with the received information. |

**Table 6.2.3.11.2.4-3: Data structures supported by the PATCH Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| NwdafRegistration | C | 0..1 | 200 OK | Upon partial success, if the NF service consumer does not support the "PatchReport" feature, the UDM shall return an NwdafRegistration object in the response.<br>(NOTE 2) |
| PatchResult | C | 0..1 | 200 OK | Upon success, if the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature, and in case some of the requested modifications are discarded while the rest of the modification instructions are fully accepted, UDM may return the execution report instead of the whole NwdafRegistration.<br>(NOTE 2) |
| n/a | | | 204 No Content | Upon success, an empty response body is returned indicating that all the modification instructions in the PATCH request have been implemented. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- CONTEXT_NOT_FOUND<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 422 Unprocessable Entity | The "cause" attribute may be used to indicate one of the following application errors:<br>- 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.<br>NOTE 2: One of NwdafRegistration or PatchResult shall be returned. | | | | |

### 6.2.3.12 Resource: NwdafRegistrations

#### 6.2.3.12.1 Description

This resource is used to represent NWDAF registrations.

#### 6.2.3.12.2 Resource Definition

Resource URI: {apiRoot}/nudm-uecm/v1/{ueId}/registrations/nwdaf-registrations

This resource shall support the resource URI variables defined in table 6.2.3.12.2-1.

**Table 6.2.3.12.2-1: Resource URI variables for this resource**

| Name | Data type | Definition |
|------|-----------|------------|
| apiRoot | string | See clause 6.1.1 |
| ueId | VarUeId | Represents the 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 GET method; pattern: See pattern of type VarUeId in 3GPP TS 29.571 [7] |

#### 6.2.3.12.3 Resource Standard Methods

##### 6.2.3.12.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.12.3.1-1.

**Table 6.2.3.12.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| analytics-ids | array(EventId) | O | 0..N | Represents the List of analytics Id(s) supplied by NWDAF, see EventId data type defined in 3GPP TS 29.520 [58] |
| 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 6.2.3.12.3.1-2 and the response data structures and response codes specified in table 6.2.3.12.3.1-3.

**Table 6.2.3.12.3.1-2: 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 6.2.3.12.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
| array(NwdafRegistration) | M | 1..N | 200 OK | Upon success, a response body containing the NwdafRegistration(s) shall be returned. (NOTE 2) |
| 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 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 there are multiple NwdafRegsitration for the same UE, all matched NwdafRegistration(s) will be returned. | | | | |

## 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 HSS triggers the UDM to notify the registered AMFs or 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:<br>- 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 | |
| Data Restoration Notification | {dataRestorationCallbackUri} | 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: {deregCallbackUri}

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: {pcscfRestorationCallbackUri}

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 |
|---|---|---|---|
| PcscfRestoration Notification | M | 1 | Contains the SUPI and optionally the address of the failed P-CSCF. |

**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.<br>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.<br>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:<br>- CONTEXT_NOT_FOUND |
| ProblemDetails | O | 0..1 | 409 Conflict | The "cause" attribute may be used to indicate one of the following application errors:<br>- TEMPORARY_REJECT_REGISTRATION_ONGOING<br>- 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 |

### 6.2.5.4 Data Restoration Notification

The POST method shall be used to inform the NF Service Consumer about a potential data-loss event occurred at the UDR, and the callback URI may be provided during the registration procedure, or dynamically discovered by UDM by querying NRF for a default notification URI.

Resource URI: {dataRestorationCallbackUri}

Support of URI query parameters is specified in table 6.2.5.4-1.

**Table 6.2.5.4-1: 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 6.2.5.4-2 and of response data structures and response codes is specified in table 6.2.5.4-3.

**Table 6.2.5.4-2: Data structures supported by the POST Request Body**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| DataRestorationNotification | M | 1 | Contains identifiers representing those UEs potentially affected by a data-loss event at the UDR. |

**Table 6.2.5.4-3: 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. |
| NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

**Table 6.2.5.4-4: 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 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 6.2.5.4-5: 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 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 |
| NwdafRegistration | 6.2.6.2.21 | The complete set of information relevant to an NWDAF serving the UE |
| NwdafRegistrationModification | 6.2.6.2.22 | Contains attributes of NwdafRegistration that can be modified using PATCH |
| SmfRegistrationModification | 6.2.6.2.23 | Contains attributes of SmfRegistration that can be modified using PATCH |
| RoamingInfoUpdate | 6.2.6.2.24 | Roaming Information Update |
| DataRestorationNotification | 6.2.6.2.25 | Contains identities representing those UEs potentially affected by a data-loss event at the UDR |
| PcscfAddress | 6.2.6.2.26 | Contains the addressing information (IP addresses and/or FQDN) of the P-CSCF |
| NwdafRegistrationInfo | 6.2.6.2.27 | List of NwdafRegistration |
| RoutingInfoSmRequest | 6.2.6.2.28 | Request body of the send-routing-info-sm custom operation. |
| RoutingInfoSmResponse | 6.2.6.2.29 | Addressing information of available nodes for SMS delivery. |
| IpSmGwInfo | 6.2.6.2.30 | Addressing information of the IP-SM-GW. |
| IpSmGwGuidance | 6.2.6.2.31 | Contains guidance information (e.g. minimum and recommended delivery times) of the IP-SM-GW. |
| SmsRouterInfo | 6.2.6.2.32 | Addressing information of the SMS Router configured at the UDM. |
| 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 | |

| UeReachableInd | 6.2.6.3.7 | UE Reachable Indication |
|---|---|---|

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 |
| 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 |
| Snssai | 3GPP TS 29.571 [7] | Single NSSAI |
| RedirectResponse | 3GPP TS 29.571 [7] | Response body of the redirect response message |
| Fqdn | 3GPP TS 29.571 [7] | Fully Qualified Domain Name |
| FqdnRm | 3GPP TS 29.571 [7] | Fully Qualified Domain Name, nullable |
| NfGroupId | 3GPP TS 29.571 [7] | NF Group ID |
| ServiceName | 3GPP TS 29.510 [19] | |
| SupiRange | 3GPP TS 29.510 [19] | |
| IdentityRange | 3GPP TS 29.510 [19] | |
| EventId | 3GPP TS 29.520 [58] | Describes the type of analytics. |
| ContextInfo | 6.1.6.2.69 | Defined in the Nudm_SDM API. Contains the HTTP Headers received by the NFs |

## 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. If the UDR supports the PeiResource feature, the UDM shall also use the PeiInfo resource of the UDR to store the received PEI if it is different from the previously stored PEI or if the PeiInfo resource does not exist. |
| imsVoPs | ImsVoPs | O | 0..1 | Indicates per UE if "IMS Voice over PS Sessions" is homogeneously supported in all TAs in the serving AMF for the current PLMN and access type, 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) |
| emergencyRegistrationInd | boolean | C | 0..1 | This IE shall be included by the AMF and set to true if the UE performs an emergency Registration. Not applicable for Nudr and Nudm_UECM GET operation. |
| 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. 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 | DualRegistration Flag | 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.<br>Not applicable for Nudr and Nudm_UECM GET operation. |
|---|---|---|---|---|
| urrpIndicator | boolean | O | 0..1 | This IE indicates whether "UE_REACHABILITY_FOR_SMS" event or "UE_REACHABILITY_FOR_DATA" event for One-Time UE Activity notification (i.e. Max Number Of reports =1) with configuration "INDIRECT_REPORT" for this user has been subscribed or not:<br>- true: the event has been subscribed<br>- false, or absence of this attribute: the event for this user is currently not subscribed<br>(NOTE 1) |
| amfEeSubscriptionId | Uri | C | 0..1 | Shall be present if urrpIndicator is true and the UDM has subscribed (e.g. on behalf of NEF) to ReachabilityReport event for "UE Reachability for DL Traffic" at the AMF to 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.<br>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 | EpsInterworkingI nfo | 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:<br>- true: 5G SRVCC is supported by the UE and AMF;<br>- false, or absence of this attribute: 5G SRVCC is not supported. |
| registrationTime | DateTime | C | 0..1 | Time of Amf3GppAccessRegistration.<br>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 Amf3GppAccessRegistration.<br>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.<br><br>When present, this IE shall indicate whether AMF does not have event exposure subscriptions in UE Context:<br>- true: No Event Exposure subscription existing in UE Context in AMF.<br>- 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. |

| ueReachableInd | UeReachableInd | C | 0..1 | This IE shall be present if the UE is currently not reachable (e.g. in not allowed areas) or the UE reachability is unknown (e.g. service restriction area of the UE is not received at the AMF during initial registration). <br><br> When the UE is not reachable (and based on operator policy when the UE reachability is unknown), the UDM shall keep the urrpIndicator and amfEeSubscriptionId attributes and not generate Reachability Report for the UE. <br><br> Absence of this IE shall be interpreted as "REACHABLE". |
|---|---|---|---|---|
| reRegistrationRequired | boolean | C | 0..1 | This IE is only applicable to Nudr interface and shall not be included over the Nudm interface. <br><br> This attribute may be included in notifications sent by the UDR to the UDM if purgeFlag is also set to true in the same notification. <br><br> When Nudr Data Change Notification is received including this attribute and the purgeFlag, both set to true, the UDM uses "REREGISTRATION_REQUIRED" as DeregistrationReason towards AMF. <br><br> This attribute shall not be included and set to true if the adminDeregSubWithdrawn attribute is present and set to true. <br> Absence of this IE shall be interpreted as false. |
| adminDeregSubWithdrawn | boolean | C | 0..1 | This IE is only applicable to Nudr interface and shall not be included over the Nudm interface. <br><br> This attribute may be included in notifications sent by the UDR to the UDM if the purgeFlag is also set to true in the same notification. <br><br> When Nudr Data Change Notification is recevied including this attribute and the purgeFlag, both set to true, the UDM uses "SUBSCRIPTION_WITHDRAWN" as DeregistrationReason towards AMF. <br><br> This attribute shall not be included and set to true if the reRegistrationRequired attribute is present and set to true. <br><br> Absence of this IE shall be interpreted as false. |
| dataRestorationCallbackUri | Uri | O | 0..1 | If present, it contains the URI where notifications about UDR-initiated data restoration shall be sent by UDM. |
| resetIds | array(string) | O | 1..N | May be present in registration response messages. The AMF may decide to re-register at the UDM when receiving a data restoration notification containing a matching resetId. |
| disasterRoamingInd | boolean | O | 0..1 | Disaster Roaming Indicator (see 3GPP TS 23.502 [3]). <br> When present, this IE shall be set as follows: <br> - true: Disaster Roaming service is applied; <br> - false (default): Disaster Roaming service is not applied. |
| ueMINTCapability | boolean | O | 0..1 | This IE indicates whether the UE supports MINT: <br> - true: MINT is supported by the UE; <br> - false, or absence of this attribute: MINT is not supported. |

| sorSnpnSiSupported | boolean | O | 0..1 | This IE may be included by the AMF in registration requests; if present, it shall contain the capability of the UE or ME to support "Steering of Roaming SNPN Selection Information" (SOR-SNPN-SI).<br>- true: SOR-SNPN-SI is supported<br>- false or absent: SOR-SNPN-SI is not supported |
|---|---|---|---|---|
| udrRestartInd | boolean | O | 0..1 | May be present in request messages from the AMF to the UDM.<br>If present:<br>- true: indicates that the registration message sent by the AMF is due to a re-synchronization event, motivated by a previous reception at the AMF of a Data Restoration Notification from the UDM<br>- false (or absent): indicates that this is a normal registration message (i.e., not motivated by a data restoration notification event) |
| lastSynchronizationTime | DateTime | O | 0..1 | This IE is only applicable to the Nudm API and shall not be used on the Nudr API.<br>It may only be included when "udrRestartInd" attribute is present and set to true.<br>When present, it contains the timestamp (previously stored by AMF locally, after successful registration at UDM) when profiles in the AMF and in UDM/UDR were synchronized. |
| NOTE 1: The urrpIndicator attribute shall only be exposed over the Nudr SBI, and it shall not be included by the AMF.<br>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. If the UDR supports the PeiResource feature and the received PEI is of type IMEI(SV), the UDM shall also use the PeiInfo resource of the UDR to store the received PEI if it is different from the previously stored PEI or if the PeiInfo resource does not exist. |
| 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. 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 or "UE_REACHABILITY_FOR_DATA" event for One-Time UE Activity notification (i.e. Max Number Of reports =1) with configuration "INDIRECT_REPORT" 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 (e.g. on behalf of NEF) 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 AmfNon3GppAccessRegistration. 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. |
| reRegistrationRequired | boolean | C | 0..1 | This IE is only applicable to Nudr interface and shall not be included over the Nudm interface. This attribute may be included in notifications sent by the UDR to the UDM if the purgeFlag is also set to true in the same notification. When Nudr Data Change Notification is received including this attribute and the purgeFlag, both set to true, the UDM uses "REREGISTRATION_REQUIRED" as DeregistrationReason towards AMF. This attribute shall not be included and set to true if the adminDeregSubWithdrawn attribute is present and set to true. Absence of this IE shall be interpreted as false. |

| adminDeregSubWithdrawn | boolean | C | 0..1 | This IE is only applicable to Nudr interface and shall not be included over the Nudm interface.<br><br>This attribute may be included in notifications sent by the UDR to the UDM if the purgeFlag is also set to true in the same notification.<br><br>When Nudr Data Change Notification is recevied including this attribute and the purgeFlag, both set to true, the UDM uses "SUBSCRIPTION_WITHDRAWN" as DeregistrationReason towards AMF.<br><br>This attribute shall not be included and set to true if the reRegistrationRequired attribute is present and set to true.<br><br>Absence of this IE shall be interpreted as false. |
|---|---|---|---|---|
| dataRestorationCallbackUri | Uri | O | 0..1 | If present, it contains the URI where notifications about UDR-initiated data restoration shall be sent by UDM. |
| resetIds | array(string) | O | 1..N | May be present in registration response messages.<br>The AMF may decide to re-register at the UDM when receiving a data restoration notification containing a matching resetId. |
| disasterRoamingInd | boolean | O | 0..1 | Disaster Roaming Indicator (see 3GPP TS 23.502 [3]).<br>When present, this IE shall be set as follows:<br>   - true: Disaster Roaming service is applied;<br>   - false (default): Disaster Roaming service is not applied. |
| sorSnpnSiSupported | boolean | O | 0..1 | This IE may be included by the AMF in registration requests; if present, it shall contain the capability of the UE or ME to support "Steering of Roaming SNPN Selection Information" (SOR-SNPN-SI).<br>- true: SOR-SNPN-SI is supported<br>- false or absent: SOR-SNPN-SI is not supported |
| udrRestartInd | boolean | O | 0..1 | May be present in request messages from the AMF to the UDM.<br>If present:<br>- true: indicates that the registration message sent by the AMF is due to a re-synchronization event, motivated by a previous reception at the AMF of a Data Restoration Notification from the UDM<br>- false (or absent): indicates that this is a normal registration message (i.e., not motivated by a data restoration notification event) |
| lastSynchronizationTime | DateTime | O | 0..1 | This IE is only applicable to the Nudm API and shall not be used on the Nudr API.<br>It may only be included when "udrRestartInd" attribute is present and set to true.<br>When present, it contains the timestamp (previously stored by AMF locally, after successful registration at UDM) when profiles in the AMF and in UDM/UDR were synchronized. |
| 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.<br>If present, it indicates the NF Set ID of SMF Set. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.2.8<br>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.<br>It shall contain the HPLMN S-NSSAI of the LBO or HR roaming PDU session, or the S-NSSAI in the serving PLMN of the non roaming PDU session. |
| dnn | Dnn | C | 0..1 | Data Network Name; shall be present if emergencyServices is false or absent.<br>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.<br><br>For a HR PDU session, this IE shall include the PLMN ID of the home network of the UE. For a LBO PDU session, this IE shall include the PLMN ID of the serving network where the UE is registered from. |
| pgwFqdn | Fqdn | C | 0..1 | FQDN of the PGW in the "PGW-C+SMF", to be included for interworking with EPS. |
| pgwIpAddr | IpAddress | O | 0..1 | IP Address 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.<br>true: access from ePDG.<br>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.<br>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.<br>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.<br>Shall be absent on Nudm and may be present on Nudr. |
| pcfId | NfInstanceId | C | 0..1 | This IE shall be present if the SMF is indicated to select the same PCF instance for SM Policy Control.<br>When present, it indicates the PCF Identifier that serving the PDU Session/PDN Connection. |
| dataRestorationCallbackUri | Uri | O | 0..1 | If present, it contains the URI where notifications about UDR-initiated data restoration shall be sent by UDM. |
| resetIds | array(string) | O | 1..N | May be present in registration response messages. The SMF may decide to re-register at the UDM when receiving a data restoration notification containing a matching resetId. |

| | | | | |
|---|---|---|---|---|
| udrRestartInd | boolean | O | 0..1 | May be present in request messages from the SMF to the UDM.<br>If present:<br>- true: indicates that the registration message sent by the SMF is due to a re-synchronization event, motivated by a previous reception at the SMF of a Data Restoration Notification from the UDM.<br>- false (or absent): indicates that this is a normal registration message (i.e., not motivated by a data restoration notification event) |
| lastSynchronizationTime | DateTime | O | 0..1 | This IE is only applicable to the Nudm API and shall not be used on the Nudr API.<br>It may only be included when "udrRestartInd" attribute is present and set to true.<br>When present, it contains the timestamp (previously stored by SMF locally, after successful registration at UDM) when profiles in the SMF and in UDM/UDR were synchronized. |

### 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 | Deregistration Reason | 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.<br>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.<br>If present, it indicates the NF Set ID of SMSF Set. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.2.8<br>These are the features supported by the SMSF. |
| plmnId | PlmnId | M | 1 | Serving PLMN identity<br><br>This IE shall include the PLMN ID of the serving network where the UE is registered from. |
| 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.<br>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.<br>Shall be absent on Nudm and may be present on Nudr.. |
| smsfSbiSupInd | boolean | C | 0..1 | SBI Support Indication of the SMSF. it shall be present if the SMSF support SBI-based MT SM transmit (see clauses 5.3.2.2.5 and 5.3.2.2.6). Contains the indication on whether or not the SMSF is expecting to support SBI-based MT SM transmit.<br>- true: the SMSF supports SBI for MT SM transmit.<br>- false, or absence of this attribute: the SMSF do not support SBI for MT SM transmit. |
| dataRestorationCallbackUri | Uri | O | 0..1 | If present, it contains the URI where notifications about UDR-initiated data restoration shall be sent by UDM. |
| resetIds | array(string) | O | 1..N | May be present in registration response messages.<br>The SMSF may decide to re-register at the UDM when receiving a data restoration notification containing a matching resetId. |
| udrRestartInd | boolean | O | 0..1 | May be present in request messages from the SMSF to the UDM.<br>If present:<br>- true: indicates that the registration message sent by the SMSF is due to a re-synchronization event, motivated by a previous reception at the SMSF of a Data Restoration Notification from the UDM<br>- false (or absent): indicates that this is a normal registration message (i.e., not motivated by a data restoration notification event) |
| lastSynchronizationTime | DateTime | O | 0..1 | This IE is only applicable to the Nudm API and shall not be used on the Nudr API.<br>It may only be included when "udrRestartInd" attribute is present and set to true.<br>When present, it contains the timestamp (previously stored by SMSF locally, after successful registration at UDM) when profiles in the SMSF and in UDM/UDR were synchronized. |

| | | | | |
|---|---|---|---|---|
| ueMemoryAvailableInd | boolean | C | 0..1 | When the SMSF detects that the UE has memory available for SMS, the SMSF shall send the registration message with ueMemoryAvailableInd set to true. Otherwise shall be absent.<br>When present and true, the UDM shall trigger Alert for SMS. Storing the ueMemoryAvailableInd in the UDR is not applicable. |

### 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.<br>If the UDR supports the PeiResource feature and the received PEI is of type IMEI(SV), the UDM shall in addition to updating the Amf3GppAccessRegistration resource also update the PeiInfo resource of the UDR to store the received PEI if it is different from the previously stored PEI. |
| imsVoPs | ImsVoPs | O | 0..1 | Indicates per UE if "IMS Voice over PS Sessions" is homogeneously supported in all TAs in the serving AMF for the current PLMN and access type, 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.<br>The UDM uses this attribute to do an NRF query in order to invoke later services in a backup AMF, e.g. Namf_EventExposure.<br>An empty array indicates that the complete backupAmfInfo shall be deleted. |
| 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.<br>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:<br>- true: 5G SRVCC is supported by the UE and AMF;<br>- false: 5G SRVCC is not supported. |
| ueMINTCapability | boolean | O | 0..1 | This IE indicates whether the UE supports MINT:<br>- true: MINT is supported by the UE;<br>- false: MINT 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. If the UDR supports the PeiResource feature and the PEI is of type IMEI(SV), the UDM shall in addition to updating the AmfNon3GppAccessRegistration resource also update the PeiInfo resource of the UDR to store the received PEI if it is different from the previously stored PEI. |
| 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. An empty array indicates that the complete backupAmfInfo shall be deleted. |
| 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 |
| failedPcscf | PcscfAddress | C | 0..1 | Information about 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 | Fqdn | M | 1 | The PGW FQDN of the "PGW-C+SMF" |
| smfInstanceId | NfInstanceId | M | 1 | The SMF Instance Id of the "PGW-C+SMF" |
| plmnId | PlmnId | O | 0..1 | PLMN where the PGW-C+SMF is located |

### 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 | |
| failedPcscf | PcscfAddress | C | 0..1 | Information about the failed P-CSCF |

### 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 | Deregistration Reason | 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. |
| 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 PeiUpdateInfo**

| 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 | 0..1 | AMF 3GPP Access Registration |
| amfNon3Gpp | AmfNon3GppAccessRegistration | O | 0..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 |
| ipSmGw | IpSmGwRegistration | O | 0..1 | IP-SM-GW Registration |
| nwdafRegistration | NwdafRegistrationInfo | O | 0..1 | NWDAF Registration Information |

### 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]) (NOTE 1) |
| 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]) (NOTE 1) |
| ipsmgwIpv4 | Ipv4Addr | C | 0..1 | This IE shall be present if available. When present, this IE indicates the IPv4 address of the IP-SM-GW. (NOTE 1) |
| ipsmgwIpv6 | Ipv6Addr | C | 0..1 | This IE shall be present if available. When present, this IE indicates the IPv6 address of the IP-SM-GW. (NOTE 1) |
| ipsmgwFqdn | Fqdn | C | 0..1 | This IE shall be present if available. When present, this IE indicates the FQDN of the IP-SM-GW. (NOTE 1) |
| ipSmGwSbiSupInd | boolean | C | 0..1 | SBI Support Indication of the IP-SM-GW. it shall be present if provided in IP-SM-GW registration procedure (see clauses 5.3.2.2.7) Contains the indication on whether or not the IP-SM-GW is expecting to support SBI-based MT SM transmit. - true: the IP-SM-GW supports SBI for MT SM transmit. - false, or absence of this attribute: the IP-SM-GW do not support SBI for MT SM transmit. |
| nfInstanceId | NfInstanceId | C | 0..1 | NF Instance ID of the SBI-capable IP-SM-GW |
| 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 |
| resetIds | array(string) | O | 1..N | May be present in registration response messages. The IP-SM-GW may decide to re-register at the UDM when receiving a data restoration notification containing a matching resetId. |
| NOTE 1: At least one of the properties, ipSmGwMapAddress or ipSmGwDiameterAddress or ipsmgwIpv4 or ipsmgwIpv6 or ipsmgwFqdn, shall be present. If the IP-SM-GW supports SBI, the nfInstanceId property 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. |

6.2.6.2.21     Type: NwdafRegistration

**Table 6.2.6.2.21-1: Definition of type NwdafRegistration**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| nwdafInstanceId | NfInstanceId | M | 1 | NF Instance Id of the NWDAF. |
| analyticsIds | array(EventId) | M | 1..N | List of analytics Id(s) provided by the consumers of NWDAF. |
| nwdafSetId | NfSetId | C | 0..1 | This IE shall be present if the NWDAF belongs to an NWDAF SET. If present, it indicates the NF Set ID of NWDAF Set. |
| registrationTime | DateTime | C | 0..1 | Time of NwdafRegistration. 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 NwdafRegistration. Shall be absent on Nudm and may be present on Nudr. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.2.8 These are the features supported by the NWDAF. |
| resetIds | array(string) | O | 1..N | May be present in registration response messages. The NWDAF may decide to re-register at the UDM when receiving a data restoration notification containing a matching resetId. |

6.2.6.2.22     Type: NwdafRegistrationModification

**Table 6.2.6.2.22-1: Definition of type NwdafRegistrationModification**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| nwdafInstanceId | NfInstanceId | M | 1 | NF  Instance Id of the NWDAF |
| nwdafSetId | NfSetId | C | 0..1 | This IE shall be present if the NWDAF belongs to an NWDAF SET. If present, it indicates the NF Set ID of NWDAF Set. |
| analyticsIds | array(EventId) | O | 0..N | List of analytics Id(s) supplied by NWDAF. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.2.8 These are the features supported by the NWDAF. |
| 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. | | | | |

6.2.6.2.23     Type: SmfRegistrationModification

This type is derived from the type SmfRegistration by deleting all attributes that are not subject to modification by means of the HTTP PATCH method.

**Table 6.2.6.2.23-1: Definition of type SmfRegistrationModification**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| smfInstanceId | NfInstanceId | M | 1 | NF Instance Id of the SMF requesting the modification. If the NF Set Id is absent and the NF Instance Id does not match the stored NF Instance Id value, the modification request shall be rejected. |
| smfSetId | NfSetId | O | 0..1 | NF Set Id of the SMF requesting the modification. If the NF Set Id is present and does not match the stored NF Set Id value, the modification request shall be rejected. |
| pgwFqdn | FqdnRm | C | 0..1 | FQDN of the PGW in the "PGW-C+SMF", to be included for interworking with EPS. For deletion of the PGW FQDN, the value of the pgwFqdn shall be set to null. |
| 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. | | | | |

## 6.2.6.2.24 Type: RoamingInfoUpdate

**Table 6.2.6.2.24-1: Definition of type RoamingInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| servingPlmn | PlmnId | M | 1 | the new Serving PLMN |
| roaming | boolean | C | 0..1 | This IE shall be included if the roaming status changes (from roaming to non-roaming or vice versa).<br>True: The new serving PLMN is different from the HPLMN;<br>False: The new serving PLMN is the HPLMN |

6.2.6.2.25          Type: DataRestorationNotification

**Table 6.2.6.2.25-1: Definition of type DataRestorationNotification**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| lastReplicationTime | DateTime | O | 0..1 | If present, it contains the timestamp of the most recent instant when the data was assumed to be consistent at UDR (i.e. the potential data loss event at UDR did not occur before this instant). |
| recoveryTime | DateTime | O | 0..1 | If present, it contains the timestamp of the instant when the potential data loss event was recovered at UDR (i.e. all data records stored by UDR after this time are assumed to be consistent). |
| plmnId | PlmnId | C | 0..1 | If present, it shall contain the PLMN-ID of the UDM/UDR that originated the Data Restoration Notification. It shall be included in notifications sent by UDM to its NF consumers located in other PLMNs. |
| supiRanges | array(SupiRange) | O | 1..N | If present, it contains the list of SUPIs potentially subject to a data-loss event at the UDR. |
| gpsiRanges | array(IdentityRange) | O | 1..N | If present, it contains the list of GPSIs potentially subject to a data-loss event at the UDR. |
| resetIds | array(string) | O | 1..N | If present, it contains the list of Reset-IDs of those UEs potentially subject to a data-loss event at the UDR. |
| sNssaiList | array(Snssai) | O | 1..N | If present, it contains the list of slices (S-NSSAIs) potentially subject to a data-loss event at the UDR. |
| dnnList | array(Dnn) | O | 1..N | If present, it contains the list of DNNs potentially subject to a data-loss event at the UDR. |
| udmGroupId | NfGroupId | O | 1..N | If present, it contains the ID of the UDM Group whose UEs have been potentially subject to a data loss event at the UDR. |

6.2.6.2.26          Type: PcscfAddress

**Table 6.2.6.2.26-1: Definition of type PcscfAddress**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ipv4Addrs | array(Ipv4Addr) | O | 1..N | If present, it contains IPv4 address(es) of the P-CSCF (NOTE 2). |
| ipv6Addrs | array(Ipv6Addr) | O | 1..N | If present, it contains IPv6 address(es) of the P-CSCF (NOTE 2). |
| fqdn | Fqdn | O | 0..1 | If present, it contains the FQDN of the P-CSCF. |
| NOTE 1:  At least, one of these P-CSCF addressing attributes shall be included. | | | | |
| NOTE 2:  Several addresses may be included (in ipv4Addrs or ipv6Addrs) to convey multiple redundant IP endpoints on the Mw interface of the P-CSCF. | | | | |

6.2.6.2.27          Type: NwdafRegistrationInfo

**Table 6.2.6.2.27-1: Definition of type NwdafRegistrationInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| nwdafRegistrationList | array(NwdafRegistration) | M | 1..N | List of NwdafRegistration. |

### 6.2.6.2.28 Type: RoutingInfoSmRequest

**Table 6.2.6.2.28-1: Definition of type RoutingInfoSmRequest**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ipSmGwInd | boolean | C | 0..1 | This IE indicates whether the SMS-GMSC is prepared to receive IP-SM-GW guidance information in the response:<br>- true: receiving IP-SM-GW guidance in the response is supported;<br>- false, or absence: receiving IP-SM-GW guidance in the response is not supported. |
| correlationId | string | O | 0..1 | Contains the MSISDN-less Correlation ID. |
| supportedFeatures | SupportedFeatures | O | 0..1 | Features of the Nudm_UECM API supported by the NF Service Consumer. |

### 6.2.6.2.29 Type: RoutingInfoSmResponse

**Table 6.2.6.2.29-1: Definition of type RoutingInfoSmResponse**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| supi | Supi | O | 0..1 | Contains the SUPI of the UE |
| smsf3Gpp | SmsfRegistration | O | 0..1 | SMSF 3GPP Access Registration |
| smsfNon3Gpp | SmsfRegistration | O | 0..1 | SMSF Non 3GPP Access Registration |
| ipSmGw | IpSmGwInfo | O | 0..1 | IP-SM-GW Registration |
| smsRouter | SmsRouterInfo | O | 0..1 | SMS Router address |

### 6.2.6.2.30 Type: IpSmGwInfo

**Table 6.2.6.2.30-1: Definition of type IpSmGwInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ipSmGwRegistration | IpSmGwRegistration | M | 1 | IP-SM-GW routing information |
| ipSmGwGuidance | IpSmGwGuidance | C | 0..1 | Contains the recommended and the minimum timer values for supervision of MT SMS response. It shall be present if the ipSmGwInd attribute in the request is set to true. |

### 6.2.6.2.31 Type: IpSmGwGuidance

**Table 6.2.6.2.31-1: Definition of type IpSmGwGuidance**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| minDeliveryTime | integer | M | 1 | The minimum timer value in units of seconds. Minimum = 30. Maximum = 600. |
| recommDeliveryTime | integer | M | 1 | The recommended timer value in units of seconds. Minimum = 30. Maximum = 600. |

6.2.6.2.32 Type: SmsRouterInfo

**Table 6.2.6.2.32-1: Definition of type SmsRouterInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| nfInstanceId | NfInstanceId | O | 0..1 | NF Instance ID of the SMS Router |
| diameterAddress | NetworkNodeDiameterAddress | O | 0..1 | Diameter address of the SMS Router |
| mapAddress | E164Number | O | 0..1 | MAP address of the SMS Router |
| routerIpv4 | Ipv4Addr | O | 0..1 | This IE shall be present if available. When present, this IE indicates the IPv4 address of the SMS Router. |
| routerIpv6 | Ipv6Addr | O | 0..1 | This IE shall be present if available. When present, this IE indicates the IPv6 address of the SMS Router. |
| routerFqdn | Fqdn | O | 0..1 | This IE shall be present if available. When present, this IE indicates the FQDN of the SMS Router. |

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] |
| "DUPLICATE_PDU_SESSION" | This value shall only be sent by the UDM to an SMF. It indicates that the deregistration in the SMF is due to a new PDU session with the same PDU session ID has been established in another SMF. |
| "DISASTER_CONDITION_TERMINATED" | This value shall be used by the UDM when the disaster condition ceases. |

### 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 |
| "IP_SM_GW" | IP-SM-GW Registration |
| "NWDAF" | NWDAF 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).

6.2.6.3.7          Enumeration: UeReachableInd

**Table 6.2.6.3.7-1: Enumeration UeReachableInd**

| Enumeration value | Description |
|---|---|
| "REACHABLE" | Indicates the UE is currently reachable for services, i.e. the UE is in allowed areas. |
| "NOT_REACHABLE" | Indicates the UE is currently not reachable for services, i.e. the UE is in not allowed areas. |
| "UNKNOWN" | Indicates whether UE is in not allowed area is unknown, e.g. the AMF does not have the UE subscription data including the Service Area Restriction Configuration for the UE when performing UECM Registration. |

# 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. MT-SMS 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. MT-SMS is barred). |
| SNPN_NOT_ALLOWED | 403 Forbidden | The user is not authorized to access an SNPN, when the registration to the SNPN is performed by using credentials from the Credentials Holder. |
| 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 |
| ABSENT_SUBSCRIBER_SM | 404 Not Found | The UE is not reachable for MT-SMS (e.g. SMSF registered but not reachable as indicated by SMS message waiting data or by URRP flag) |
| DATA_NOT_FOUND | 404 Not Found | The requested data associated to the UE or Group does not exist |
| AF_NOT_ALLOWED | 403 Forbidden | This AF is not allowed to perform monitoring configuration. |
| GROUP_IDENTIFIER_NOT_FOUND | 404 Not Found | The group does not exist |

## 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]. |
| 3 | SharedDataTreatment | This feature is an extension to the SharedData feature, i.e. support of SharedDataTreatment requires support of SharedData. When receiving a Nudm_UECM_Registration service operation request for a UE that shares subscription data with treatment instruction 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. |

## 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 the following scopes for OAuth2 authorization:

**Table 6.2.9-1: OAuth2 scopes defined in Nudm_UECM API**

| Scope | Description |
|---|---|
| "nudm-uecm" | Access to the Nudm UE Context Management API |
| "nudm-uecm:amf-registration:write" | Write access (update/modify) to representations of the Amf3GppAccessRegistration and AmfNon3GppAccessRegistration resources. |
| "nudm-uecm:smf-registration:write" | Write access (create/delete/modify) to the representations of a individualSmfRegistration resources. |
| "nudm-uecm:smsf-registration:write" | Write access (create/delete/modify) to representations of the Smsf3GppAccessRegistration and SmsfNon3GppAccessRegistration resources. |
| "nudm-uecm:ip-sm-gw-registration:write | Write access (create/delete/modify) to the representation of the IpSmGwRegistration resource. |

## 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

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

Figure 6.3.3.1-1 depicts the resource URIs structure for the Nudm_UEAU API.

//{apiRoot}/nudm-ueau/v1

/{supiOrSuci}

/security-information

/generate-auth-data

/security-information-rg

/auth-event

/{authEventId}

/prose-security-information

/generate-av

/{supi}

/hss-security-information

/{hssAuthType}

/generate-av

/gba-security-information

/generate-av
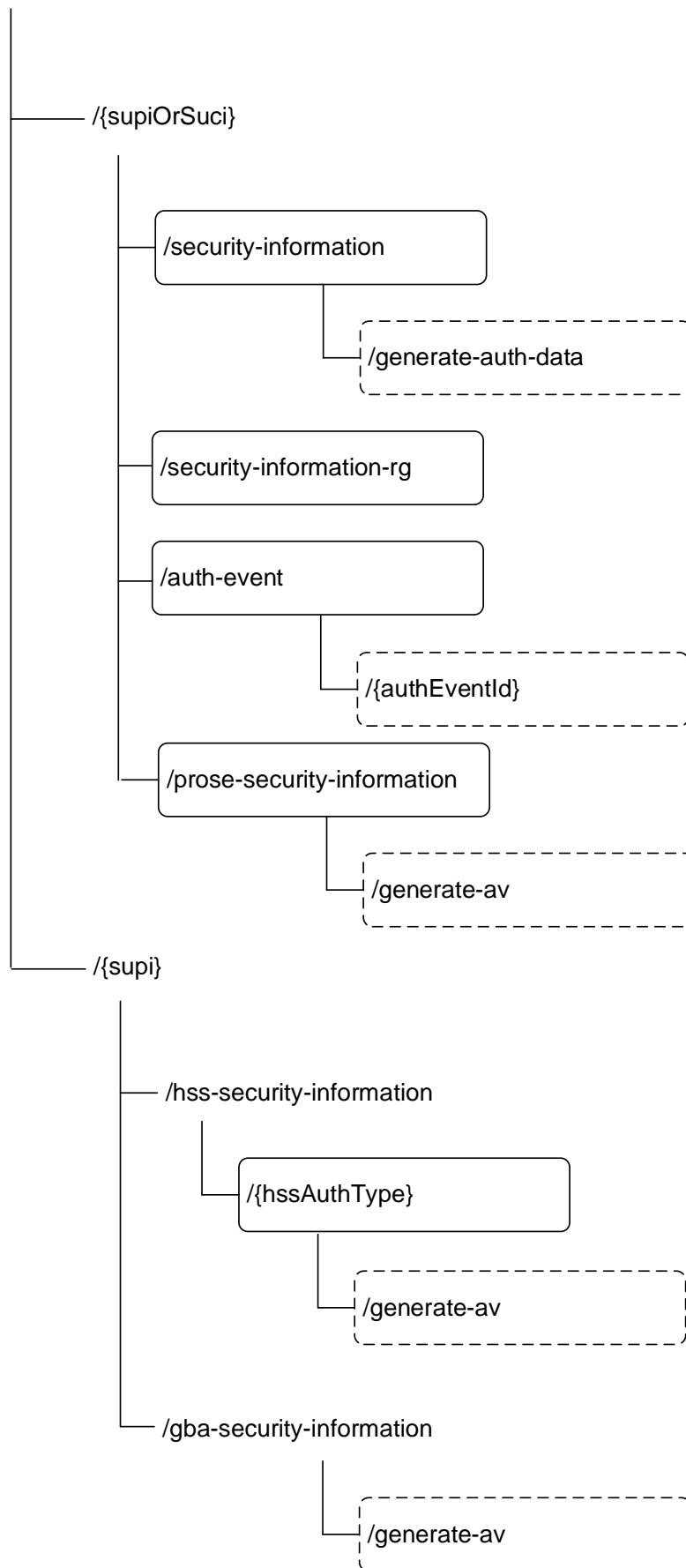
**Figure 6.3.3.1-1: Resource URI structure of the Nudm_UEAU API**

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. If the variable {supiOrSuci} takes the value of an anonymous SUCI, the UDM calculates the corresponding anonymous 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. |
| GbaSecurityInformation (Custom operation) | /{supi}/gba-security-information/generate-av | generate-av (POST) | The UDM generates the authentication vector(s) of the requested type based on stored security information for the SUPI. |
| ProSeSecurityInformation (Custom operation) | /{supiOrSuci}/prose-security-information/generate-av | generate-av (POST) | 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. |

## 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]).<br><br>Pattern: See pattern of type SupiOrSuci in 3GPP TS 29.571 [7]<br><br>(See NOTE 1, NOTE 2, NOTE 3). |
| 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. | |
| NOTE 3: | If the anonymous SUCI contain the realm part, the UDM calculates the corresponding anonymous SUPI. | |

### 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 |
|-----------|---|-------------|-------------|
| AuthenticationInfo Request | 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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AUTHENTICATION_REJECTED<br>- INVALID_HN_PUBLIC_KEY_IDENTIFIER<br>- INVALID_SCHEME_OUTPUT |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate one of the following application errors:<br>- UNSUPPORTED_PROTECTION_SCHEME<br><br>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.<br><br>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:<br>- 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]).<br><br>Pattern: See pattern of type SupiOrSuci in 3GPP TS 29.571 [7].<br><br>(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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AUTHENTICATION_REJECTED<br>- 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 |
|-----------|---|-------------|-------------|
| HssAuthentication InfoRequest | M | 1 | Contains the authentication method, number of requested vectors, serving network id and resynchronization information |

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**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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AUTHENTICATION_REJECTED |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate the following application error:<br>- UNSUPPORTED_AUTHENTICATION_METHOD<br><br>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)<br>    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.<br><br>The "cause" attribute may be set to:<br>- 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. | | | | |

## 6.3.3.7          Resource: GbaSecurityInformation (Custom operation)

### 6.3.3.7.1          Description

This resource represents the information that is needed to calculate authentication vector(s) for GBA's BSF. See 3GPP TS 33.220 [61].

### 6.3.3.7.2          Resource Definition

Resource URI: {apiRoot}/nudm-ueau/v1/{supi}/gba-security-information

This resource shall support the resource URI variables defined in table 6.3.3.7.2-1.

**Table 6.3.3.7.2-1: 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]). |

### 6.3.3.7.3          Resource Standard Methods

No Standard Methods are supported for this resource.

### 6.3.3.7.4          Resource Custom Operations

#### 6.3.3.7.4.1          Overview

**Table 6.3.3.7.4.1-1: Custom operations**

| Operation Name | Custom operation URI | Mapped HTTP method | CaDescription |
|----------------|----------------------|--------------------|---------------|
| generate-av | /generate-av | POST | Calculate the authentication vector(s) |

#### 6.3.3.7.4.2          Operation: generate-av

##### 6.3.3.7.4.2.1          Description

This custom operation is used by the NF service consumer (GBA's BSF) to request calculation of authentication vector(s) for the provided SUPI.

##### 6.3.3.7.4.2.2          Operation Definition

This operation shall support the request data structures specified in table 6.3.3.7.4.2.2-1 and the response data structure and response codes specified in table 6.3.3.7.4.2.2-2.

**Table 6.3.3.7.4.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| GbaAuthenticatio nInfoRequest | M | 1 | It contains the requested authentication type and, optionally, resynchronization info. |

**Table 6.3.3.7.4.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| GbaAuthenticationInf oResult | M | 1 | 200 OK | Upon success, a response body containing an authentication vector of the requested type shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate the following application error:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AUTHENTICATION_REJECTED |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate the following application error:<br>- UNSUPPORTED_AUTHENTICATION_METHOD<br><br>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. | | |

## 6.3.3.8 Resource: ProSeSecurityInformation (Custom operation)

### 6.3.3.8.1 Description

This resource represents the 5G ProSe security information, see 3GPP TS 33.503 [64].

### 6.3.3.8.2 Resource Definition

Resource URI: {apiRoot}/nudm-ueau/v1/{supiOrSuci}/prose-security-information

This resource shall support the resource URI variables defined in table 6.3.3.8.2-1.

**Table 6.3.3.8.2-1: 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]).<br><br>Pattern: See pattern of type SupiOrSuci in 3GPP TS 29.571 [7]<br><br>(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. |

### 6.3.3.8.3 Resource Standard Methods

No Standard Methods are supported for this resource.

### 6.3.3.8.4          Resource Custom Operations

#### 6.3.3.8.4.1  Overview

**Table 6.3.3.8.4.1-1: Custom operations**

| Operation Name | Custom operation URI | Mapped HTTP method | Description |
|---|---|---|---|
| generate-av | /generate-av | POST | Generates the 5G ProSe authentication data. |

#### 6.3.3.8.4.2  Operation: generate-av

##### 6.3.3.8.4.2.1          Description

This custom operation is used by the NF service consumer (AUSF) to request ProSe authentication vector(s) for the 5G ProSe Remote UE 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 EAP-AKA' is selected. For details see 3GPP TS 33.501 [6].

##### 6.3.3.8.4.2.2          Operation Definition

This operation shall support the request data structures specified in table 6.3.3.8.4.2.2-1 and the response data structure and response codes specified in table 6.3.3.8.4.2.2-2.

**Table 6.3.3.8.4.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| ProSeAuthenticationInfoRequest | M | 1 | Contains the relay service code and, optionally, resynchronization info. |

**Table 6.3.3.8.4.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| ProSeAuthenticationInfoResult | 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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AUTHENTICATION_REJECTED |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate the following application error:<br>-<br>UNSUPPORTED_AUTHENTICATION_METHOD<br><br>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. | | | | |

## 6.3.4          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

### 6.3.5.1 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].

**Table 6.3.5.1-1: Notifications overview**

| Notification | Resource URI | HTTP method or custom operation | Description (service operation) |
|---|---|---|---|
| Data Restoration Notification | {dataRestorationCallbackUri} | POST | |

### 6.3.5.2 Data Restoration Notification

The POST method shall be used to inform the NF Service Consumer about a potential data-loss event occurred at the UDR, and the callback URI may be provided during the confirmation of a successful authentication event, or dynamically discovered by UDM by querying NRF for a default notification URI.

Resource URI: {dataRestorationCallbackUri}

Support of URI query parameters is specified in table 6.3.5.2-1.

**Table 6.3.5.2-1: 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 6.3.5.2-2 and of response data structures and response codes is specified in table 6.3.5.2-3.

**Table 6.3.5.2-2: Data structures supported by the POST Request Body**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| DataRestorationNotification | M | 1 | Contains identifiers representing those UEs potentially affected by a data-loss event at the UDR. |

**Table 6.3.5.2-3: 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.<br>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.<br>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. |
| NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

**Table 6.3.5.2-4: 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 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 6.3.5.2-5: 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 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 |

## 6.3.6 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 |
| GbaAuthenticationInfoRequest | 6.3.6.2.15 | Contains authentication method and resynchronization information |
| GbaAuthenticationInfoResult | 6.3.6.2.16 | Contains the authentication vectors for GBA's BSF domain |
| ProSeAuthenticationInfoRequest | 6.3.6.2.17 | Contains RSC and resynchronization information |
| ProSeAuthenticationInfoResult | 6.3.6.2.18 | Contains the authentication vectors for ProSe |
| ProSeAuthenticationVectors | 6.3.6.2.19 | Contains the authentication vectors for ProSe |
| 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 | |
| GbaAuthType | 6.3.6.3.10 | |

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] | |
| ServerAddressingInfo | 3GPP TS 29.571 [7] | Server address info, which in this specification contains information of a Provisioning Server (PVS) |
| 3GAkaAv | 3GPP TS 29.562 [65] | See clause 6.3.6.2.5 of 3GPP TS 29.562 |
| ResynchronizationInfo | 3GPP TS 29.562 [65] | See clause 6.3.6.2.4 of 3GPP TS 29.562 |
| RelayServiceCode | 3GPP TS 29.571 [7] | |
| DataRestorationNotification | 6.2.6.2.25 | Contains identities representing those UEs potentially affected by a data-loss event at the UDR |

## 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 6.1.3.3.2 |
| 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 |
| nswoInd | boolean | O | 0..1 | NSWO Indicator (see 3GPP TS 33.501 [6]) |
| disasterRoamingInd | boolean | O | 0..1 | Disaster Roaming Indicator (see 3GPP TS 23.502 [3]). When present, this IE shall be set as follows: - true: Disaster Roaming service is applied; - false (default): Disaster Roaming service is not applied. |
| 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<br>SUPI or anonymous SUPI shall be present if the request contained the anonymous SUCI within the request URI |
| akmaInd | boolean | C | 0..1 | When present, this IE shall be set as follows:<br>- true: AKMA keys need to be generated for the UE;<br>- false (default): AKMA keys are not needed. |
| authAaa | Boolean | C | 0..1 | When present, this IE shall be set as follows:<br>- true: Primary authentication with AAA Server that acts as the EAP server is required, i.e. the AUSF is required to act as EAP proxy towards the AAA Server, or if the UDM receives an anonymous SUCI, the AUSF is indicated to run primary authentication with an external Credentials holder;<br>- false (default): Primary authentication with AAA Server that acts as the EAP server is not required, i.e. the AUSF is required to act as EAP server according to the EAP method defined in authType attribute. See clause 6.3.6.3.3. |
| routingId | string | C | 0..1 | This IE shall be present if the akmaInd is set to "true".<br>When present, this IE shall include the Routing Indicator contained in the SUCI (see 3GPP TS 23.003 [8], clause 2.2B). |
| pvsInfo | array(ServerAddressingInfo) | C | 1..N | When present, this IE shall contain the remote Provisioning Server(s) information (PVS FQDN(s) and/or IP address(es)). This is used for the case of SNPN onboarding with DCS hosting AUSF and UDM. |
| 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) |
| resetIds | array(string) | O | 1..N | May be present in Authentication Confirmation response messages. The AUSF may decide to re-confirm the authentication at the UDM when receiving a data restoration notification containing a matching resetId. |
| dataRestorationCallbackUri | Uri | O | 0..1 | If present, it contains the URI where notifications about UDR-initiated data restoration shall be sent by UDM. |
| udrRestartInd | boolean | O | 0..1 | May be present in request messages from the AUSF to the UDM. If present: - true: indicates that the registration message sent by the AUSF is due to a re-synchronization event, motivated by a previous reception at the AUSF of a Data Restoration Notification from the UDM - false (or absent): indicates that this is a normal request message (i.e., not motivated by a data restoration notification event) |

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 | 1 | This IE shall be set as follows:<br>- true: authentication is not required;<br>- 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 | |

6.3.6.2.15        Type: GbaAuthenticationInfoRequest

**Table 6.3.6.2.15-1: Definition of type GbaAuthenticationInfoRequest**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| authType | GbaAuthType | M | 1 | Indicates the authentication method. |
| resynchronizationInfo | ResynchronizationInfo | O | 0..1 | Contains RAND and AUTS. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.3.8 |

6.3.6.2.16        Type: GbaAuthenticationInfoResult

**Table 6.3.6.2.16-1: Definition of type GbaAuthenticationInfoResult**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| 3gAkaAv | 3GAkaAv | O | 0..1 | Contains an AV when the requested authentication type is "DIGEST_AKAV1_MD5" |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.3.8 |

### 6.3.6.2.17 Type: ProSeAuthenticationInfoRequest

**Table 6.3.6.2.17-1: Definition of type ProSeAuthenticationInfoRequest**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| servingNetworkName | ServingNetworkName | M | 1 | See 3GPP TS 33.501 [6] clause 6.1.1.4 |
| relayServiceCode | RelayServiceCode | M | 1 | Indicates Relay Service Code. See 3GPP TS 29.571 [7] clause 5.4.2 |
| resynchronizationInfo | ResynchronizationInfo | O | 0..1 | Contains RAND and AUTS. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.3.8 |

### 6.3.6.2.18 Type: ProSeAuthenticationInfoResult

**Table 6.3.6.2.18-1: Definition of type ProSeAuthenticationInfoResult**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| authType | AuthType | M | 1 | Indicates the authentication method. |
| proseAuthenticationVectors | ProSeAuthenticationVectors | O | 0..1 | This IE shall be present if the AUSF of the 5G ProSe Remote UE retrieves the Authentication Vectors from the UDM. When present, this IE shall contain Authentication Vector for Prose. See 3GPP TS 33.503 [64] clause 7.4.2.1 |
| 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 |

### 6.3.6.2.19 Type: ProSeAuthenticationVectors

**Table 6.3.6.2.19-1: Definition of type ProSeAuthenticationVectors as a list of alternatives**

| Data type | Cardinality | Description |
|---|---|---|
| array(AvEapAkaPrime) | 1..5 | |

## 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<br>pattern: "^(5G:mnc[0-9]{3}[.]mcc[0-9]{3}[.]3gppnetwork[.]org(:[A-F0-9]{11})?)\|5G:NSWO$" |
| Success | boolean | true indicates success, false indicates no success |
| Xres | string | pattern: "^[A-Fa-f0-9]{8,32}$" |
| XresStar | string | pattern: "^[A-Fa-f0-9]{32}$" |
| AuthenticatedInd | boolean | Indicates whether authenticated by the W-AGF or not:<br>- true: authenticated by the W-AGF;<br>- false: unauthenticated by the W-AGF. |
| ConfidentialityKey | string | pattern: "^[A-Fa-f0-9]{32}$" |
| IntegrityKey | string | pattern: "^[A-Fa-f0-9]{32}$" |
| Kasme | string | pattern: "^[A-Fa-f0-9]{64}$" |
| NumOfRequestedVectors | integer | minimum: 1<br>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 1 |
| "NONE" | No specific EAP method type is signalled. See NOTE 2 |
| "EAP_TTLS" | EAP-TTLS. See NOTE 3. |
| NOTE 1: EAP-TLS is described in the Informative Annex B and Annex O of 3GPP TS 33.501 [6] and is not mandatory to support. | |
| NOTE 2: NONE indicates that EAP method type is not signalled, because of the following scenario. Primary authentication with AAA Server that acts as the EAP server is required for the UEs that use credentials from an AAA Server in a Credentials Holder, as described in clause 5.30.2.9.2 of 3GPP TS 23.501 [2]. This value is necessary when authAaa attribute is included in the AuthenticationInfoResult type and because authType is a mandatory attribute. | |
| NOTE 3: EAP-TTLS is described in the Informative Annex U of 3GPP TS 33.501 [6] and is optional 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" | |

6.3.6.3.10          Enumeration: GbaAuthType

**Table 6.3.6.3.10-1: Enumeration GbaAuthType**

| Enumeration value | Description |
|---|---|
| "DIGEST_AKAV1_MD5" | IMS-AKA authentication scheme |

# 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 the following scopes for OAuth2 authorization:

**Table 6.3.9-1: Oauth2 scopes defined in Nudm_UEAU API**

| Scope | Description |
|---|---|
| "nudm-ueau" | Access to the Nudm_UEAU API |
| "nudm-ueau:security-information:generate-auth-data:invoke" | Acess to invoke the "generate-auth-data" custom operation on the "security-information" resource |
| "nudm-ueau:security-information-rg:read" | Access to read the "security-information-rg" resource |
| "nudm-ueau:auth-events:create" | Access to create a new child resource on the "auth-events" collection resource |
| "nudm-ueau:auth-event-id:modify" | Access to modify (delete) an "auth-event-id" individual resource |
| "nudm-ueau:hss-security-information:generate-av:invoke" | Acess to invoke the "generate-av" custom operation on the "hss-security-information" resource |
| "nudm-ueau:gba-security-information:generate-av:invoke" | Acess to invoke the "generate-av" custom operation on the "gba-security-information" resource |

# 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

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

Figure 6.4.3.1-1 depicts the resource URIs structure for the Nudm_EE API.
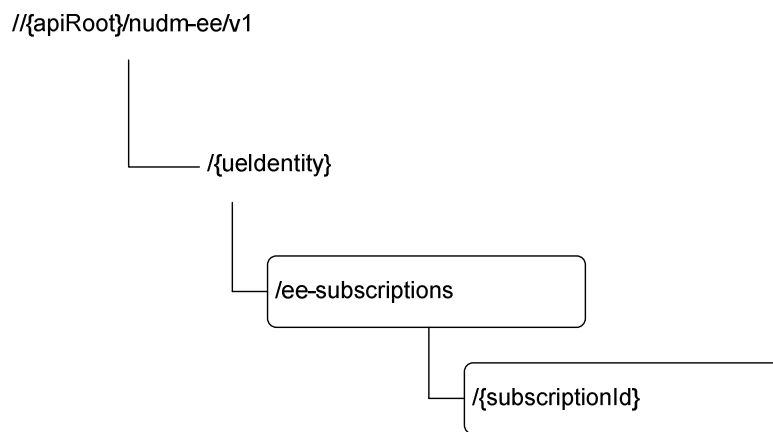


**Figure 6.4.3.1-1: Resource URI structure of the Nudm_EE API**

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.<br>- If representing a single UE, this parameter shall contain the Generic Public Subscription Identifier (see 3GPP TS 23.501 [2] clause 5.9.8)<br>pattern: "^(msisdn-[0-9]{5,15}\|extid-[^@]+@[^@]+\|.+)$"<br><br>- If representing a group of UEs, this parameter shall contain the External GroupId.<br>pattern: "^extgroupid-[^@]+@[^@]+$"<br><br>- If representing any UE, this parameter shall contain "anyUE".<br>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.<br><br>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:<br>- MONITORING_NOT_ALLOWED<br>- AF_NOT_ALLOWED<br>- 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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate one of the following application errors:<br>- UNSUPPORTED_MONITORING_EVENT_TYPE<br>- UNSUPPORTED_MONITORING_REPORT_OPTIONS<br><br>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 6.4.3.2.3.1-4: Headers supported by the 201 Response Code on this resource**

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

## 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.<br>- If representing a single UE, this parameter shall contain the Generic Public Subscription Identifier (see 3GPP TS 23.501 [2] clause 5.9.8)<br>    pattern: "^(msisdn-[0-9]{5,15}\|extid-[^@]+@[^@]+\|.+)$"<br><br>- If representing a group of UEs, this parameter shall contain the External GroupId.<br><br>  pattern: "^extgroupid-[^@]+@[^@]+$"<br><br>- If representing any UE, this parameter shall contain "anyUE".<br><br>  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:<br>- USER_NOT_FOUND<br>- 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:<br>- USER_NOT_FOUND<br> - 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.<br><br>The "cause" attribute may be used to indicate one of the following application errors:<br>- 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.<br>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 | |
| Monitoring Revocation Notification | {secondCallbackRef} | POST | |
| Data Restoration Notification | {dataRestorationCallbackUri} | 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:<br>- 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. | | | |

### 6.4.5.3 Monitoring Revocation Notification

The POST method shall be used for Monitoring Revocation Notification and the URI shall be as provided during the subscription procedure.

Resource URI: {secondCallbackRef}

Support of URI query parameters is specified in table 6.4.5.3-1.

**Table 6.4.5.3-1: 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 6.4.5.3-2 and of response data structures and response codes is specified in table 6.4.5.3-3.

**Table 6.4.5.3-2: Data structures supported by the POST Request Body**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| EeMonitoringRev oked | M | 0..1 | The monitoring events that is to be revoked. |

**Table 6.4.5.3-3: 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. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- 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. | | | | |

### 6.4.5.4 Data Restoration Notification

The POST method shall be used to inform the NF Service Consumer about a potential data-loss event occurred at the UDR, and the callback URI may be provided during the subscription procedure, or dynamically discovered by UDM by querying NRF for a default notification URI.

Resource URI: {dataRestorationCallbackUri}

Support of URI query parameters is specified in table 6.4.5.4-1.

**Table 6.4.5.4-1: 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 6.4.5.4-2 and of response data structures and response codes is specified in table 6.4.5.4-3.

**Table 6.4.5.4-2: Data structures supported by the POST Request Body**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| DataRestorationN otification | M | 1 | Contains identifiers representing those UEs potentially affected by a data-loss event at the UDR. |

**Table 6.4.5.4-3: 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. |
| NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. | | | | |

**Table 6.4.5.4-4: 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 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 6.4.5.4-5: 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 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 |

## 6.4.6 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 | Event report |
| ReportingOptions | 6.4.6.2.6 | Report options |
| ChangeOfSupiPeiAssociationReport | 6.4.6.2.7 | Report for change of SUPI/PEI association |
| RoamingStatusReport | 6.4.6.2.8 | Report for roaming status retrieval |
| CreatedEeSubscription | 6.4.6.2.9 | Created subscription for event exposure |
| LocationReportingConfiguration | 6.4.6.2.10 | Configuration for location reporting |
| CnTypeChangeReport | 6.4.6.2.11 | Report for CN type change |
| ReachabilityForSmsReport | 6.4.6.2.12 | Report for reachability status for SMS |
| 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 |
| ReachabilityReport | 6.4.6.2.20 | Reachability report |
| ReachabilityForDataConfiguration | 6.4.6.2.21 | Reachability for Data Configuration |
| EeMonitoringRevoked | 6.4.6.2.22 | Revoked monitoring events information |
| MonitoringEvent | 6.4.6.2.23 | Monitoring Event |
| FailedMonitoringConfiguration | 6.4.6.2.24 | Failed Monitoring Configuration in the EE subscription |
| 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 | Association type |
| EventReportMode | 6.4.6.3.7 | Event report mode |
| ReachabilityForSmsConfiguration | 6.4.6.3.8 | Configuration for report of reachablity status for SMS |
| PdnConnectivityStatus | 6.4.6.3.9 | PDN Connectivity Status |
| ReachabilityForDataReportConfig | 6.4.6.3.10 | Configuration for report of reachability status for data |
| RevokedCause | 6.4.6.3.11 | Revocation Cause for the monitoring event |
| FailedCause | 6.4.6.3.12 | Failed cause of the failed Monitoring Configuration in the EE subscription |

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] | DateTime |
| Pei | 3GPP TS 29.571 [7] | Permanent Equipment Identifier |
| PlmnId | 3GPP TS 29.571 [7] | PLMN ID |
| Gpsi | 3GPP TS 29.571 [7] | Generic Public Subscription Identifier |
| AccessType | 3GPP TS 29.571 [7] | Access Type |
| PatchItem | 3GPP TS 29.571 [7] | Patch item of JSON PATCH |
| PatchResult | 3GPP TS 29.571 [7] | Patch result of JSON PATCH |
| DddTrafficDescriptor | 3GPP TS 29.571 [7] | Traffic description for downlink data delivery |
| SamplingRatio | 3GPP TS 29.571 [7] | Sampling ratio |
| DurationSec | 3GPP TS 29.571 [7] | A duration expressed in seconds |
| 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 (FQDN) |
| 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 |
| NfInstanceId | 3GPP TS 29.571 [7] | Network Function Instance Identifier |
| NotificationFlag | 3GPP TS 29.571 [7] | Notification flag |
| UeReachability | 3GPP TS 29.518 [36] | Describes the reachability of the UE |
| 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. |
| ContextInfo | 6.1.6.2.69 | Contains the HTTP Headers received by the NFs |
| DataRestorationNotification | 6.2.6.2.25 | Contains identities representing those UEs potentially affected by a data-loss event at the UDR |
| IdleStatusIndication | 3GPP TS 29.518 [36] | Idle Status Indication |

## 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**

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 | Applicability |
|---|---|---|---|---|---|
| callbackReference | Uri | M | 1 | URI provided by the NF service consumer to receive notifications | |
| monitoringConfigurations | map(Monitoring Configuration) | 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 | ReportingOptio ns | 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 | SupportedFeat ures | 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.<br><br>true: the subscription applies also to EPC. false or absent: the subscription doesn't apply to EPC. | |
| scefDiamHost | DiameterIdentit y | C | 0..1 | This IE shall be included if parameter epcAppliedInd is set to true and at least one of the notifications 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 | DiameterIdentit y | C | 0..1 | This IE shall be included if parameter epcAppliedInd is set to true and at least one of the notifications to subscription applied to EPC will be reported directly from the MME to the SCEF (e.g. event LOCATION_REPORTING).<br><br>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. | |
| secondCallbackRef | Uri | O | 0..1 | URI provided by the NF service consumer to receive Monitoring Revocation Notification. | |
| gpsi | Gpsi | O | 0..1 | This IE if present may contain the GPSI used during the Event Exposure subscribe operation. This information shall be used to identify if a subscription must be cancelled in case this GPSI is no longer associated to the UE. It shall be absent on Nudm and may be present on Nudr. | |
| excludeGpsiList | array(Gpsi) | O | 1..N | This IE may be present for a group subscription.<br><br>When present, this IE shall carry the GPSI of the group member UE(s) that are excluded from the group subscription. | DGEM |
| includeGpsiList | array(Gpsi) | O | 1..N | This IE may be present for a group subscription.<br><br>When present, this IE shall carry the GPSI of the group member UE(s) that are added into the group subscription. | DGEM |

| dataRestorationCallbackUri | Uri | O | 0..1 | If present, it contains the URI where notifications about UDR-initiated data restoration shall be sent by UDM. | |
|---|---|---|---|---|---|
| udrRestartInd | boolean | O | 0..1 | May be present in request messages from the UDM consumer to the UDM.<br>If present:<br>- true: indicates that the registration message sent by the UDM consumer is due to a re-synchronization event, motivated by a previous reception at the UDM consumer of a Data Restoration Notification from the UDM<br>- false (or absent): indicates that this is a normal request message (i.e., not motivated by a data restoration notification event) | |

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.<br><br>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.<br><br>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.<br>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".<br>(NOTE 1) |
| maximumLatency | DurationSec | O | 0..1 | May be present if eventType is "UE_REACHABILITY_FOR_DATA"<br>When present, it indicates the configured Maximum Latency.<br>(NOTE 1) |
| maximumResponseTime | DurationSec | O | 0..1 | May be present if eventType is "UE_REACHABILITY_FOR_DATA"<br>When present, it indicates the configured Maximum Response Time.<br>(NOTE 1) |
| suggestedPacketNumDl | integer | O | 0..1 | May be present if eventType is "UE_REACHABILITY_FOR_DATA"<br>When present, it indicates the configured Suggested number of downlink packets.<br>(NOTE 1) |
| dnn | Dnn | O | 0..1 | May be present if suggestedPacketNumDl is present.<br>When present, it indicates the DNN for which the suggestedPacketNumDl is applicable. |
| singleNssai | Snssai | O | 0..1 | May be present if suggestedPacketNumDl is present.<br>When present, it indicates the slice for which the suggestedPacketNumDl is applicable. |
| reachabilityForDataCfg | ReachabilityForDataConfiguration | O | 0..1 | May be present if eventType is "UE_REACHABILITY_FOR_DATA" |
| 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. |

| 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]). |
|------|--------|---|------|--------------------------------------------------------|
| 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 recommended to be used for the AFs that support to set them by Parameter Provision service operation via NEF. | | | | |

### 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<br>only the following values are allowed:<br>"UE_REACHABILITY_FOR_SMS"<br>"UE_REACHABILITY_FOR_DATA"<br>"CHANGE_OF_SUPI_PEI_ASSOCIATION"<br>"ROAMING_STATUS"<br>"CN_TYPE_CHANGE"<br>"UE_CONNECTION_MANAGEMENT_STATE"<br>"LOSS_OF_CONNECTIVITY"<br>"LOCATION_REPORTING"<br>"PDN_CONNECTIVITY_STATUS"<br>"UE_MEMORY_AVAILABLE_FOR_SMS"<br>(NOTE) |
| report | Report | C | 0..1 | Shall be present if eventType is "CHANGE_OF_SUPI_PEI_ASSOCIATION" or "ROAMING_STATUS"<br>"CN_TYPE_CHANGE"<br>"UE_CONNECTION_MANAGEMENT_STATE"<br>"LOSS_OF_CONNECTIVITY"<br>"LOCATION_REPORTING"<br>"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 |
| reachabilityReport | ReachabilityReport | C | 0..1 | Should be present if eventType is "UE_REACHABILITY_FOR_DATA" with configuration "INDIRECT_REPORT" or "UE_REACHABILITY_FOR_SMS" with configuration "REACHABILITY_FOR_SMS_OVER_IP" |
| 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_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 | Report Change of SUPI-PEI Association |
| RoamingStatusReport | 1 | Report Roaming Status |
| 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 | Applicability |
|---|---|---|---|---|---|
| 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.<br>(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.<br>(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].<br>(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". | |
| notifFlag | NotificationFlag | O | 0..1 | Indicates the notification flag, which is used to mute/unmute notifications and to retrieve events stored during a period of muted notifications.<br>(NOTE 3) | EneNA |
| 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.<br>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.<br>NOTE 3 The information is only applicable to the event detected by a remote NF (e.g. AMF) and directly notified to the NF consumer (e.g. NWDAF), the UDM shall ignore this attribute in other scenarios. | | | | | |

### 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 |

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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;<br>False: The new serving PLMN is the HPLMN |
| newServingPlmn | PlmnId | M | 1 | the new Serving PLMN |
| accessType | AccessType | O | 0..1 | The access type used for accessing the new Serving PLMN<br><br>This information may be used by SoR-AF to generate updated SoR information for the UE |

### 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(Monitoring Report) | 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.<br><br>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) supports 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.<br><br>true: the subscription was also successful in EPC domain.<br>false: the subscription was not successful in EPC domain.<br><br>This IE shall be included if epcAppliedInd is true in the subscription request. |
| failedMonitoringConfigs | map(FailedMonit oringConfiguratio n) | O | 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 FailedMonitoringConfiguration; see clause 6.4.6.2.24.<br><br>This IE is used to indicate the failed subscriptions of event monitoring configuration and the failed cause for them. |
| failedMoniConfigsEPC | map(FailedMonit oringConfiguratio n) | O | 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 FailedMonitoringConfiguration; see clause 6.4.6.2.24.<br>In addition to defined EventTypes, the key value "ALL" may be used to identify a map entry which contains the failed cause of the EE subscription was not successful in EPC domain.<br><br>This IE is used to indicate the failed subscriptions of event monitoring configuration in EPC and the failed cause for them.<br>This IE may be present when the EE subscription applies also to the EPC. When present,<br>    - the key-value "ALL" shall be used and only one map entry exists if the epcStatusInd sets false;<br>    - the key-values shall be ReferenceId converted from integer to string if the epcStatusInd sets true or absent. |
| resetIds | array(string) | O | 1..N | May be present in subscribe response messages. The NF service consumer may decide to re-subscribe at the UDM when receiving a data restoration notification containing a matching resetId. |

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### 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.<br>When false: Indicates that last known location is requested. |
| oneTime | boolean | C | 0..1 | When true: Indicates that a single report is requested.<br>When false or absent: Indicates that continuous reporting is requested.<br>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.<br><br>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(DddTraffic Descriptor) | C | 1..N | This IE shall be present for event type "DL_DATA_DELIVERY_STATUS" "AVAILABILITY_AFTER_DDN_FAILURE". <br><br> 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(DlDataDeliv eryStatus) | O | 1..N | This IE shall be present for event type "DL_DATA_DELIVERY_STATUS". <br><br> 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 | LossOfConnectivi tyReason | 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. |

6.4.6.2.20        Type: ReachabilityReport

**Table 6.4.6.2.20-1: Definition of type ReachabilityReport**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| amfInstanceId | NfInstanceId | O | 0..1 | The serving AMF which the UE is reachable. |
| accessTypeList | array(AccessType) | O | 1..N | Describes the access type(s) of the UE |
| reachability | UeReachability | O | 0..1 | Describes the reachability of the UE (NOTE) |
| maxAvailabilityTime | DateTime | O | 0..1 | Indicates the time (in UTC) until which the UE is expected to be reachable. |
| idleStatusIndication | IdleStatusIndication | O | 0..1 | Idle Status Indication |
| NOTE: Only the value "REACHABLE" is supported in this release. | | | | |

6.4.6.2.21        Type: ReachabilityForDataConfiguration

**Table 6.4.6.2.21-1: Definition of type ReachabilityForDataConfiguration**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| reportCfg | ReachabilityForDataReportConfig | M | 1 | Specify the reporting configuration of Reachability for Data event. |
| minInterval | DurationSec | O | 0..1 | When present, this IE indicates the minimal interval to report the event, i.e. when an event is reported, a subseqnet event report shall not be sent during the interval. (NOTE) |
| NOTE: This IE is applicable only to AMF. When received, the UDM shall forward this IE when subscribing to AMF for UE Reachability for Data event. | | | | |

### 6.4.6.2.22 Type: EeMonitoringRevoked

**Table 6.4.6.2.22-1: Definition of type EeMonitoringRevoked**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| revokedMonitoringEvent List | map(MonitoringEvent) | M | 1..N | Shall contain 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 the MonitoringEvents (see clause 6.4.6.2.20) that shall be revoked.<br><br>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 revoked monitoring event with the corresponding event that was requested to be monitored. | |
| removedGpsi | Gpsi | O | 1 | This IE may be present when Network initiated explicit event notification subscription cancel procedure, as specified in clause 4.15.3.2.11 of 3GPP TS 23.502 [3].<br><br>When present, this IE shall indicate the GPSI of the individual subscription used during the Event Exposure subscribe operation and which is not associated to this subscription anymore. | |
| excludeGpsiList | array(Gpsi) | O | 1..N | This IE may be present when Network initiated explicit event notification subscription cancel procedure, as specified in clause 4.15.3.2.11 of 3GPP TS 23.502 [3].<br><br>When present, this IE shall indicate the GPSI of the group member UE(s) that are excluded from the group subscription. | DGEM |

### 6.4.6.2.23 Type: MonitoringEvent

**Table 6.4.6.2.23-1: Definition of type MonitoringEvent**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| eventType | EventType | M | 1 | String; see clause 6.4.6.3.3 |
| revokedCause | RevokedCause | O | 0..1 | When present, it contains the reason for revocation of the monitoring event. |

### 6.4.6.2.24 Type: FailedMonitoringConfiguration

**Table 6.4.6.2.24-1: Definition of type FailedMonitoringConfiguration**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| eventType | EventType | M | 1 | Contains the Event type, see clause 6.4.6.3.3 |
| failedCause | FailedCause | M | 1 | Contains the failed cause of the subscription of the event monitoring. |

### 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.<br>Minimum: 1 |
| ReferenceId | integer | ReferenceId is used as key in a map of MonitoringConfigurations; see clause 6.4.6.2.2.<br><br>ReferenceId is also used as key in a map of MonitoringEvents; see clause 6.4.6.2.20.<br><br>ReferenceId is used as key in a map of FailedMonitoringConfiguration; see clause 6.4.6.2.9.<br><br>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].<br><br>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.<br><br>When this event is subscribed by an NF service consumer, the UDM shall request the AMF to directly send notification to NF, if reachabilityForDataCfg is not present or indicates "DIRECT_REPORT".<br><br>When this event is subscribed by an NF service consumer and reachabilityForDataCfg indicates "INDIRECT_REPORT", the UDM shall request the AMF to send notification via the UDM. The Event is reported to an NF service consumer by the UDM when a UE Activity notification or Nudm_UECM_Registration is received from AMF, unless the AMF indicated in UECM registration that UE is not reachable or the UE reachability is unknown and UDM is configured to not report event based on operator policy (see clause 5.3.2.2.2). |
| "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].<br><br>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.<br><br>This Event is also reported when a UE Activity notification or Nudm_UECM_Registration is received from AMF regardless of an SMSF being registered. when the request configuration is for SMS over IP, unless the AMF indicated in UECM registration that UE is not reachable or the UE reachability is unknown and UDM is configured to not report event based on operator policy (see clause 5.3.2.2.2).<br><br>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 |
| "ACCESS_TYPE_REPORT" | The event is detected and reported by AMF (see clause 6.2.6.3.3 of 3GPP TS 29.518 [36]).<br><br>A NF subscribes to this event via UDM to receive the current access type(s) of a UE or a group of UEs, and updated access type(s) of the UE or any UE in the group when AMF becomes aware of the access type change of the UE. |

| | |
|---|---|
| "REGISTRATION_STATE_REPORT" | The event is detected and reported by AMF (see clause 6.2.6.3.3 of 3GPP TS 29.518 [36]).<br><br>A NF subscribes to this event via UDM to receive the current registration state of a UE or a group of UEs, and report for updated registration state of a UE or any UE in the group when AMF becomes aware of a registration state change of the UE. |
| "CONNECTIVITY_STATE_REPORT" | The event is detected and reported by AMF (see clause 6.2.6.3.3 of 3GPP TS 29.518 [36]).<br><br>A NF subscribes to this event via UDM to receive the current connection management state of a UE or a group of UEs, and report for updated connection management state of a UE or any UE in the group when AMF becomes aware of a connection management state change of the UE. |
| "TYPE_ALLOCATION_CODE_REPORT" | The event is detected and reported by AMF (see clause 6.2.6.3.3 of 3GPP TS 29.518 [36]).<br><br>A NF subscribes to this event via UDM to receive the TAC of a UE or group of UEs. |
| "FREQUENT_MOBILITY_REGISTRATION _REPORT" | The event is detected and reported by AMF (see clause 6.2.6.3.3 of 3GPP TS 29.518 [36]).<br><br>A NF subscribes to this event via UDM to receive the number of mobility registration procedures during a period of a UE or group of UEs. |
| "PDU_SES_REL" | The event is detected and reported by SMF (see clause 5.6.3.3 of 3GPP TS 29.508 [40]).<br><br>A NF subscribes to this event via UDM to receive event report when a PDU session is released of a UE or group of UEs. |
| "PDU_SES_EST" | The event is detected and reported by SMF (see clause 5.6.3.3 of 3GPP TS 29.508 [40]).<br><br>A NF subscribes to this event via UDM to receive event report when a PDU session is established of a UE or group of UEs. |
| "UE_MEMORY_AVAILABLE_FOR_SMS" | The event is detected and reported by SMS-GMSC/IWMSC (see clause 5.1.8 of 3GPP TS 29.540 [66]).<br><br>A NF subscribes to this event via UDM to receive event report when UE memory capacity is exceeded. |

### 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 |
| "RAN_NODE_LEVEL" | change of serving RAN node 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. |

#### 6.4.6.3.10 Enumeration: ReachabilityForDataReportConfig

**Table 6.4.6.3.10-1: Enumeration ReachabilityForDataReportConfig**

| Enumeration value | Description |
|---|---|
| "DIRECT_REPORT" | It indicates UE reachability is detected in AMF and reported directly to the consumer NF by AMF (default). |
| "INDIRECT_REPORT" | It indicates UE reachability is detected in AMF and UDM and reported to the consumer NF by the UDM. The UDM shall send reporting of "UE_REACHABILITY_FOR_DATA" to the consumer NF when it receives "UE Reachability for DL Traffic" report or Nudm_UECM_Registration from the AMF (see TS 23.502 [3] clause 4.2.5.3). |

#### 6.4.6.3.11 Enumeration: RevokedCause

**Table 6.4.6.3.11-1: Enumeration RevokedCause**

| Enumeration value | Description |
|---|---|
| "NOT_ALLOWED" | Monitoring is not allowed |
| "EXCLUDED_FROM_GROUP" | Group member UE(s) are removed from a group subscription |
| "GPSI_REMOVED" | The GPSI used in the Event Exposure subscription is not longer valid for this individual subscription |

#### 6.4.6.3.12 Enumeration: FailedCause

**Table 6.4.6.3.12-1: Enumeration FailedCause**

| Enumeration value | Description |
|---|---|
| "AF_NOT_ALLOWED" | This AF is not allowed to perform monitoring for the requested event type. |
| "MTC_PROVIDER_NOT_ALLOWED" | MTC Provider is not allowed to perform monitoring for the requested event type. |
| "MONITORING_NOT_ALLOWED" | The subscriber does not have the necessary subscription for monitoring with the requested Event Type. |
| "UNSUPPORTED_MONITORING_EVENT_TYPE" | The required event type is unsupported. |
| "UNSUPPORTED_MONITORING_REPORT_OPTIONS" | The monitoring configuration for the required event type contains unsupported report options. |
| "UNSPECIFIED" | The failed cause is unspecified. |

## 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]. |
| 2 | EneNA | Enhancement of Enablers for Network Automation for 5G

An UDM and an NF that support this feature shall support the enhancement of network data analytics specified in 3GPP TS 23.288 [35]. |
| 3 | DGEM | Dynamic Group-based Event Monitoring

An UDM supporting this feature shall allow the NF consumer to remove list of group member UE(s) from a group-based event monitoring subscription (see clause 5.5.2.5.3) and send Monitoring Revocation Notification triggered by Network initiated explicit event notification subscription cancel procedure (see clause 5.5.2.4.1).

An supporting this feature shall also allow the NF consumer to add list of group member UE(s) into a group-based event monitoring subscription (see clause 5.5.2.5.3).

An NF consumer supporting this feature shall handle the Monitoring Revocation Notification triggered by Network initiated explicit event notification subscription cancel procedure (see clause 5.5.2.4.1). |
| 4 | 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

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

Figure 6.5.3.1-1 depicts the resource URIs structure for the Nudm_PP API.
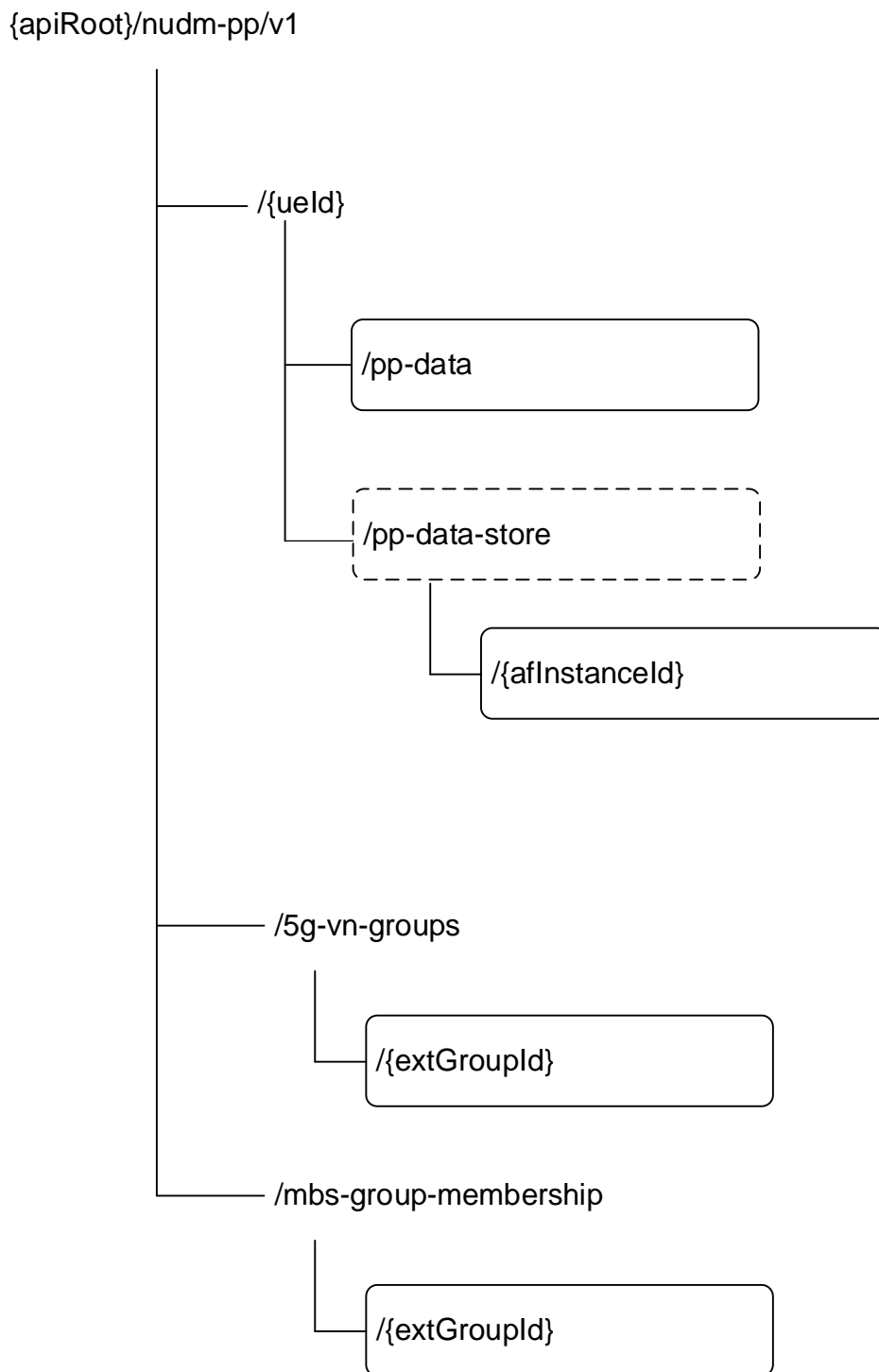
**Figure 6.5.3.1-1: Resource URI structure of the Nudm_PP API**

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<br>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 |
| ParameterProvisioningDataEntry | /{ueId}/pp-data-store/{afInstanceId} | PUT | Create or update a Parameter Provisioning Data entry per AF |
| | | DELETE | Delete a Parameter Provisioning Data entry per AF |
| | | GET | Retrieve a Parameter Provisioning Data entry per AF |
| MulticastMbsGroupMemb | /mbs-group-membership/{extGroupId} | PUT | Create a 5G MBS Group |
| | | DELETE | Delete a 5G MBS Group |
| | | PATCH | Delete a 5G MBS Group |
| | | GET | Retrieve a 5G MBS 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.<br><br>- 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.<br>    pattern: See pattern of data type VarUeId in 3GPP TS 29.571 [7]<br><br>- If representing a group of UEs, this parameter shall contain the External GroupId.<br>    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.

| 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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- MODIFICATION_NOT_ALLOWED<br>- DETACHED_USER<br>- AF_NOT_ALLOWED<br>- 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<br>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:<br>- CREATION_NOT_ALLOWED<br>- AF_NOT_ALLOWED<br>- 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.<br>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 6.5.3.3.2-3: 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:<br>- GROUP_IDENTIFIER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AF_NOT_ALLOWED<br>- 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 PATCH

This method shall support the URI query parameters specified in table 6.5.3.3.3-1.

**Table 6.5.3.3.3-1: 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 6.5.3.3.3-2 and the response data structures and response codes specified in table 6.5.3.3.3-3.

**Table 6.5.3.3.3-2: 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: 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:<br>- GROUP_IDENTIFIER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- MODIFICATION_NOT_ALLOWED<br>- AF_NOT_ALLOWED<br>- 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.<br>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:<br>- GROUP_IDENTIFIER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AF_NOT_ALLOWED |

## 6.5.3.4          Resource: ParameterProvisioningDataEntry

### 6.5.3.4.1          Description

This resource is used to allow the storage of different Parameter Provisioning entries for different Application Functions.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

### 6.5.3.4.2          Resource Definition

Resource URI: {apiRoot}/nudm-pp/<apiVersion>/{ueId}/pp-data-store/{afInstanceId}

This resource shall support the resource URI variables defined in table 6.5.3.4.2-1.

**Table 6.5.3.4.2-1: Resource URI variables for this resource**

| Name | Data type | Definition |
|------|-----------|------------|
| apiRoot | string | See clause 6.5.1 |
| ueId | string | Represents the Subscription Identifier SUPI, GPSI, Group Id or anyUE (see 3GPP TS 23.501 [4] clause 5.9.2)<br>- If representing a single UE, this parameter shall contain the GPSI or SUPI.<br>    pattern: See pattern of type VarUeId 3GPP TS 29.571 [7]<br>- If representing a group of UEs, this parameter shall contain the External GroupId.<br>    pattern: "^extgroupid-[^@]+@[^@]+$"<br>- If representing any UE, this parameter shall contain "anyUE".<br>    pattern: "^anyUE$" |
| afInstanceId | string | The string identifying the originating AF. (NOTE) |
| 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. |

### 6.5.3.4.3    Resource Standard Methods

#### 6.5.3.4.3.1    PUT

This method shall support the URI query parameters specified in table 6.5.3.4.3.1-1.

**Table 6.5.3.4.3.1-1: 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 6.5.3.4.3.1-2 and the response data structures and response codes specified in table 6.5.3.4.3.1-3.

**Table 6.5.3.4.3.1-2: Data structures supported by the PUT Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| PpDataEntry | M | 1 | Contains a Parameter Provisioning Data entry |

**Table 6.5.3.4.3.1-3: Data structures supported by the PUT Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
| PpDataEntry | M | 1 | 201 Created | Indicates a successful creation of the resource. |
| n/a | | | 204 No Content | Indicates a successful update of the resource. 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:<br>- CREATION_NOT_ALLOWED<br>- AF_NOT_ALLOWED<br>- 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:<br>- 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. | | | |

#### 6.5.3.4.3.2    DELETE

This method shall support the URI query parameters specified in table 6.5.3.4.3.2-1.

**Table 6.5.3.4.3.2-1: 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 6.5.3.4.3.2-2 and the response data structures and response codes specified in table 6.5.3.4.3.2-3.

**Table 6.5.3.4.3.2-2: Data structures supported by the DELETE Request Body on this resource**

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

**Table 6.5.3.4.3.2-3: 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 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AF_NOT_ALLOWED<br>- 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:<br>- 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. | | | | |

6.5.3.4.3.3          GET

This method shall support the URI query parameters specified in table 6.5.3.4.3.3-1.

**Table 6.5.3.4.3.3-1: 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 response data structures and response codes specified in table 6.5.3.4.3.3-3.

**Table 6.5.3.4.3.3-2: Data structures supported by the GET Request Body on this resource**

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

**Table 6.5.3.4.3.3-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| PpDataEntry | M | 1 | 200 OK | Upon success, the request body contain the target PPDataEntry. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AF_NOT_ALLOWED |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- CONTEXT_NOT_FOUND |

## 6.5.3.5          Resource: MulticastMbsGroupMemb

### 6.5.3.5.1          Description

This resource is used to represent Multicast MBS Group Membership.

### 6.5.3.5.2          Resource Definition

Resource URI: {apiRoot}/nudm-pp/<apiVersion>/mbs-group-membership/{ExtGroupId}

This resource shall support the resource URI variables defined in table 6.5.3.5.2-1.

**Table 6.5.3.5.2-1: 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 MBS group<br>pattern: "^extgroupid-[^@]+@[^@]+$" |

#### 6.5.3.5.3 Resource Standard Methods

##### 6.5.3.5.3.1 PUT

This method shall support the URI query parameters specified in table 6.5.3.5.3.1-1.

**Table 6.5.3.5.3.1-1: 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 6.5.3.5.3.1-2 and the response data structures and response codes specified in table 6.5.3.5.3.1-3.

**Table 6.5.3.5.3.1-2: Data structures supported by the PUT Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| MulticastMbsGroupMemb | M | 1 | Contains the 5G MBS Group |

**Table 6.5.3.5.3.1-3: 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:<br>- CREATION_NOT_ALLOWED<br>- AF_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. | | | | |

##### 6.5.3.5.3.2 DELETE

This method shall support the URI query parameters specified in table 6.5.3.5.3.1-1.

**Table 6.5.3.5.3.2-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|------|-----------|---|-------------|-------------|
| af-id | string | O | 0..1 | The af-Id contains the AF ID that originates 5G-MBS-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.<br>It is formatted as described in the definition of type MonitoringConfiguration. |

This method shall support the request data structures specified in table 6.5.3.5.3.1-2 and the response data structures and response codes specified in table 6.5.3.5.3.1-3.

**Table 6.5.3.5.3.2-2: Data structures supported by the DELETE Request Body on this resource**

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

**Table 6.5.3.5.3.2-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
| n/a | | | 204 No Content | 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:<br>- GROUP_IDENTIFIER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- AF_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. | | | | |

6.5.3.5.3.3        PATCH

This method shall support the URI query parameters specified in table 6.5.3.5.3.3-1.

**Table 6.5.3.5.3.3-1: 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 6.5.3.5.3.3-2 and the response data structures and response codes specified in table 6.5.3.5.3.3-3.

**Table 6.5.3.5.3.3-2: Data structures supported by the PATCH Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| MulticastMbsGroupMemb | M | 1 | Contains the modification instruction |

**Table 6.5.3.5.3.3-3: 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:<br>- GROUP_IDENTIFIER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- MODIFICATION_NOT_ALLOWED<br>- AF_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.<br>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. | | | | |

6.5.3.5.3.4          GET

This method shall support the URI query parameters specified in table 6.5.3.5.3.4-1.

**Table 6.5.3.5.3.4-1: 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 6.5.3.5.3.4-2.

**Table 6.5.3.5.3.4-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| N/A       |   |             |             |

**Table 6.5.3.5.3.4-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|-----------|---|-------------|----------------|-------------|
| MulticastMbsGroupMemb |   |      | 200 OK | |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- GROUP_IDENTIFIER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- 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 | |
| UmtTime | 6.5.6.2.18 | |
| PpDataEntry | 6.5.6.2.19 | Provisioning Parameter Data Entry |
| CommunicationCharacteristicsAF | 6.5.6.2.20 | Communication Characteristics per AF |
| EcsAddrConfigInfo | 6.5.6.2.21 | ECS Address Configuration Information |
| 5MbsAuthorizationInfo | 6.5.6.2.22 | 5MBS Session Authorization Information |
| MulticastMbsGroupMemb | 6.5.6.2.23 | Multicast MBS group membership management |
| 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] | |
| EcsServerAddr | 3GPP TS 29.571 [7] | |
| Fqdn | 3GPP TS 29.571 [7] | Fully Qualified Domain Name |
| SpatialValidityCond | 3GPP TS 29.571 [7] | |
| MbsSessionId | 3GPP TS 29.571 [7] | 5MBS Session Identifier |
| GroupId | 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. |
| 5mbsAuthorizationInfo | 5MbsAuthorizationInfo | O | 0..1 | When present, this IE shall include the 5MBS Session Authorization Information as specified in 3GPP TS 23.247 [59] |
| 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.<br>If this IE is in request body, it indicates the expected validity time by consumer.<br>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.<br>If this IE is in request body, it indicates the expected validity time by consumer.<br>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 | MtcProviderInfor mation | 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(PduSessio nType) | O | 1..N | List of PDU Session Types allowed for 5G VN group's communication session |
| appDescriptors | array(AppDescrip tor) | 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.<br>true: secondary authentication and authorization is needed.<br>false: secondary authentication and authorization is not needed.<br>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. |
| dnAaaIpAddressAllocati on | 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.<br>true: required<br>false: not required<br>If absent, it indicates that the request by SMF of the UE IP address from the DN-AAA server is not required, but it still may be required by local policies at the SMF. |
| dnAaaAddress | IpAddress | O | 0..1 | The IP address of the DN-AAA server, used for secondary authentication and authorization. |
| additionalDnAaaAddres ses | array(IpAddress) | O | 1..N | Additional IP addresses of the DN-AAA server used for secondary authentication and authorization. |
| dnAaaFqdn | Fqdn | O | 0..1 | The FQDN of the 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(Geographic Area) | O | 0..N | Identifies a list of geographic area of the user where the UE is located. |
| civicAddresses | array(CivicAddre ss) | 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. |
| umtTime | UmtTime | O | 0..1 | This IE identifies the time when the UE is expected to arrive at the location.<br>May be present when LocationArea is part of the UE's expected geographical movement. |

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(GlobalRan NodeId) | O | 0..N | This IE contains a list of the NG-RAN nodes.<br>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. |
| mtcProviderInformati on | MtcProviderInfor mation | O | 0..1 | Indicates MTC provider information for UE Parameter 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. <br><br>true: Enhanced Coverage for NB-N1 mode is restricted. <br>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 |
| dnn | Dnn | O | 0..1 | When present, it indicates the DNN for which the ppDlPacketCount is applicable. |
| singleNssai | Snssai | O | 0..1 | When present, it indicates the slice for which the ppDlPacketCount is applicable. |
| 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.<br><br>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]). | | | |

6.5.6.2.18        Type: UmtTime

**Table 6.5.6.2.18-1: Definition of type UmtTimey**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| timeOfDay | TimeOfDay | M | 1 | see 3GPP TS 29.571 [7] |
| dayOfWeek | DayOfWeek | M | 1 | see 3GPP TS 29.571 [7] |

6.5.6.2.19        Type: PpDataEntry

**Table 6.5.6.2.19-1: Definition of type PpDataEntry**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| communicationCharacteristics | CommunicationCharacteristicsAF | O | 0..1 | Communication characteristics for the AF |
| referenceId | ReferenceId | M | 1 | Transaction Reference ID |
| validityTime | DateTime | O | 0..1 | When present, this IE shall identify the point of time up to which the provisioned parameters will be expire and shall be deleted. If absent, it indicates that there is no expiration time for the provisioned parameters.<br><br>If this IE is in request body, it indicates the expected validity time by consumer.<br><br>If this IE is in response body, it indicates the confirmed validity time by UDM. |
| mtcProviderInformation | MtcProviderInformation | O | 0..1 | When present, this IE shall indicate the MTC provider information for Parameter Provisioning authorization. |
| supportedFeatures | SupportedFeatures | O | 0..1 | Supported Features |
| ecsAddrConfigInfo | EcsAddrConfigInfo | O | 0..1 | ECS Address ConfigurationInformation Parameters; see 3GPP TS 23.502 [3] |
| additionalEcsAddrConfigInfos | array(EcsAddrConfigInfo) | O | 1..N | Additional ECS Address Configuration Information Parameters. See 3GPP TS 23.548 [60] |
| ecRestriction | EcRestriction | O | 0..1 | Enhanced Coverage Restriction Parameters |

6.5.6.2.20        Type: CommunicationCharacteristicsAF

**Table 6.5.6.2.20-1: Definition of type CommunicationCharacteristicsAF**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ppDlPacketCount | PpDlPacketCount | O | 0..1 | AF provisioned DL Buffering Suggested Packet Count; nullable |
| maximumResponseTime | DurationSec | O | 0..1 | When present, this IE shall contain value of Maximum Response Time in seconds.<br><br>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]. |
| maximumLatency | DurationSec | O | 0..1 | When present, this IE shall contain value of Maximum Latency in seconds.<br><br>Maximum Latency identifies maximum delay acceptable for downlink data transfers, see clause 4.15.6.3a of 3GPP TS 23.502 [3]. |

### 6.5.6.2.21          Type: EcsAddrConfigInfo

**Table 6.5.6.2.21-1: Definition of type EcsAddrConfigInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| ecsServerAddr | EcsServerAddr | O | 0..1 | This IE shall include address information of the Edge Configuration Server(s). |
| spatialValidityCond | SpatialValidityCond | O | 0..1 | When present, this IE shall include the Spatial Validity Condition as defined in clause 4.15.6.3d of 3GPP TS 23.502 [3] |
| dnn | Dnn | C | 0..1 | DNN shall be present if ecsServerAddr is present |
| snssai | Snssai | C | 0..1 | S-NSSAI shall be present if ecsServerAddr is present |
| NOTE 1:   When the UDR receives ECS Address Configuration Information from the UDM for a group of UEs (or anyUE), it may need to modify the shared ECS Address Configuration Information shared by members of the group (or by any UE). | | | | |
| NOTE 2:   The DNN/S-NSSAI will be either provisioned by an AF or derived by the NEF using AF ID. | | | | |

### 6.5.6.2.22          Type: 5MbsAuthorizationInfo

**Table 6.5.6.2.22-1: Definition of type 5MbsAuthorizationInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| 5mbsSessionIds | array(MbsSessionId) | M | 1..N | 5MBS Session Identifiers (TMGI or SSM) |

### 6.5.6.2.23          Type: MulticastMbsGroupMemb

**Table 6.5.6.2.23-1: Definition of type MulticastMbsGroupMemb**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| multicastGroupMemb | array(Gpsi) | M | 1..N | When present, this IE shall indicate a list of multicast group members, each member is identified by GPSI. |
| afInstanceId | string | C | 1 | The string identifying the originating AF |
| internalGroupIdentifier | GroupId | C | 0..1 | Shall be present in successful PUT requests and GET responses on Nudr; otherwise shall be absent. |

## 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

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

Figure 6.6.3.1-1 depicts the resource URIs structure for the Nudm_NIDDAU API.
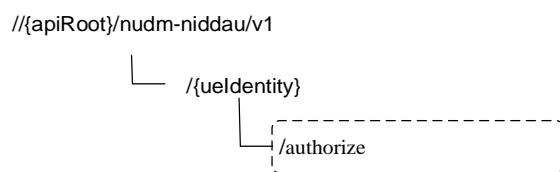


**Figure 6.6.3.1-1: Resource URI structure of the Nudm-NIDDAU API**

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 S-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:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- DNN_NOT_ALLOWED<br>- MTC_PROVIDER_NOT_ALLOWED<br>- AF_INSTANCE_NOT_ALLOWED<br>- SNSSAI_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].

**Table 6.6.5.1-1: Notifications overview**

| Notification | Resource URI | HTTP method or custom operation | Description (service operation) |
|---|---|---|---|
| Authorization Data Update Notification | {authUpdateCallbackUri} | POST | |

### 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: {authUpdateCallbackUri}

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.<br>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. (NOTE) |
| authUpdateCallbackUri | Uri | M | 1 | A URI provided by NEF to receive (implicitly subscribed) notifications on authorization data update.<br>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.<br><br>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.<br>If absent, it indicates the authorisation result is valid permanently |
| contextInfo | ContextInfo | O | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with the Authorization Data Retrieval request.<br>Shall be absent on Nudm and may be present on Nudr. |
| NOTE: When the service operation is originated by external AF via T8/N33 interface, information carried in mtcProviderId attribute in NiddConfiguration structured data type (see clause 5.6.2.1.2 of 3GPP TS 29.122 [45]) can be used as the value for this IE. If the value is not received via T8/N33, the value for the mtcProviderInformation attribute shall be the empty string. | | | | |

### 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 |
| SNSSAI_NOT_ALLOWED | 403 Forbidden | This SNSSAI is not authorized to this user |
| DATA_NOT_FOUND | 404 Not Found | There is no valid authorization data for the UE |

# 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

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

Figure 6.7.3.1-1 depicts the resource URIs structure for the Nudm_MT API.
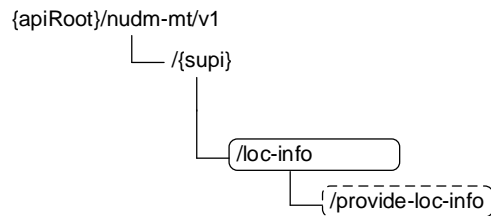


**Figure 6.7.3.1-1: Resource URI structure of the Nudm-MT API**

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:<br>- USER_NOT_FOUND<br>- 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)<br>        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:<br>- USER_NOT_FOUND<br>- 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.<br><br>When present, the IE shall be set as following:<br>- true: the location of the UE is requested<br>- 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.<br><br>When present, the IE shall be set as following:<br>- true: the current location of the UE is requested<br>- 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.<br><br>When present, the IE shall be set as following:<br>- true: the RAT type of the UE is requested<br>- 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.<br><br>When present, the IE shall be set as following:<br>- true: the local timezone of the UE is requested<br>- 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.<br>When present, the IE shall be set as following:<br>- true: only serving node(s) identity is requested<br>- 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:<br>- true: the current location of the UE is returned<br>- 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:<br>- true: 5G SRVCC is supported by the UE<br>- 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.

# 6.8     Nudm_ServiceSpecificAuthorization Service API

## 6.8.1     API URI

The Nudm_ServiceSpecificAuthorization service shall use the Nudm_SSAU API.

The API URI of the Nudm_SSAU 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-ssau".

-     The <apiVersion> shall be "v1".

-     The <apiSpecificResourceUriPart> shall be set as described in clause 6.8.3.

## 6.8.2 Usage of HTTP

### 6.8.2.1 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_ServiceSpecificAuthorization service shall comply with the OpenAPI [14] specification contained in Annex A.9.

### 6.8.2.2 HTTP standard headers

#### 6.8.2.2.1 General

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

#### 6.8.2.2.2 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"

### 6.8.2.3 HTTP custom headers

#### 6.8.2.3.1 General

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

## 6.8.3 Resources

### 6.8.3.1 Overview

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

Figure 6.8.3.1-1 depicts the resource URIs structure for the Nudm_SSAU API.
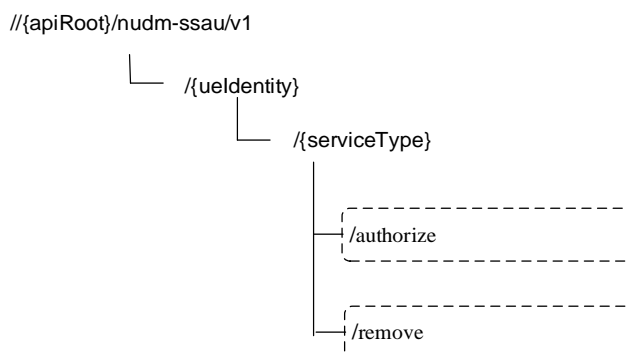


**Figure 6.8.3.1-1: Resource URI structure of the Nudm-SSAU API**

Table 6.8.3.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 6.8.3.1-1: Resources and methods overview**

| Resource name (Archetype) | Resource URI | HTTP method or custom operation | Description |
|---|---|---|---|
| ServiceType (Document) | /{ueIdentity}/{serviceType}/authorize | authorize (POST) | Authorize the configuration request for the specific service identified by the serviceType. |
| | /{ueIdentity}/{serviceType}/remove | remove (POST) | Remove the authorization of configuration request for the specific service identified by the serviceType. |

## 6.8.3.2 Resource: ServiceType (Document)

### 6.8.3.2.1 Description

This resource represents the subscribed authorization information of a specific service for a GPSI or External Group Identifier.

### 6.8.3.2.2 Resource Definition

Resource URI: {apiRoot}/nudm-ssau/<apiVersion>/{ueIdentity}/{serviceType}

This resource shall support the resource URI variables defined in table 6.8.3.2.2-1.

**Table 6.8.3.2.2-1: Resource URI variables for this resource**

| Name | Data type | Definition |
|---|---|---|
| apiRoot | string | See clause 6.8.1 |
| 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-[^@]+@[^@]+\|.+)$" |
| serviceType | ServiceType | In this release the only defined Service Type is "AF guidance for URSP" |

### 6.8.3.2.3 Resource Standard Methods

No Standard Methods are supported for this resource.

### 6.8.3.2.4 Resource Custom Operations

#### 6.8.3.2.4.1 Overview

**Table 6.8.3.2.4.1-1: Custom operations**

| Operation Name | Custom operation URI | Mapped HTTP method | Description |
|---|---|---|---|
| authorize | /{ueIdentity}/{serviceType}/authorize | POST | Authorize the configuration request. |
| remove | /{ueIdentity}/{serviceType}/remove | POST | Remove the authorization of configuration request. |

#### 6.8.3.2.4.2 Operation: authorize

##### 6.8.3.2.4.2.1 Description

This custom operation is used by the NF service consumer (NEF) to request UDM to authorize a specific service's configuration for the GPSI/External Group Identifier.

6.8.3.2.4.2.2          Operation Definition

This operation shall support the request data structures specified in table 6.8.3.2.4.2.2-1 and the response data structure and response codes specified in table 6.8.3.2.4.2.2-2.

**Table 6.8.3.2.4.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| ServiceSpecificAuthorizationInfo | M | 1 | This IE shall indicate the information for service specific authorization, which should contain the callback URI and may contain S-NSSAI, DNN, MTC Provider Information, AF-ID. |

**Table 6.8.3.2.4.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| ServiceSpecificAuthorizationData | M | 1 | 200 OK | Upon success, a response body containing the GPSI and SUPI or Internal Group Identifier mapped from External Group ID, and Service Specific Authorization Id shall be returned. |
| ProblemDetails | O | 1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- DNN_NOT_ALLOWED<br>- MTC_PROVIDER_NOT_ALLOWED<br>- AF_INSTANCE_NOT_ALLOWED<br>- SNSSAI_NOT_ALLOWED<br>- SERVICE_TYPE_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. | | | | |

6.8.3.2.4.3          Operation: remove

6.8.3.2.4.3.1          Description

This custom operation is used by the NF service consumer (NEF) to request UDM to remove the authorization of a specific service's configuration for the GPSI/External Group Identifier.

6.8.3.2.4.3.2          Operation Definition

This operation shall support the request data structures specified in table 6.8.3.2.4.3.2-1 and the response data structure and response codes specified in table 6.8.3.2.4.3.2-2.

**Table 6.8.3.2.4.3.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| ServiceSpecificAuthorizationRemoveData | M | 1 | This IE shall indicate the information to remove the authorization of specific service's configuration. |

**Table 6.8.3.2.4.3.2-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| n/a | | | 204 No Content | Successfully removed the authorization of specific service's configuration. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- AUTHORIZATION_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. | | | | |

## 6.8.4    Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nudm_ServiceSpecificAuthorization Service.

## 6.8.5    Notifications

### 6.8.5.1    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].

**Table 6.8.5.1-1: Notifications overview**

| Notification | Resource URI | HTTP method or custom operation | Description (service operation) |
|---|---|---|---|
| Service Specific Data Update Notification | {authUpdateCallbackUri} | POST | |

### 6.8.5.2    Service Specific Data Update Notification

The POST method shall be used for Service Specific Data Update Notifications and the Call-back URI shall be provided during the Service Specific Authorization Data Retrieval procedure.

Resource URI: {authUpdateCallbackUri}

Support of URI query parameters are specified in table 6.8.5.2-1.

**Table 6.8.5.2-1: 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 6.8.5.2-2 and of response data structures and response codes is specified in table 6.8.5.2-3.

**Table 6.8.5.2-2: Data structures supported by the POST Request Body**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| AuthUpdateNotification | M | 1 | |

**Table 6.8.5.2-3: 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:<br>- CONTEXT_NOT_FOUND |
| NOTE: In addition common data structures as listed in table 6.8.7-1 are supported. | | | | |

## 6.8.6 Data Model

### 6.8.6.1 General

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

Table 6.8.6.1-1 specifies the structured data types defined for the Nudm_SSAU service API. For simple data types defined for the Nudm_SSAU service API see table 6.8.6.3.2-1.

**Table 6.8.6.1-1: Nudm_SSAU specific Data Types**

| Data type | Clause defined | Description |
|---|---|---|
| AuthUpdateNotification | 6.8.6.2.2 | |
| AuthUpdateInfo | 6.8.6.2.3 | |
| ServiceSpecificAuthorizationInfo | 6.8.6.2.4 | |
| ServiceSpecificAuthorizationData | 6.8.6.2.5 | Authorization Response for a specific service |
| AuthorizationUeId | 6.8.6.2.6 | UE Id of the Authorization Data |
| ServiceSpecificAuthorizationRemoveData | 6.8.6.2.7 | Information for Authorization removal of a specific service |
| ServiceType | 6.8.6.3.2 | Service Type of the Authorization |
| InvalidCause | 6.8.6.3.3 | Authorization Invalid Cause |

Table 6.8.6.1-2 specifies data types re-used by the Nudm_SSAU service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudm_SSAU service API.

**Table 6.8.6.1-2: Nudm_SSAU re-used Data Types**

| Data type | Reference | Comments |
|---|---|---|
| AuthorizationData | 6.6.6.2.2 | |
| Dnn | 3GPP TS 29.571 [7] | Data Network Name with Network Identifier only. |
| Snssai | 3GPP TS 29.571 [7] | |
| ExternalGroupId | 3GPP TS 29.571 [7] | |
| GroupId | 3GPP TS 29.571 [7] | |

### 6.8.6.2 Structured data types

#### 6.8.6.2.1 Introduction

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

### 6.8.6.2.2 Type: AuthUpdateNotification

**Table 6.8.6.2.2-1: Definition of type AuthUpdateNotification**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| serviceType | ServiceType | M | 1 | Specific service for which the authorization is updated |
| snssai | Snssai | C | 0..1 | Identifies the Single Network Slice. |
| dnn | Dnn | C | 0..1 | Identifies the DNN, shall contain the Network Identifier only. |
| authUpdateInfoList | array(AuthUpdateInfo) | M | 1..N | List of AuthUpdateInfo. |
| mtcProviderInformation | MtcProviderInformation | O | 0..1 | When present, this IE shall indicate the MTC provider information for the Service Specific authorization. |
| afId | string | O | 0..1 | When present, this IE shall indicate the string identifying the originating AF. |

### 6.8.6.2.3 Type: AuthUpdateInfo

**Table 6.8.6.2.4-1: Definition of type AuthUpdateInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| authorizationData | ServicepecificAuthorizationData | M | 1 | This IE shall include the Authorization data. |
| invalidityInd | boolean | O | 0..1 | Indicates whether the authorized Service Specific authoration data is still valid or not. true: the authorized Service Specific authoration data is not valid. false or absent: the authorized Service Specific authoration data is valid. |
| invalidCause | InvalidCause | O | 0..1 | This IE may be included when invalidityInd IE is included with the value true. When present, this IE shall indicate the cause why the authorization becomes invalid. |

### 6.8.6.2.4 Type: ServiceSpecificAuthorizationInfo

**Table 6.8.6.2.4-1: Definition of type ServiceSpecificAuthorizationInfo**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| snssai | Snssai | C | 0..1 | This IE shall be included for following service type(s):<br>- AF_GUIDANCE_FOR_URSP<br>When present, this IE shall indicate the Single Network Slice Selection Assistance Information for the Service Specific authorization. |
| dnn | Dnn | C | 0..1 | This IE shall be included for following service type(s):<br>- AF_GUIDANCE_FOR_URSP<br>When present, this IE shall indicate the DNN for the Service Specific authorization, shall contain the Network Identifier only. |
| mtcProviderInformation | MtcProviderInformation | C | 0..1 | This IE shall be included if available.<br>When present, this IE shall indicate the MTC provider information for the Service Specific authorization. |
| authUpdateCallbackUri | Uri | O | 0..1 | A URI provided by NEF to receive (implicitly subscribed) notifications on authorization data update.<br>The authUpdateCallbackUri URI shall have unique information within NEF to identify the authorized result.<br><br>(NOTE) |
| afId | string | O | 0..1 | When present, indicates the string identifying the originating AF. |
| nefId | NefId | O | 0..1 | When present, this IE shall contain the ID of the requesting NEF. |
| NOTE: The NEF should always include the authUpdateCallbackUri IE to receive the change of Service Specific Authorization Data from the UDM. | | | | |

### 6.8.6.2.5 Type: ServicepecificAuthorizationData

**Table 6.8.6.2.5x-1: Definition of type ServiceSpecificAuthorizationData**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| authorizationUeId | AuthorizationUeId | C | 0..1 | This IE shall be present for the service specific authorisation of the individual UE. |
| extGroupId | ExternalGroupId | C | 0..1 | This IE shall be present for the service specific authorisation of the group of UEs. |
| IntGroupId | GroupId | C | 0..1 | This IE shall be present for the service specific authorisation of the group of UEs.<br><br>When present, this IE shall indicate the Internal Group identifier mapped from the External Group Identifier indicated by extGroupId IE. |
| authId | string | C | 0..1 | This IE shall be included in a successful Service Specific Authorization response.<br><br>When present, this IE shall indicate the Id of the Service Specific Authorization. |

### 6.8.6.2.6 Type: AuthorizationUeId

**Table 6.8.6.2.6-1: Definition of type AuthorizationUeId**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| supi | Supi | M | 1 | |
| gpsi | Gpsi | O | 0..1 | |

### 6.8.6.2.7 Type: ServicepecificAuthorizationRemoveData

**Table 6.8.6.2.7-1: Definition of type ServiceSpecificAuthorizationRemoveData**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| authId | string | M | 1 | Indicates the Id of the authorization of specific service's configuration to be removed. |

## 6.8.6.3 Simple data types and enumerations

### 6.8.6.3.1 Introduction

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

### 6.8.6.3.2 Enumeration: ServiceType

**Table 6.8.6.3.2-1: Enumeration ServiceType**

| Enumeration value | Description |
|---|---|
| "AF_GUIDANCE_FOR_URSP" | AF guidance for URSP allowed for the subscription |

### 6.8.6.3.3 Enumeration: InvalidCause

**Table 6.8.6.3.2-1: Enumeration InvalidCause**

| Enumeration value | Description |
|---|---|
| "SUBSRIPTION_WITHDRAWAL" | Indicates that the authorization becomes invalid due to UE Subscription withdrawal. |
| "DNN_REMOVED" | Indicates that the authorization becomes invalid because the DNN associated to the authorization is removed from UE subscription. |
| "SLICE_REMOVED" | Indicates that the authorization becomes invalid because the Slice associated to the authorization is removed from UE subscription. |
| "AUTHORIZATION_REVOKED" | Indicates that the authorization is revoked at the UDM. |

## 6.8.7 Error Handling

### 6.8.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

### 6.8.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

### 6.8.7.3      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_ServiceSpecificAuthorization service. The following application errors listed in Table 6.8.7.3-1 are specific for the Nudm_ServiceSpecificAuthorization service.

**Table 6.8.7.3-1: 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 |
| SNSSAI_NOT_ALLOWED | 403 Forbidden | This SNSSAI is not authorized to this user |
| SERVICE_TYPE_NOT_ALLOWED | 403 Forbidden | This serviceType is not authorized to this user. |
| CONTEXT_NOT_FOUND | 404 Not Found | It is used when no corresponding context exists. |
| AUTHORIZATION_NOT_FOUND | 404 Not Found | The authorization for specific service's configuration to be removed does not exist in the UDM. |

## 6.8.8      Feature Negotiation

The optional features in table 6.8.8-1 are defined for the Nudm_SSAU API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

**Table 6.8.8-1: Supported Features**

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

## 6.8.9      Security

As indicated in 3GPP TS 33.501 [6] and 3GPP TS 29.500 [4], the access to the Nudm_SSAU 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_SSAU 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_SSAU service.

The Nudm_SSAU API defines a single scope "nudm-ssau" 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.

# 6.9      Nudm_ReportSMDeliveryStatus Service API

## 6.9.1      API URI

The Nudm_ReportSMDeliveryStatus service shall use the Nudm_RSDS API.

The API URI of the Nudm_RSDS 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-rsds".

-   The <apiVersion> shall be "v1".

-   The <apiSpecificResourceUriPart> shall be set as described in clause 6.8.3.

## 6.9.2     Usage of HTTP

### 6.9.2.1     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_ReportSMDeliveryStatus service shall comply with the OpenAPI [14] specification contained in Annex A.9.

### 6.9.2.2     HTTP standard headers

#### 6.9.2.2.1     General

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

#### 6.9.2.2.2     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"

### 6.9.2.3     HTTP custom headers

#### 6.9.2.3.1     General

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

## 6.9.3     Resources

### 6.9.3.1     Overview

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

Figure 6.9.3.1-1 depicts the resource URIs structure for the Nudm_RSDS API.

//{apiRoot}/nudm-rsds/v1

└─── /{ueIdentity}

└─── /smdelivery-report-status
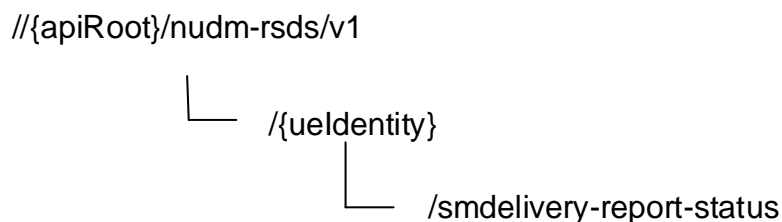
**Figure 6.9.3.1-1: Resource URI structure of the nudm-rsds API**

Table 6.9.3.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 6.9.3.1-1: Resources and methods overview**

| Resource name (Archetype) | Resource URI | HTTP method or custom operation | Description |
|---|---|---|---|
| SmDeliveryStatus (Document) | /{ueidentity}/sm-delivery-status | sm-delivery-status (POST) | Report the SM-Delivery Status. |

## 6.9.3.2 Resource: SmDeliveryStatus (Document)

### 6.9.3.2.1 Description

This resource represents the SM-Delivery Status for a GPSI.

### 6.9.3.2.2 Resource Definition

Resource URI: {apiRoot}/nudm-rsds/<apiVersion>/{ueIdentity}/sm-delivery-status

This resource shall support the resource URI variables defined in table 6.9.3.2.2-1.

**Table 6.9.3.2.2-1: Resource URI variables for this resource**

| Name | Data type | Definition |
|---|---|---|
| apiRoot | string | See clause 6.8.1 |
| ueIdentity | string | Represents the GPSI (see 3GPP TS 23.501 [2] clause 7.2.5) pattern: "^ (msisdn-[0-9]{5,15}\|extid-[^@]+@[^@]+\|extgroupid-[^@]+@[^@]+\|.+)$" |

### 6.9.3.2.3 Resource Standard Methods

No Standard Methods are supported for this resource.

### 6.9.3.2.4 Resource Custom Operations

#### 6.9.3.2.4.1 Overview

**Table 6.9.3.2.4.1-1: Custom operations**

| Operation Name | Custom operation URI | Mapped HTTP method | Description |
|---|---|---|---|
| sm-delivery-status | /{ueIdentity}/sm-delivery-status | POST | Report the SM-Delivery Status. |

6.9.3.2.4.2          Operation: sm-delivery-status

6.9.3.2.4.2.1          Description

This custom operation is used by the NF service consumer (SMS-GMSC, IP-SM-GW) to report the SM-Delivery Status to UDM for the GPSI.

6.9.3.2.4.2.2          Operation Definition

This operation shall support the request data structures specified in table 6.9.3.2.4.2.2-1 and the response data structure and response codes specified in table 6.9.3.2.4.2.2-2.

**Table 6.9.3.2.4.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| SmDeliveryStatus | M | 1 | This IE shall indicate the SM-Delivery Status. |

**Table 6.9.3.2.4.2.2-2: 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 | 1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- 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. | | | | |

# 6.9.4      Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nudm_ReportSMDeliveryStatus Service.

# 6.9.5      Notifications

In this release of this specification, no notifications are defined for the Nudm_ReportSMDeliveryStatus Service.

# 6.9.6      Data Model

## 6.9.6.1      General

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

Table 6.9.6.1-1 specifies the structured data types defined for the Nudm_RSDS service API. For simple data types defined for the Nudm_RSDS service API see table 6.9.6.3.2-1.

**Table 6.9.6.1-1: Nudm_RSDS specific Data Types**

| Data type | Clause defined | Description |
|---|---|---|
| SmDeliveryStatus | 6.9.6.2.2 | SM Delivery Status-Report |

Table 6.9.6.1-2 specifies data types re-used by the Nudm_RSDS service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudm_RSDS service API.

**Table 6.9.6.1-2: Nudm_RSDS re-used Data Types**

| Data type | Reference | Comments |
|-----------|-----------|----------|
| Gpsi | 3GPP TS 29.571 [7] | Generic Public Subscription Identifier |

### 6.9.6.2 Structured data types

#### 6.9.6.2.1 Introduction

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

#### 6.9.6.2.2 Type: SmDeliveryStatus

**Table 6.9.6.2.2-1: Definition of type SmDeliveryStatus**

| Attribute name | Data type | P | Cardinality | Description |
|----------------|-----------|---|-------------|-------------|
| gpsi | Gpsi | M | 1 | Generic Public Subscription Identifier |
| smStatusReport | string | M | 1 | Indicates SMS-STATUS-REPORT as defined in 3GPP TS 23.040 [53] |

### 6.9.6.3 Simple data types and enumerations

#### 6.9.6.3.1 Introduction

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

## 6.9.7 Error Handling

### 6.9.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

### 6.9.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

### 6.9.7.3 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_ReportSMDeliveryStatus service. The following application errors listed in Table 6.8.7.3-1 are specific for the Nudm_ReportSMDeliveryStatus service.

**Table 6.9.7.3-1: Application errors**

| Application Error | HTTP status code | Description |
|-------------------|------------------|-------------|
| USER_NOT_FOUND | 404 Not Found | The provided subscriber identifier is not found. |

## 6.9.8 Feature Negotiation

The optional features in table 6.9.8-1 are defined for the Nudm_RSDS API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

**Table 6.9.8-1: Supported Features**

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

## 6.9.9 Security

As indicated in 3GPP TS 33.501 [6] and 3GPP TS 29.500 [4], the access to the Nudm_RSDS 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_RSDS 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_RSDS service.

The Nudm_RSDS API defines a single scope "nudm-rsds" 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.

# 6.10 Nudm_UEIdentifier Service API

## 6.10.1 API URI

The Nudm_UEIdentifier service shall use the Nudm_UEID API.

The API URI of the Nudm_UEID 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-ueid".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.8.3.

## 6.10.2 Usage of HTTP

### 6.10.2.1 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_UEIdentifier service shall comply with the OpenAPI [14] specification contained in Annex A.11.

### 6.10.2.2 HTTP standard headers

#### 6.10.2.2.1 General

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

#### 6.10.2.2.2 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"

### 6.10.2.3 HTTP custom headers

#### 6.10.2.3.1 General

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

## 6.10.3 Resources

### 6.10.3.1 Overview

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

Figure 6.10.3.1-1 depicts the resource URIs structure for the Nudm_UEID API.

//{apiRoot}/nudm-ueid/v1

└── /deconceal

**Figure 6.10.3.1-1: Resource URI structure of the nudm-ueid API**

Table 6.10.3.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 6.10.3.1-1: Resources and methods overview**

| Resource name (Archetype) | Resource URI | HTTP method or custom operation | Description |
|---|---|---|---|
|  |  |  |  |

There is no resource defined for the Nudm_UEIdentifier Service.

## 6.10.4    Custom Operations without associated resources

### 6.10.4.1    Overview

**Table 6.10.4.1-1: Custom operations without associated resources**

| Operation Name | Custom operation URI | Mapped HTTP method | Description |
|---|---|---|---|
| Deconceal | /deconceal | POST | Deconceal SUCI to SUPI |

### 6.10.4.2    Operation: Deconceal

#### 6.10.4.2.1    Description

This custom operation is used by the NF service consumer (i.e. 5G PKMF) to deconceal the SUCI of the 5G ProSe Remote UE to the SUPI.

#### 6.10.4.2.2    Operation Definition

This operation shall support the data structures and response codes specified in tables 6.10.4.2.2-1 and 6.10.4.2.2-2.

**Table 6.10.4.2.2-1: Data structures supported by the Request Body**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| DeconcealReqData | M | 1 | Deconceal request data, including the SUCI of the UE to be deconcealed. |

**Table 6.10.4.2.2-2: Data structures supported by the POST Response Body**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| DeconcealRspData | M | 1 | 200 OK | Upon success, the response data contain the SUPI of the UE that deconealed from the input SUCI. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:<br>- INVALID_HN_PUBLIC_KEY_IDENTIFIER<br>- INVALID_SCHEME_OUTPUT |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:<br>- USER_NOT_FOUND |
| ProblemDetails | O | 0..1 | 501 Not implemented | The "cause" attribute may be used to indicate one of the following application errors:<br>- UNSUPPORTED_PROTECTION_SCHEME |

## 6.10.5    Notifications

In this release of this specification, no notifications are defined for the Nudm_UEIdentifier Service.

## 6.10.6    Data Model

### 6.10.6.1    General

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

Table 6.10.6.1-1 specifies the structured data types defined for the Nudm_UEID service API. For simple data types defined for the Nudm_UEID service API see table 6.10.6.3.2-1.

**Table 6.10.6.1-1: Nudm_UEID specific Data Types**

| Data type | Clause defined | Description |
|---|---|---|
| DeconcealReqData | 6.10.6.2.2 | Deconceal Request Data |
| DeconcealRspData | 6.10.6.2.3 | Deconceal Response Data |

Table 6.10.6.1-2 specifies data types re-used by the Nudm_UEID service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudm_UEID service API.

**Table 6.10.6.1-2: Nudm_UEID re-used Data Types**

| Data type | Reference | Comments |
|---|---|---|
| Suci | 3GPP TS 29.509 [24] | Subscription Concealed Identifier |
| Supi | 3GPP TS 29.571 [7] | Subscription Permanent Identifier |

### 6.10.6.2 Structured data types

#### 6.10.6.2.1 Introduction

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

#### 6.10.6.2.2 Type: DeconcealReqData

**Table 6.10.6.2.2-1: Definition of type DeconcealReqData**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| suci | Suci | M | 1 | This IE shall contain the SUCI to be deconcealed |

#### 6.10.6.2.3 Type: DeconcealRspData

**Table 6.10.6.2.2-1: Definition of type DeconcealRspData**

| Attribute name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| supi | Supi | M | 1 | This IE shall contain the SUPI that is deconcealed from the input SUCI. |

### 6.10.6.3 Simple data types and enumerations

#### 6.10.6.3.1 Introduction

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

## 6.10.7 Error Handling

### 6.10.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

### 6.10.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [4].

### 6.10.7.3 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_UEIdentifier service. The following application errors listed in Table 6.8.7.3-1 are specific for the Nudm_UEIdentifier service.

**Table 6.10.7.3-1: Application errors**

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

## 6.10.8 Feature Negotiation

The optional features in table 6.10.8-1 are defined for the Nudm_UEID API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

**Table 6.10.8-1: Supported Features**

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

## 6.10.9 Security

As indicated in 3GPP TS 33.501 [6] and 3GPP TS 29.500 [4], the access to the Nudm_UEID 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_UEID 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_UEID service.

The Nudm_UEID API defines a single scope "nudm-ueid" 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 clause 5.3.1 of 3GPP TS 29.501 [5] and clause 5B of 3GPP TR 21.900 [30]).

# A.2 Nudm_SDM API

```
openapi: 3.0.0

info:
  version: '2.2.8'
  title: 'Nudm_SDM'
  description: |
    Nudm Subscriber Data Management Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.503 Unified Data Management Services, version 17.17.0
  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 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 or SNPN ID
              content:
                application/json:
                  schema:
                    $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
            - name: disaster-roaming-ind
              in: query
              description: Indication whether Disaster Roaming service is applied 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/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 or SNPN ID
            content:
              application/json:
                schema:
                  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
          - name: disaster-roaming-ind
            in: query
            description: Indication whether Disaster Roaming service is applied or not
            required: false
            schema:
              type: boolean
              default: false
          - 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 or SNPN ID
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
        - name: adjacent-plmns
          in: query
          description: List of PLMNs adjacent to the UE's serving PLMN
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
                minItems: 1
        - name: disaster-roaming-ind
          in: query
          description: Indication whether Disaster Roaming service is applied or not
          required: false
          schema:
            type: boolean
            default: false
        - 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
```

```yaml
  /{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 or SNPN ID
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
        - name: disaster-roaming-ind
          in: query
          description: Indication whether Disaster Roaming service is applied or not
          required: false
          schema:
            type: boolean
            default: false
        - 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 or SNPN ID
              content:
                application/json:
                  schema:
                    $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
            - 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
            description: serving PLMN ID or SNPN ID
            content:
              application/json:
                schema:
                  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
          - 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/SmSubsData'
          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
          description: serving PLMN ID or SNPN ID
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
        - 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
          description: serving PLMN ID or SNPN ID
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
        - 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:
```

```yaml
              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
            description: serving PLMN ID or SNPN ID
            content:
              application/json:
                schema:
                  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
          - 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

  /{supi}/prose-data:
    get:
      summary: retrieve a UE's ProSe Subscription Data
      operationId: GetProseData
      tags:
        - Prose 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/ProseSubscriptionData'
          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}/5mbs-data:
    get:
      summary: retrieve a UE's 5MBS Subscription Data
      operationId: GetMbsData
      tags:
        - 5MBS 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/MbsSubscriptionData'
          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}/uc-data:
    get:
      summary: retrieve a UE's User Consent Subscription Data
      operationId: GetUcData
      tags:
        - User Consent 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: uc-purpose
          in: query
          description: User consent purpose
          schema:
             $ref: '#/components/schemas/UcPurpose'
        - 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/UcSubscriptionData'
          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>/{ueId}/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
        dataRestorationNotification:
          '{request.body#/dataRestorationCallbackUri}':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: 'TS29503_Nudm_UECM.yaml#/components/schemas/DataRestorationNotification'
              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

  /{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 or SUPI to GPSI 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: af-id
          in: query
          description: AF identifier
          schema:
            type: string
        - name: app-port-id
          in: query
          description: Application port identifier
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AppPortId'
        - name: af-service-id
          in: query
          description: AF Service Identifier
          schema:
            type: string
        - name: mtc-provider-info
          in: query
          description: MTC Provider Information
          schema:
             $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
        - name: requested-gpsi-type
          in: query
          description: Requested GPSI Type
          schema:
            $ref: '#/components/schemas/GpsiType'
        - 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'
          '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}/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'
          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: af-id
            in: query
            description: AF identifier
            schema:
              type: string
          - 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'
          '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

  /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: 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/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

  /multiple-identifiers:
    get:
      summary: Mapping of UE Identifiers
      operationId: GetMultipleIdentifiers
      tags:
        - Multiple Identifiers
      parameters:
        - name: supported-features
          in: query
          description: Supported Features
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        - name: gpsi-list
          in: query
          description: list of the GPSIs
          required: true
          schema:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
            minItems: 1
          style: form
          explode: false
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
```

```
                  schema:
                    $ref: '#/components/schemas/UeIdentifiers'
              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'
            '401':
              $ref: 'TS29571_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29571_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29571_CommonData.yaml#/components/responses/404'
            '406':
              $ref: 'TS29571_CommonData.yaml#/components/responses/406'
            '429':
              $ref: 'TS29571_CommonData.yaml#/components/responses/429'
            '500':
              $ref: 'TS29571_CommonData.yaml#/components/responses/500'
            '502':
              $ref: 'TS29571_CommonData.yaml#/components/responses/502'
            '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:
          $ref: '#/components/schemas/SmSubsData'
        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'
        proseData:
          $ref: '#/components/schemas/ProseSubscriptionData'
        mbsData:
          $ref: '#/components/schemas/MbsSubscriptionData'
        ucData:
          $ref: '#/components/schemas/UcSubscriptionData'

    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'
        smsfSetId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'


    AccessAndMobilitySubscriptionData:
      type: object
      properties:
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        gpsis:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        hssGroupId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
        internalGroupIds:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
          minItems: 1
        sharedVnGroupDataIds:
          description: A map(list of key-value pairs) where GroupId serves as key of SharedDataId
          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'
          uniqueItems: true
        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:
      $ref: '#/components/schemas/UpuInfo'
    routingIndicator:
      type: string
      pattern: '^[0-9]{1,4}$'
    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'
      uniqueItems: true
```

```
        secondaryRatRestrictions:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
          uniqueItems: true
        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
        adjacentPlmnRestrictions:
          description: A map (list of key-value pairs where PlmnId serves as key) of PlmnRestriction
          type: object
          additionalProperties:
            $ref: '#/components/schemas/PlmnRestriction'
          minProperties: 1
        wirelineForbiddenAreas:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/WirelineArea'
        wirelineServiceAreaRestriction:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/WirelineServiceAreaRestriction'
        pcfSelectionAssistanceInfos:
          type: array
          items:
            $ref: '#/components/schemas/PcfSelectionAssistanceInfo'
          minItems: 1
        aerialUeSubInfo:
          $ref: '#/components/schemas/AerialUeSubscriptionInfo'
        roamingRestrictions:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RoamingRestrictions'
        remoteProvInd:
          type: boolean
          default: false
        3gppChargingCharacteristics:
          $ref: '#/components/schemas/3GppChargingCharacteristics'

    PcfSelectionAssistanceInfo:
      type: object
      required:
        - dnn
        - singleNssai
      properties:
        dnn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
        singleNssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'

    PlmnRestriction:
      type: object
      properties:
        ratRestrictions:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
          uniqueItems: true
        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'
        primaryRatRestrictions:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
```

```
              uniqueItems: true
          secondaryRatRestrictions:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
            uniqueItems: true

    ProseSubscriptionData:
      description: Contains the ProSe Subscription Data.
      type: object
      properties:
        proseServiceAuth:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ProseServiceAuth'
        nrUePc5Ambr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
        proseAllowedPlmn:
          type: array
          items:
            $ref: '#/components/schemas/ProSeAllowedPlmn'
          minItems: 1

    ProSeAllowedPlmn:
      description: Contains the PLMN identities where the Prose services are authorised to use and
the authorised Prose services on this given PLMNs.
      type: object
      required:
        - visitedPlmn
      properties:
        visitedPlmn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
        proseDirectAllowed:
          type: array
          items:
            $ref: '#/components/schemas/ProseDirectAllowed'
          minItems: 1

    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:
          description: A map(list of key-value pairs) where singleNssai serves as key of SnssaiInfo
          type: object
          additionalProperties:
            $ref: '#/components/schemas/SnssaiInfo'
        sharedSnssaiInfosId:
          $ref: '#/components/schemas/SharedDataId'
        hssGroupId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'

    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:
            description: A map(list of key-value pairs) where singleNssai serves as key of
AdditionalSnssaiData
            type: object
            additionalProperties:
              $ref: '#/components/schemas/AdditionalSnssaiData'
            minProperties: 1
          suppressNssrgInd:
            type: boolean
        nullable: true

      UeContextInAmfData:
        type: object
        properties:
          epsInterworkingInfo:
            $ref: 'TS29503_Nudm_UECM.yaml#/components/schemas/EpsInterworkingInfo'
          amfInfo:
            description: AMF information
            type: array
            items:
              $ref: '#/components/schemas/AmfInfo'
            minItems: 1
            maxItems: 2
```

```
    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:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
        pgwIpAddress:
          $ref: '#/components/schemas/IpAddress'
        smfInstanceId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        epdgInd:
          type: boolean
          default: false
        plmnId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'


    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'

    AmfInfo:
      type: object
      required:
        - amfInstanceId
        - guami
      properties:
        amfInstanceId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        guami:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Guami'
        accessType:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'

    PgwInfo:
      type: object
      required:
        - dnn
        - pgwFqdn
      properties:
        dnn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
        pgwFqdn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
```

```
          pgwIpAddr:
            $ref: '#/components/schemas/IpAddress'
          plmnId:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
          epdgInd:
            type: boolean
            default: false
          pcfId:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
          registrationTime:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

    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:
          description: A map(list of key-value pairs) where GroupId serves as key of SharedDataId
          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:
          description: A map(list of key-value pairs) where Dnn serves as key of
ExpectedUeBehaviourData
          type: object
          additionalProperties:
            $ref: '#/components/schemas/ExpectedUeBehaviourData'
          minProperties: 1
        suggestedPacketNumDlList:
          description: A map(list of key-value pairs) where Dnn serves as key of
SuggestedPacketNumDl
          type: object
          additionalProperties:
            $ref: '#/components/schemas/SuggestedPacketNumDl'
          minProperties: 1
        3gppChargingCharacteristics:
          $ref: '#/components/schemas/3GppChargingCharacteristics'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    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:
```

```yaml
        $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
      uavSecondaryAuth:
        type: boolean
        default: false
      dnAaaIpAddressAllocation:
        type: boolean
      dnAaaAddress:
        $ref: '#/components/schemas/IpAddress'
      additionalDnAaaAddresses:
        type: array
        items:
          $ref: '#/components/schemas/IpAddress'
        minItems: 1
      dnAaaFqdn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
      iptvAccCtrlInfo:
        type: string
      ipv4Index:
        $ref: '#/components/schemas/IpIndex'
      ipv6Index:
        $ref: '#/components/schemas/IpIndex'
      ecsAddrConfigInfo:
        $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/EcsAddrConfigInfo'
      additionalEcsAddrConfigInfos:
        type: array
        items:
          $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/EcsAddrConfigInfo'
        minItems: 1
      sharedEcsAddrConfigInfo:
         $ref: '#/components/schemas/SharedDataId'
      additionalSharedEcsAddrConfigInfoIds:
        type: array
        items:
          $ref: '#/components/schemas/SharedDataId'
        minItems: 1
      easDiscoveryAuthorized:
        type: boolean
        default: false
      onboardingInd:
        type: boolean
        default: false
      aerialUeInd:
        $ref: '#/components/schemas/AerialUeIndication'
```

```
      subscribedMaxIpv6PrefixSize:
        type: integer

    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
      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'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    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/ImmediateReport'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        contextInfo:
          $ref: '#/components/schemas/ContextInfo'
        nfChangeFilter:
          type: boolean
          default: false
        uniqueSubscription:
          type: boolean
        resetIds:
          type: array
          items:
            type: string
          minItems: 1
        ueConSmfDataSubFilter:
          $ref: '#/components/schemas/UeContextInSmfDataSubFilter'
        dataRestorationCallbackUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        udrRestartInd:
          type: boolean
          default: false

    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'
        additionalSupis:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
          minItems: 1
        additionalGpsis:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
          minItems: 1

    AcknowledgeInfo:
      type: object
      required:
        - provisioningTime
      properties:
        sorMacIue:
          $ref: 'TS29509_Nausf_SoRProtection.yaml#/components/schemas/SorMac'
        upuMacIue:
          $ref: 'TS29509_Nausf_UPUProtection.yaml#/components/schemas/UpuMac'
        provisioningTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        sorTransparentContainer:
          $ref: '#/components/schemas/SorTransparentContainer'
        ueNotReachable:
          type: boolean
          default: false
        upuTransparentContainer:
          $ref: '#/components/schemas/UpuTransparentContainer'

    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'
        sorTransparentContainer:
          $ref: '#/components/schemas/SorTransparentContainer'
        sorCmci:
          $ref: '#/components/schemas/SorCmci'
        storeSorCmciInMe:
          type: boolean
        usimSupportOfSorCmci:
          type: boolean
      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'
           upuTransparentContainer:
             $ref: '#/components/schemas/UpuTransparentContainer'
         required:
           - 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:
             description: A map(list of key-value pairs) where Dnn, or optionally the Wildcard DNN,
serves as key of DnnConfiguration
             type: object
             additionalProperties:
               $ref: '#/components/schemas/DnnConfiguration'
             minProperties: 1
           sharedTraceData:
             $ref: 'TS29571_CommonData.yaml#/components/schemas/TraceData'
           sharedSnssaiInfos:
             description: A map(list of key-value pairs) where singleNssai serves as key of SnssaiInfo
             type: object
             additionalProperties:
               $ref: '#/components/schemas/SnssaiInfo'
             minProperties: 1
           sharedVnGroupDatas:
             description: A map(list of key-value pairs) where GroupId serves as key of VnGroupData
             type: object
             additionalProperties:
               $ref: '#/components/schemas/VnGroupData'
             minProperties: 1
           treatmentInstructions:
             description: A map(list of key-value pairs) where JSON pointer pointing to an attribute
within the SharedData serves as key of SharedDataTreatmentInstruction
             type: object
             additionalProperties:
               $ref: '#/components/schemas/SharedDataTreatmentInstruction'
             minProperties: 1
           sharedSmSubsData:
             $ref: '#/components/schemas/SessionManagementSubscriptionData'
           sharedEcsAddrConfigInfo:
```

```
          $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/EcsAddrConfigInfo'

    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
        subscribedUeSliceMbr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SliceMbrRm'
        subscribedNsSrgList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/NsSrg'
          minItems: 1

    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
        moAssistanceDataTypes:
          $ref: '#/components/schemas/LcsBroadcastAssistanceTypesData'
```

```yaml
    LcsBroadcastAssistanceTypesData:
      type: object
      required:
        - locationAssistanceType
      properties:
        locationAssistanceType:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Binary'

    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'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    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:
        $ref: '#/components/schemas/OperationMode'
      ptwValue:
        type: string
        pattern: '^([0-1]{4})$'
      extendedPtwValue:
        type: string
        pattern: '^([0-1]{8})$'

  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
        requestHeaders:
          type: array
          items:
            type: string
          minItems: 1

    AerialUeSubscriptionInfo:
      description: Contains the Aerial UE Subscription Information, it at least contains the Aerial
UE Indication.
      type: object
      required:
        - aerialUeInd
      properties:
        aerialUeInd:
          $ref: '#/components/schemas/AerialUeIndication'
        3gppUavId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'

    SmSubsData:
      oneOf:
        - type: array
          items:
            $ref: '#/components/schemas/SessionManagementSubscriptionData'
          minItems: 1
        - $ref: '#/components/schemas/ExtendedSmSubsData'

    ExtendedSmSubsData:
      description: Contains identifiers of shared Session Management Subscription Data and
optionally individual Session Management Subscription Data.
      type: object
      required:
        - sharedSmSubsDataIds
      properties:
        sharedSmSubsDataIds:
          type: array
          items:
            $ref: '#/components/schemas/SharedDataId'
          minItems: 1
        individualSmSubsData:
          type: array
          items:
            $ref: '#/components/schemas/SessionManagementSubscriptionData'

    ImmediateReport:
      oneOf:
        - $ref: '#/components/schemas/SubscriptionDataSets'
        - type: array
          items:
            $ref: '#/components/schemas/SharedData'
          minItems: 0

    MbsSubscriptionData:
      description: Contains the 5MBS Subscription Data.
      type: object
      properties:
        mbsAllowed:
          type: boolean
          default: false
        mbsSessionIdList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSessionId'
          minItems: 1

    UcSubscriptionData:
      description: Contains the User Consent Subscription Data.
      type: object
      properties:
        userConsentPerPurposeList:
```

```
              description: A map(list of key-value pairs) where user consent purpose serves as key of
user consent
              type: object
              additionalProperties:
                $ref: '#/components/schemas/UserConsent'
              minProperties: 1

      UeContextInSmfDataSubFilter:
        description: UE Context In Smf Data Subscription Filter.
        type: object
        properties:
          dnnList:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
            minItems: 1
          snssaiList:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
            minItems: 1
          emergencyInd:
            type: boolean
            default: false

      UeIdentifiers:
        description: Contains a list of UE IDs
        type: object
        properties:
          ueIdList:
            description: A map(list of key-value pairs) where Gpsi serves as key of arrays of Supi
            type: object
            additionalProperties:
              $ref: '#/components/schemas/SupiInfo'
            minProperties: 1

      SupiInfo:
        description: List of Supis.
        type: object
        required:
          - supiList
        properties:
          supiList:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'


# 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

    SorTransparentContainer:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'

    UpuTransparentContainer:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'

    IpIndex:
      description: Represents the IP Index to be sent from UDM to the SMF (its value can be either
an integer or a string)
      anyOf:
        - type: integer
        - type: string

    SorCmci:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'


# 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
          - LCS_BCA
          - PROSE
          - UC
          - MBS
        - type: string

    UcPurpose:
      anyOf:
        - type: string
          enum:
          - ANALYTICS
          - MODEL_TRAINING
          - NW_CAP_EXPOSURE
          - EDGEAPP_UE_LOCATION
```

```
            - type: string
        description: Indicates the purpose of the user consent.

    UserConsent:
      anyOf:
        - type: string
          enum:
            - CONSENT_NOT_GIVEN
            - CONSENT_GIVEN
        - 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
            - NR_N1
            - NR_N1_REDCAP
        - 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

    SharedDataTreatmentInstruction:
      anyOf:
        - type: string
          enum:
            - USE_IF_NO_CLASH
            - OVERWRITE
            - MAX
            - MIN
        - type: string

    GpsiType:
      description: Type of GPSI (MSISDN or External-ID)
      anyOf:
        - type: string
          enum:
            - MSISDN
            - EXT_ID
            - EXT_GROUP_ID
        - type: string

    AerialUeIndication:
      anyOf:
        - type: string
          enum:
            - AERIAL_UE_ALLOWED
            - AERIAL_UE_NOT_ALLOWED
        - type: string
      description: >
        Indicates the Aerial service for the UE is allowed or not allowed, possible values are
        - AERIAL_UE_ALLOWED: Aerial service for the UE is allowed.
        - AERIAL_UE_NOT_ALLOWED: Aerial service for the UE is not allowed.

    ProseDirectAllowed:
      anyOf:
        - type: string
          enum:
            - ANNOUNCE
            - MONITOR
            - RESTRICTD_ANNOUNCE
            - RESTRICTD_MONITOR
            - DISCOVERER
            - DISCOVEREE
            - BROADCAST
            - GROUPCAST
            - UNICAST
            - LAYER2_RELAY
            - LAYER3_RELAY
        - type: string
      description: Indicates the 5G ProSe Direct services that can be authorised to use in the given
PLMN for the UE.
```

# A.3    Nudm_UECM API

```
openapi: 3.0.0

info:
```

```
      version: '1.2.6'
    title: 'Nudm_UECM'
    description: |
      Nudm Context Management Service.
      © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
      All rights reserved.

externalDocs:
  description: 3GPP TS 29.503 Unified Data Management Services, version 17.14.0
  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 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/send-routing-info-sm:
    post:
      summary: Retreive addressing information for SMS delivery
      operationId: SendRoutingInfoSm
      tags:
        - SendRoutingInfoSM (Custom Operation)
      parameters:
        - name: ueId
          in: path
          description: Identifier of the UE
          required: true
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/RoutingInfoSmRequest'
        required: true
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/RoutingInfoSmResponse'
        '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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:amf-registration:write
      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:
      deregistrationNotification:
        '{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
      dataRestorationNotification:
```

```
            '{request.body#/dataRestorationCallbackUri}':
             post:
               requestBody:
                 required: true
                 content:
                   application/json:
                     schema:
                       $ref: '#/components/schemas/DataRestorationNotification'
               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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:amf-registration:write
      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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:amf-registration:write
      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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:amf-registration:write
      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-3gpp-access/roaming-info-update:
    post:
      summary: Update the Roaming Information
      operationId: UpdateRoamingInformation
      tags:
        - Roaming Information Update
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:roaming-info-update:write
      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/RoamingInfoUpdate'
        required: true
      responses:
        '201':
          description: Created
```

```
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/RoamingInfoUpdate'
              headers:
                Location:
                  description: 'Contains the URI of the newly created resource, according to the
structure: {apiRoot}/nudm-uecm/<apiVersion>/{ueId}/registrations/amf-3gpp-access/roaming-info-
update'
                  required: true
                  schema:
                    type: string
          '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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:amf-registration:write
      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:
      deregistrationNotification:
        '{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
      dataRestorationNotification:
        '{request.body#/dataRestorationCallbackUri}':
          post:
            requestBody:
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/DataRestorationNotification'
            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 non-3GPP access
      operationId: UpdateNon3GppRegistration
      tags:
        - Parameter update in the AMF registration for non-3GPP access
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:amf-registration:write
      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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:smf-registration:write
      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:
        deregistrationNotification:
          '{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':
```

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```
                                  $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
              dataRestorationNotification:
                '{request.body#/dataRestorationCallbackUri}':
                  post:
                    requestBody:
                      required: true
                      content:
                        application/json:
                          schema:
                            $ref: '#/components/schemas/DataRestorationNotification'
                    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
        delete:
          summary: delete an SMF registration
          operationId: SmfDeregistration
          tags:
            - SMF Deregistration
          security:
            - {}
            - oAuth2ClientCredentials:
              - nudm-uecm
            - oAuth2ClientCredentials:
              - nudm-uecm
              - nudm-uecm:smf-registration:write
          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
          patch:
            summary: update a parameter in the SMF registration
```

```
      operationId: UpdateSmfRegistration
      tags:
        - Parameter update in the SMF registration
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:smf-registration:write
      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: 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/SmfRegistrationModification'
        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'
        '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

  /{ueId}/registrations/smsf-3gpp-access:
    put:
      summary: register as SMSF for 3GPP access
      operationId: 3GppSmsfRegistration
      tags:
        - SMSF registration for 3GPP access
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:smsf-registration:write
      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
            ETag:
            description: Entity Tag, containing a strong validator, as described in IETF RFC 7232,
2.3
              schema:
                type: string
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SmsfRegistration'
          headers:
            ETag:
            description: Entity Tag, containing a strong validator, as described in IETF RFC 7232,
2.3
              schema:
                type: string
        '204':
          description: No content
          headers:
            ETag:
            description: Entity Tag, containing a strong validator, as described in IETF RFC 7232,
2.3
              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'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          description: Unexpected error
      callbacks:
        dataRestorationNotification:
          '{request.body#/dataRestorationCallbackUri}':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/DataRestorationNotification'
              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'
```

```yaml
              '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
    delete:
      summary: delete the SMSF registration for 3GPP access
      operationId: 3GppSmsfDeregistration
      tags:
        - SMSF Deregistration for 3GPP Access
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:smsf-registration:write
      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'
        - name: If-Match
          in: header
          description: Validator for conditional requests, as described in IETF RFC 7232, 3.1
          schema:
            type: string
      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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:smsf-registration:write
      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
            ETag:
              description: Entity Tag, containing a strong validator, as described in IETF RFC 7232,
2.3
              schema:
                type: string
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SmsfRegistration'
          headers:
            ETag:
              description: Entity Tag, containing a strong validator, as described in IETF RFC 7232,
2.3
              schema:
                type: string
        '204':
          description: No content
          headers:
            ETag:
              description: Entity Tag, containing a strong validator, as described in IETF RFC 7232,
2.3
```

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                  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'
              '503':
                $ref: 'TS29571_CommonData.yaml#/components/responses/503'
            default:
              description: Unexpected error
      callbacks:
        dataRestorationNotification:
          '{request.body#/dataRestorationCallbackUri}':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/DataRestorationNotification'
              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
    delete:
      summary: delete SMSF registration for non 3GPP access
      operationId: Non3GppSmsfDeregistration
      tags:
        - SMSF Deregistration for non-3GPP access
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:smsf-registration:write
      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'
        - name: If-Match
          in: header
          description: Validator for conditional requests, as described in IETF RFC 7232, 3.1
          schema:
            type: string
      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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:ip-sm-gw-registration:write
      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
        security:
          - {}
          - oAuth2ClientCredentials:
            - nudm-uecm
          - oAuth2ClientCredentials:
            - nudm-uecm
            - nudm-uecm:ip-sm-gw-registration:write
        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

  /{ueId}/registrations/nwdaf-registrations:
    get:
      summary: retrieve the NWDAF registration
      operationId: GetNwdafRegistration
      tags:
        - NWDAF Registration Info Retrieval
      parameters:
        - name: ueId
          in: path
          description: Identifier of the UE
          required: true
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
        - name: analytics-ids
          in: query
          description: List of analytics Id(s) provided by the consumers of NWDAF.
          schema:
            type: array
            items:
              $ref: 'TS29520_Nnwdaf_AnalyticsInfo.yaml#/components/schemas/EventId'
        - 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:
                type: array
                items:
                  $ref: '#/components/schemas/NwdafRegistration'
                minItems: 1
        '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/nwdaf-registrations/{nwdafRegistrationId}:
    put:
      summary: register as NWDAF
      operationId: NwdafRegistration
      tags:
        - NWDAF registration
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-uecm
        - oAuth2ClientCredentials:
          - nudm-uecm
          - nudm-uecm:nwdaf-registration:write
      parameters:
        - name: ueId
          in: path
          description: Identifier of the UE
          required: true
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
        - name: nwdafRegistrationId
          in: path
          description: NWDAF registration identifier
          required: true
          schema:
```

```
                type: string
          requestBody:
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/NwdafRegistration'
            required: true
          responses:
            '201':
              description: Created
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/NwdafRegistration'
            '200':
              description: Expected response to a valid request
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/NwdafRegistration'
            '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 an NWDAF registration
        operationId: NwdafDeregistration
        tags:
          - NWDAF Deregistration
        security:
          - {}
          - oAuth2ClientCredentials:
            - nudm-uecm
          - oAuth2ClientCredentials:
            - nudm-uecm
            - nudm-uecm:nwdaf-registration:write
        parameters:
          - name: ueId
            in: path
            description: Identifier of the UE
            required: true
            schema:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
          - name: nwdafRegistrationId
            in: path
            description: NWDAF registration identifier
            required: true
            schema:
              type: string
        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

      patch:
        summary: Update a parameter in the NWDAF registration
        operationId: UpdateNwdafRegistration
        tags:
```

```
            - Parameter update in the NWDAF registration
        security:
          - {}
          - oAuth2ClientCredentials:
            - nudm-uecm
          - oAuth2ClientCredentials:
            - nudm-uecm
            - nudm-uecm:nwdaf-registration:write
        parameters:
          - name: ueId
            in: path
            description: Identifier of the UE
            required: true
            schema:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
          - name: nwdafRegistrationId
            in: path
            description: NWDAF registration identifier
            required: true
            schema:
              type: string
          - name: supported-features
            in: query
            description: Supported Features
            schema:
               $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        requestBody:
          content:
            application/merge-patch+json:
              schema:
                $ref: '#/components/schemas/NwdafRegistrationModification'
          required: true
        responses:
          '200':
            description: Expected response to a valid request
            content:
              application/json:
                schema:
                  oneOf:
                    - $ref: '#/components/schemas/NwdafRegistration'
                    - $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

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nudm-uecm: Access to the nudm-uecm API
            nudm_uecm:amf-registration:write: Write access (update/modify) to representations of the
Amf3GppAccessRegistration and AmfNon3GppAccessRegistration resources
            nudm_uecm:smf-registration:write: Write access (create/delete/modify) to the
representations of individualSmfRegistration resources
            nudm_uecm:smsf-registration:write: Write access (create/delete/modify) to
representations of the Smsf3GppAccessRegistration and SmsfNon3GppAccessRegistration resources
```

```
            nudm_uecm:ip-sm-gw-registration:write: Write access (create/delete/modify) to the
representation of the IpSmGwRegistration resource
            nudm_uecm:nwdaf-registration:write: Write access (create/delete/modify) to the
representation of the NwdafRegistration resource


  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
        emergencyRegistrationInd:
          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'
        ueReachableInd:
          $ref: '#/components/schemas/UeReachableInd'
        reRegistrationRequired:
          type: boolean
        adminDeregSubWithdrawn:
          type: boolean
        dataRestorationCallbackUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        resetIds:
```

```
          type: array
          items:
            type: string
          minItems: 1
        disasterRoamingInd:
          type: boolean
          default: false
        ueMINTCapability:
          type: boolean
        sorSnpnSiSupported:
          type: boolean
          default: false
        udrRestartInd:
          type: boolean
          default: false
        lastSynchronizationTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'


    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
        ueMINTCapability:
          type: boolean

    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:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
        smfInstanceId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        plmnId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'

    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'
        reRegistrationRequired:
          type: boolean
        adminDeregSubWithdrawn:
          type: boolean
        dataRestorationCallbackUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        resetIds:
          type: array
          items:
            type: string
          minItems: 1
        disasterRoamingInd:
          type: boolean
          default: false
        sorSnpnSiSupported:
          type: boolean
          default: false
        udrRestartInd:
          type: boolean
          default: false
        lastSynchronizationTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

    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'
```

```yaml
    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:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
        pgwIpAddr:
          $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/IpAddress'
        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'
        pcfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        dataRestorationCallbackUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        resetIds:
          type: array
          items:
            type: string
          minItems: 1
        udrRestartInd:
          type: boolean
          default: false
        lastSynchronizationTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

    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'
          dataRestorationCallbackUri:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
          resetIds:
            type: array
            items:
              type: string
            minItems: 1
          smsfSbiSupInd:
            type: boolean
            default: false
          udrRestartInd:
            type: boolean
            default: false
          lastSynchronizationTime:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
          ueMemoryAvailableInd:
            type: boolean
            enum:
             - true

    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'
        failedPcscf:
            $ref: '#/components/schemas/PcscfAddress'

    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'
        failedPcscf:
            $ref: '#/components/schemas/PcscfAddress'

    SmfRegistrationInfo:
      type: object
      required:
        - smfRegistrationList
      properties:
        smfRegistrationList:
          type: array
          items:
              $ref: '#/components/schemas/SmfRegistration'
          minItems: 1

    IpSmGwRegistration:
```

```
        type: object
        anyOf:
          - required: [ ipSmGwMapAddress ]
          - required: [ ipSmGwDiameterAddress ]
          - required: [ ipsmgwIpv4 ]
          - required: [ ipsmgwIpv6 ]
          - required: [ ipsmgwFqdn ]
        properties:
          ipSmGwMapAddress:
            $ref: '#/components/schemas/E164Number'
          ipSmGwDiameterAddress:
            $ref: '#/components/schemas/NetworkNodeDiameterAddress'
          ipsmgwIpv4:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
          ipsmgwIpv6:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
          ipsmgwFqdn:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
          nfInstanceId:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
          unriIndicator:
            type: boolean
            default: false
          resetIds:
            type: array
            items:
              type: string
            minItems: 1
          ipSmGwSbiSupInd:
            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: 'TS29571_CommonData.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'
        ipSmGw:
          $ref: '#/components/schemas/IpSmGwRegistration'
        nwdafRegistration:
          $ref: '#/components/schemas/NwdafRegistrationInfo'

    NwdafRegistration:
      description: The complete set of information relevant to an NWDAF serving the UE
      type: object
      required:
        - nwdafInstanceId
        - analyticsIds
      properties:
        nwdafInstanceId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        analyticsIds:
          type: array
          items:
            $ref: 'TS29520_Nnwdaf_AnalyticsInfo.yaml#/components/schemas/EventId'
          minItems: 1
        nwdafSetId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
        registrationTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        contextInfo:
          $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/ContextInfo'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        resetIds:
          type: array
          items:
            type: string
          minItems: 1

    NwdafRegistrationModification:
      description: Contains attributes of NwdafRegistration that can be modified using PATCH
      type: object
      required:
        - nwdafInstanceId
```

```
      properties:
        nwdafInstanceId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        nwdafSetId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
        analyticsIds:
          type: array
          items:
            $ref: 'TS29520_Nnwdaf_AnalyticsInfo.yaml#/components/schemas/EventId'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    SmfRegistrationModification:
      description: Contains attributes of SmfRegistration that can be modified using PATCH
      type: object
      required:
        - smfInstanceId
      properties:
        smfInstanceId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        smfSetId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
        pgwFqdn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/FqdnRm'

    DataRestorationNotification:
      description: Contains identities representing those UEs potentially affected by a data-loss
event at the UDR
      type: object
      properties:
        lastReplicationTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        recoveryTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        plmnId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
        supiRanges:
          type: array
          items:
            $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/SupiRange'
          minItems: 1
        gpsiRanges:
          type: array
          items:
            $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/IdentityRange'
          minItems: 1
        resetIds:
          type: array
          items:
            type: string
          minItems: 1
        sNssaiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
          minItems: 1
        dnnList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
          minItems: 1
        udmGroupId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'

    RoamingInfoUpdate:
      description: Contains the Roaming Information Update
      type: object
      required:
        - servingPlmn
      properties:
        roaming:
          type:
            boolean
        servingPlmn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'

    PcscfAddress:
      description: Contains the addressing information (IP addresses and/or FQDN) of the P-CSCF
```

```
          type: object
          anyOf:
            - required: [ipv4Addrs]
            - required: [ipv6Addrs]
            - required: [fqdn]
          properties:
            ipv4Addrs:
              type: array
              items:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
              minItems: 1
            ipv6Addrs:
              type: array
              items:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
              minItems: 1
            fqdn:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'

    NwdafRegistrationInfo:
      description: List of NwdafRegistration
      type: object
      required:
        - nwdafRegistrationList
      properties:
        nwdafRegistrationList:
          type: array
          items:
            $ref: '#/components/schemas/NwdafRegistration'
          minItems: 1

    RoutingInfoSmRequest:
      description: Request body of the send-routing-info-sm custom operation
      type: object
      properties:
        ipSmGwInd:
          type: boolean
          default: false
        correlationId:
          type: string
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    RoutingInfoSmResponse:
      description: Addressing information of available nodes for SMS delivery
      type: object
      properties:
        supi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
        smsf3Gpp:
          $ref: '#/components/schemas/SmsfRegistration'
        smsfNon3Gpp:
          $ref: '#/components/schemas/SmsfRegistration'
        ipSmGw:
          $ref: '#/components/schemas/IpSmGwInfo'
        smsRouter:
          $ref: '#/components/schemas/SmsRouterInfo'

    IpSmGwInfo:
      description: Contains the IP-SM-GW Information
      type: object
      properties:
        ipSmGwRegistration:
          $ref: '#/components/schemas/IpSmGwRegistration'
        ipSmGwGuidance:
          $ref: '#/components/schemas/IpSmGwGuidance'

    IpSmGwGuidance:
      description: >
        Contains guidance information (e.g. minimum and recommended delivery times) of the IP-SM-GW
      type: object
      required:
        - minDeliveryTime
        - recommDeliveryTime
      properties:
        minDeliveryTime:
          type: integer
          minimum: 30
```

```
                maximum: 600
              recommDeliveryTime:
                type: integer
                minimum: 30
                maximum: 600

    SmsRouterInfo:
      description: Addressing information of the SMS Router configured at the UDM
      type: object
      properties:
        nfInstanceId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        diameterAddress:
          $ref: '#/components/schemas/NetworkNodeDiameterAddress'
        mapAddress:
          $ref: '#/components/schemas/E164Number'
        routerIpv4:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
        routerIpv6:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
        routerFqdn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'

# 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
            - DUPLICATE_PDU_SESSION
            - DISASTER_CONDITION_TERMINATED
        - 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
            - IP_SM_GW
```

```
                - NWDAF
            - type: string

    UeReachableInd:
      description: UE Reachable Indication
      anyOf:
        - type: string
          enum:
            - REACHABLE
            - NOT_REACHABLE
            - UNKNOWN
        - type: string
```

# A.4 Nudm_UEAU API

```
openapi: 3.0.0
info:
  version: '1.2.2'
  title: 'Nudm_UEAU'
  description: |
    UDM UE Authentication Service.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.503 Unified Data Management Services, version 17.10.0
  url: 'https://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 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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-ueau
        - oAuth2ClientCredentials:
          - nudm-ueau
          - nudm-ueau:security-information:generate-auth-data:invoke
      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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-ueau
        - oAuth2ClientCredentials:
          - nudm-ueau
          - nudm-ueau:security-information-rg:read
      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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-ueau
        - oAuth2ClientCredentials:
          - nudm-ueau
          - nudm-ueau:auth-events:create
      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
      callbacks:
        dataRestorationNotification:
          '{request.body#/dataRestorationCallbackUri}':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: 'TS29503_Nudm_UECM.yaml#/components/schemas/DataRestorationNotification'
              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

  /{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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-ueau
        - oAuth2ClientCredentials:
          - nudm-ueau
          - nudm-ueau:hss-security-information:generate-av:invoke
      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
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-ueau
        - oAuth2ClientCredentials:
          - nudm-ueau
          - nudm-ueau:auth-event-id:modify
      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'

  /{supi}/gba-security-information/generate-av:
    post:
      summary: Generate authentication data for the UE in GBA domain
      operationId: GenerateGbaAv
      tags:
        - Generate GBA Authentication Vectors
      security:
        - {}
        - oAuth2ClientCredentials:
          - nudm-ueau
        - oAuth2ClientCredentials:
          - nudm-ueau
          - nudm-ueau:gba-security-information:generate-av:invoke
      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/GbaAuthenticationInfoRequest'
        required: true
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/GbaAuthenticationInfoResult'
        '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}/prose-security-information/generate-av:
    post:
```

```yaml
      summary: Generate authentication data for ProSe
      operationId: GenerateProseAV
      tags:
        - Generate ProSe Authentication Vectors
      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/ProSeAuthenticationInfoRequest'
        required: true
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ProSeAuthenticationInfoResult'
        '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

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nudm-ueau: Access to the nudm-ueau API
            nudm-ueau:security-information:generate-auth-data:invoke: Acess to invoke the "generate-
auth-data" custom operation on the "security-information" resource
            nudm-ueau:security-information-rg:read: Access to read the "security-information-rg"
resource
            nudm-ueau:auth-events:create: Access to create a new child resource on the "auth-events"
collection resource
            nudm-ueau:auth-event-id:modify: Access to modify (delete) an "auth-event-id" individual
resource
            nudm-ueau:hss-security-information:generate-av:invoke: Acess to invoke the "generate-av"
custom operation on the "hss-security-information" resource
            nudm-ueau:gba-security-information:generate-av:invoke: Acess to invoke the "generate-av"
custom operation on the "gba-security-information" resource


  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
      nswoInd:
        type: boolean
        default: false
      disasterRoamingInd:
        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:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
        akmaInd:
          type: boolean
          default: false
        authAaa:
          type: boolean
          default: false
        routingId:
          type: string
          pattern: '^[0-9]{1,4}$'
        pvsInfo:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/ServerAddressingInfo'
          minItems: 1

    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'
        resetIds:
          type: array
          items:
            type: string
          minItems: 1
        dataRestorationCallbackUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        udrRestartInd:
          type: boolean
          default: false


    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'

    GbaAuthenticationInfoRequest:
      type: object
      required:
        - authType
      properties:
        authType:
          $ref: '#/components/schemas/GbaAuthType'
        resynchronizationInfo:
          $ref: 'TS29562_Nhss_imsUEAU.yaml#/components/schemas/ResynchronizationInfo'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    GbaAuthenticationInfoResult:
      type: object
      properties:
        3gAkaAv:
          $ref: 'TS29562_Nhss_imsUEAU.yaml#/components/schemas/3GAkaAv'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    ProSeAuthenticationInfoRequest:
      type: object
      required:
        - servingNetworkName
        - relayServiceCode
      properties:
        servingNetworkName:
          $ref: '#/components/schemas/ServingNetworkName'
        relayServiceCode:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RelayServiceCode'
        resynchronizationInfo:
          $ref: '#/components/schemas/ResynchronizationInfo'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    ProSeAuthenticationInfoResult:
      type: object
      required:
        - authType
      properties:
        authType:
          $ref: '#/components/schemas/AuthType'
        proseAuthenticationVectors:
          $ref: '#/components/schemas/ProSeAuthenticationVectors'
        supi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    ProSeAuthenticationVectors:
      oneOf:
        - type: array
          items:
            $ref: '#/components/schemas/AvEapAkaPrime'
          minItems: 1
          maxItems: 5


# 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})?)|5G:NSWO$'

    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
          - NONE
          - EAP_TTLS
        - 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

    GbaAuthType:
      anyOf:
        - type: string
          enum:
          - DIGEST_AKAV1_MD5
        - type: string
```

# A.5 Nudm_EE API

```
openapi: 3.0.0

info:
  version: '1.2.3'
```

```
  title: 'Nudm_EE'
  description: |
    Nudm Event Exposure Service.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.503 Unified Data Management Services, version 17.10.0
  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 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
  monitoringRevocationNotification:
    '{request.body#/secondCallbackRef}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EeMonitoringRevoked'
          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
  dataRestorationNotification:
    '{request.body#/dataRestorationCallbackUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: 'TS29503_Nudm_UECM.yaml#/components/schemas/DataRestorationNotification'
          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'
            '401':
              $ref: 'TS29571_CommonData.yaml#/components/responses/401'
            '403':
              $ref: 'TS29571_CommonData.yaml#/components/responses/403'
            '404':
              $ref: 'TS29571_CommonData.yaml#/components/responses/404'
            '409':
              $ref: 'TS29571_CommonData.yaml#/components/responses/409'
            '411':
              $ref: 'TS29571_CommonData.yaml#/components/responses/411'
            '413':
              $ref: 'TS29571_CommonData.yaml#/components/responses/413'
            '415':
              $ref: 'TS29571_CommonData.yaml#/components/responses/415'
            '429':
              $ref: 'TS29571_CommonData.yaml#/components/responses/429'
            '500':
              $ref: 'TS29571_CommonData.yaml#/components/responses/500'
```

```
              '502':
                $ref: 'TS29571_CommonData.yaml#/components/responses/502'
              '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
        failedMonitoringConfigs:
          description: 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 FailedMonitoringConfiguration
          type: object
          additionalProperties:
            $ref: '#/components/schemas/FailedMonitoringConfiguration'
          minProperties: 1
        failedMoniConfigsEPC:
          description: 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 FailedMonitoringConfiguration, the key value "ALL"
may be used to identify a map entry which contains the failed cause of the EE subscription was not
successful in EPC domain.
          type: object
          additionalProperties:
            $ref: '#/components/schemas/FailedMonitoringConfiguration'
          minProperties: 1
        resetIds:
          type: array
          items:
            type: string
          minItems: 1


    FailedMonitoringConfiguration:
      description: Contains the event type and failed cause of the failed Monitoring Configuration
in the EE subscription
      type: object
      required:
        - eventType
        - failedCause
      properties:
        eventType:
```

```
              $ref: '#/components/schemas/EventType'
            failedCause:
              $ref: '#/components/schemas/FailedCause'


    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
        secondCallbackRef:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        excludeGpsiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
          minItems: 1
        includeGpsiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
          minItems: 1
        dataRestorationCallbackUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        udrRestartInd:
          type: boolean
          default: false

    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
            dnn:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
            singleNssai:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
            pduSessionStatusCfg:
              $ref: '#/components/schemas/PduSessionStatusCfg'
            reachabilityForSmsCfg:
              $ref: '#/components/schemas/ReachabilityForSmsConfiguration'
            mtcProviderInformation:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
            afId:
              type: string
            reachabilityForDataCfg:
              $ref: '#/components/schemas/ReachabilityForDataConfiguration'
            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'
          notifFlag:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/NotificationFlag'

      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'
```

```
        reachabilityReport:
          $ref: '#/components/schemas/ReachabilityReport'

    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'
        accessType:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'

    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'

    ReachabilityReport:
      type: object
      properties:
        amfInstanceId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        accessTypeList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
          minItems: 1
        reachability:
          $ref: 'TS29518_Namf_EventExposure.yaml#/components/schemas/UeReachability'
        maxAvailabilityTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        idleStatusIndication:
          $ref: 'TS29518_Namf_EventExposure.yaml#/components/schemas/IdleStatusIndication'

    ReachabilityForDataConfiguration:
      type: object
      required:
        - reportCfg
      properties:
        reportCfg:
          $ref: '#/components/schemas/ReachabilityForDataReportConfig'
        minInterval:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'

    EeMonitoringRevoked:
      type: object
      required:
        - revokedMonitoringEventList
      properties:
        revokedMonitoringEventList:
          description: A map (list of key-value pairs where ReferenceId serves as key) of
MonitoringEvents
          type: object
          additionalProperties:
            $ref: '#/components/schemas/MonitoringEvent'
          minProperties: 1
        removedGpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        excludeGpsiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
          minItems: 1

    MonitoringEvent:
      type: object
      required:
        - eventType
      properties:
        eventType:
          $ref: '#/components/schemas/EventType'
        revokedCause:
          $ref: '#/components/schemas/RevokedCause'

    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
                 - ACCESS_TYPE_REPORT
                 - REGISTRATION_STATE_REPORT
                 - CONNECTIVITY_STATE_REPORT
```

```
                - TYPE_ALLOCATION_CODE_REPORT
                - FREQUENT_MOBILITY_REGISTRATION_REPORT
                - PDU_SES_REL
                - PDU_SES_EST
                - UE_MEMORY_AVAILABLE_FOR_SMS
              - type: string

    LocationAccuracy:
      anyOf:
        - type: string
          enum:
            - CELL_LEVEL
            - RAN_NODE_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

    ReachabilityForDataReportConfig:
      anyOf:
        - type: string
          enum:
            - DIRECT_REPORT
            - INDIRECT_REPORT
        - type: string

    RevokedCause:
      anyOf:
        - type: string
          enum:
            - NOT_ALLOWED
            - EXCLUDED_FROM_GROUP
            - GPSI_REMOVED
        - type: string

    FailedCause:
      anyOf:
        - type: string
          enum:
            - AF_NOT_ALLOWED
            - MTC_PROVIDER_NOT_ALLOWED
            - MONITORING_NOT_ALLOWED
            - UNSUPPORTED_MONITORING_EVENT_TYPE
            - UNSUPPORTED_MONITORING_REPORT_OPTIONS
            - UNSPECIFIED
        - type: string
      description: Indicates the Failed cause of the failed Monitoring Configuration in the EE
subscription

    PdnConnectivityStatus:
      anyOf:
        - type: string
```

```
    enum:
    - ESTABLISHED
    - RELEASED
 - type: string
```

# A.6    Nudm_PP API

```
openapi: 3.0.0

info:
  version: '1.2.3'
  title: 'Nudm_PP'
  description: |
    Nudm Parameter Provision Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.503 Unified Data Management Services, version 17.14.0
  url: 'https://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 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

  /{ueId}/pp-data-store/{afInstanceId}:
    put:
      summary: Create a Provisioning Parameter Data Entry
      operationId: Create PP Data Entry
      tags:
        - ParameterProvisioningDataEntry (Document)
      parameters:
        - name: ueId
          in: path
          description: Identifier of the UE
```

```
                    required: true
                    schema:
                      anyOf:
                        - $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
                        - $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/ExtGroupId'
                        - type: string
                          pattern: '^anyUE$'
                  - name: afInstanceId
                    in: path
                    description: Application Function Instance Identifier
                    required: true
                    schema:
                      type: string
              requestBody:
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/PpDataEntry'
                required: true
              responses:
                '201':
                  description: Indicating a successful creation of the resource
                  content:
                    application/json:
                      schema:
                        $ref: '#/components/schemas/PpDataEntry'
                '204':
                  description: Indicating a successful update of the resource
                '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 Provisioning Parameter Data Entry
              operationId: Delete PP Data Entry
              tags:
                - ParameterProvisioningDataEntry (Document)
              parameters:
                - name: ueId
                  in: path
                  description: Identifier of the UE
                  required: true
                  schema:
                    anyOf:
                      - $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
                      - $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/ExtGroupId'
                      - type: string
                        pattern: '^anyUE$'
                - name: afInstanceId
                  in: path
                  description: Application Function Instance Identifier
                  required: true
                  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
            get:
```

```
        summary: get Parameter Provisioning Data Entry
        operationId: Get PP Data Entry
        tags:
          - ParameterProvisioningDataEntry (Document)
        parameters:
          - name: ueId
            in: path
            description: Identifier of the UE
            required: true
            schema:
              anyOf:
                - $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
                - $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/ExtGroupId'
                - type: string
                  pattern: '^anyUE$'
          - name: afInstanceId
            in: path
            description: Application Function Instance Identifier
            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'
        responses:
          '200':
            description: Expected response to a valid request
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/PpDataEntry'
          '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

  /mbs-group-membership/{extGroupId}:
    put:
      summary: create a 5G MBS Group
      operationId: Create 5G MBS Group
      tags:
        - 5G MBS 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/MulticastMbsGroupMemb'
        required: true
      responses:
        '201':
          description: Expected response to a valid request
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '411':
```

```
                      $ref: 'TS29571_CommonData.yaml#/components/responses/411'
              '413':
                $ref: 'TS29571_CommonData.yaml#/components/responses/413'
              '415':
                $ref: 'TS29571_CommonData.yaml#/components/responses/415'
              '429':
                $ref: 'TS29571_CommonData.yaml#/components/responses/429'
              '500':
                $ref: 'TS29571_CommonData.yaml#/components/responses/500'
              '502':
                $ref: 'TS29571_CommonData.yaml#/components/responses/502'
              '503':
                $ref: 'TS29571_CommonData.yaml#/components/responses/503'
            default:
              description: Unexpected error
      delete:
        summary: delete a 5G MBS Group
        operationId: Delete 5G MBS Group
        tags:
          - 5G MBS Group Deletion
        parameters:
          - name: extGroupId
            in: path
            description: External Identifier of the Group
            required: true
            schema:
              $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/ExtGroupId'
        responses:
          '204':
            description: Expected response to a valid request
          '400':
            $ref: 'TS29571_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29571_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29571_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29571_CommonData.yaml#/components/responses/404'
          '429':
            $ref: 'TS29571_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29571_CommonData.yaml#/components/responses/500'
          '502':
            $ref: 'TS29571_CommonData.yaml#/components/responses/502'
          '503':
            $ref: 'TS29571_CommonData.yaml#/components/responses/503'
          default:
            description: Unexpected error
      patch:
        summary: modify a 5G MBS Group
        operationId: Modify 5G MBS Group
        tags:
          - 5G MBS 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/MulticastMbsGroupMemb'
          required: true
        responses:
          '204':
            description: Expected response to a valid request
          '200':
            description: Expected response to a valid request
            content:
              application/json:
```

```yaml
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/PatchResult'
          '400':
            $ref: 'TS29571_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29571_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29571_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29571_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29571_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29571_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29571_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29571_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29571_CommonData.yaml#/components/responses/500'
          '502':
            $ref: 'TS29571_CommonData.yaml#/components/responses/502'
          '503':
            $ref: 'TS29571_CommonData.yaml#/components/responses/503'
          default:
            description: Unexpected error
    get:
      summary: get 5G MBS Group
      operationId: Get 5G MBS Group
      tags:
        - 5G MBS 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/MulticastMbsGroupMemb'
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29571_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29571_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
        '502':
          $ref: 'TS29571_CommonData.yaml#/components/responses/502'
        '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'
        5mbsAuthorizationInfo:
          $ref: '#/components/schemas/5MbsAuthorizationInfo'
      nullable: true

    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'
      nullable: true

    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
        dnAaaIpAddressAllocation:
          type: boolean
        dnAaaAddress:
          $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/IpAddress'
        additionalDnAaaAddresses:
          type: array
          items:
            $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/IpAddress'
          minItems: 1
        dnAaaFqdn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'

    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'
        nullable: true

    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'
        umtTime:
          $ref: '#/components/schemas/UmtTime'

    UmtTime:
      type: object
      required:
        - timeOfDay
        - dayOfWeek
      properties:
        timeOfDay:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeOfDay'
        dayOfWeek:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DayOfWeek'

    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'
        nullable: true

    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'
        dnn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
        singleNssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        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'
      nullable: true

    PpDataEntry:
      type: object
      properties:
        communicationCharacteristics:
          $ref: '#/components/schemas/CommunicationCharacteristicsAF'
        referenceId:
          $ref: '#/components/schemas/ReferenceId'
        validityTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        mtcProviderInformation:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        ecsAddrConfigInfo:
          $ref: '#/components/schemas/EcsAddrConfigInfo'
        additionalEcsAddrConfigInfos:
          type: array
          items:
            $ref: '#/components/schemas/EcsAddrConfigInfo'
          minItems: 1
        ecRestriction:
          $ref: '#/components/schemas/EcRestriction'
      nullable: true

    CommunicationCharacteristicsAF:
      type: object
      properties:
        ppDlPacketCount:
          $ref: '#/components/schemas/PpDlPacketCount'
        maximumResponseTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
        maximumLatency:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
      nullable: true

    EcsAddrConfigInfo:
      type: object
      properties:
        ecsServerAddr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/EcsServerAddr'
        spatialValidityCond:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SpatialValidityCond'
        dnn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
        snssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      nullable: true

    5MbsAuthorizationInfo:
      type: object
      properties:
        5mbsSessionIds:
          type: array
```

```
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/MbsSessionId'
            minItems: 1
        nullable: true

    MulticastMbsGroupMemb:
      type: object
      required:
        - multicastGroupMemb
      properties:
        multicastGroupMemb:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
          minItems: 1
        afInstanceId:
          type: string
        internalGroupIdentifier:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'

# SIMPLE TYPES:

    ReferenceId:
      type: integer

    PpDlPacketCount:
      type: integer
      nullable: true


# ENUMS:
```

# A.7 Nudm_NIDDAU API

```
openapi: 3.0.0

info:
  version: '1.1.1'
  title: 'Nudm_NIDDAU'
  description: |
    Nudm NIDD Authorization Service.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.503 Unified Data Management Services, version 17.8.0
  url: 'https://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 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:
      description: Represents NIDD authorization data.
      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:
      description: Represents the user identifier.
      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:
      description: Represents NIDD authorization update information.
      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:
      description: Represents a NIDD authorization update notification.
      type: object
      required:
        - niddAuthUpdateInfoList
      properties:
        niddAuthUpdateInfoList:
          type: array
          items:
            $ref: '#/components/schemas/NiddAuthUpdateInfo'
          minItems: 1

    AuthorizationInfo:
      description: Represents NIDD authorization information.
      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'
        contextInfo:
          $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/ContextInfo'


# 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: '1.1.0'
  title: 'Nudm_MT'
  description: |
    UDM MT Service.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.503 Unified Data Management Services, version 17.7.0
  url: 'https://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 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'
```

*ETSI*

```
            '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:
      description: Represents UE information.
      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:
      description: Represents 5G SRVCC information for a UE.
      type: object
      required:
       - ue5GSrvccCapability
      properties:
        ue5GSrvccCapability:
          type: boolean
```

*ETSI*

```
        stnSr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/StnSr'
        cMsisdn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/CMsisdn'

    LocationInfoRequest:
      description: Represents information to be sent in a location information request. It contains
the requested information, i.e. current location, local time zone, RAT type, or serving node
identity only.
      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:
      description: Represents the requested location information.
      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:
```

# A.9    Nudm_SSAU API

```
openapi: 3.0.0

info:
  version: '1.0.2'
  title: 'Nudm_SSAU'
  description: |
    Nudm Service Specific Authorization Service.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
```

```yaml
externalDocs:
  description: 3GPP TS 29.503 Unified Data Management Services, version 17.9.0
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.503/'

servers:
  - url: '{apiRoot}/nudm-ssau/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.

security:
  - oAuth2ClientCredentials:
    - nudm-ssau
  - {}

paths:
  /{ueIdentity}/{serviceType}/authorize:
    post:
      summary: Authorization for the Service specific parameters in the request.
      operationId: ServiceSpecificAuthorization
      tags:
        - Service specific authorization request
      parameters:
        - name: ueIdentity
          in: path
          description: Represents the scope of the UE for which the Service Specific Parameters 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-[^@]+@[^@]+)$'
        - name: serviceType
          in: path
          description: Represents the specific service for which the Service Specific Parameters are
authorized.
          required: true
          schema:
            $ref: '#/components/schemas/ServiceType'
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ServiceSpecificAuthorizationInfo'
        required: true
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ServiceSpecificAuthorizationData'
        '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:
        authUpdateNotification:
          '{request.body#/authUpdateCallbackUri}':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/AuthUpdateNotification'
              responses:
                '204':
```

```
                    description: Expected response to a valid request

  /{ueIdentity}/{serviceType}/remove:
    post:
      summary: Remove the authorization of specific service's configuration.
      operationId: ServiceSpecificAuthorizationRemoval
      tags:
        - Service specific authorization remove
      parameters:
        - name: ueIdentity
          in: path
          description: Represents the scope of the UE for which the Service Specific configuration
authorization to be removed. Contains the GPSI of the user or the external group ID.
          required: true
          schema:
            type: string
            pattern: '^(msisdn-[0-9]{5,15}|.+|extid-[^@]+@[^@]+|extgroupid-[^@]+@[^@]+)$'
        - name: serviceType
          in: path
          description: Represents the specific service for which the Service Specific configuration
authorization to be removed.
          required: true
          schema:
            $ref: '#/components/schemas/ServiceType'
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ServiceSpecificAuthorizationRemoveData'
        required: true
      responses:
        '204':
          description: Successful response
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29571_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29571_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29571_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29571_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
        '501':
          $ref: 'TS29571_CommonData.yaml#/components/responses/501'
        '502':
          $ref: 'TS29571_CommonData.yaml#/components/responses/502'
        '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-ssau: Access to the nudm-ssau API

  schemas:

# COMPLEX TYPES:
#
    AuthUpdateNotification:
      description: Represents an authorization update notification.
      type: object
```

```
      required:
        - serviceType
        - authUpdateInfoList
      properties:
        serviceType:
          $ref: '#/components/schemas/ServiceType'
        snssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        dnn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
        authUpdateInfoList:
          type: array
          items:
            $ref: '#/components/schemas/AuthUpdateInfo'
          minItems: 1
        mtcProviderInformation:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/MtcProviderInformation'
        afId:
          type: string

    AuthUpdateInfo:
      description: Represents authorization update information.
      type: object
      required:
        - authorizationData
      properties:
        authorizationData:
          $ref: '#/components/schemas/ServiceSpecificAuthorizationData'
        invalidityInd:
          type: boolean
        invalidCause:
          $ref: '#/components/schemas/InvalidCause'


    ServiceSpecificAuthorizationInfo:
      description: Authorization information for a specific service
      type: object
      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'

    ServiceSpecificAuthorizationData:
      description: Authorization Response for a specific service.
      type: object
      properties:
        authorizationUeId:
          $ref: '#/components/schemas/AuthorizationUeId'
        extGroupId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalGroupId'
        intGroupId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
        authId:
          type: string

    AuthorizationUeId:
      description: UE Id of the Authorization Data.
      type: object
      required:
        - supi
      properties:
        supi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'

    ServiceSpecificAuthorizationRemoveData:
      description: Information for Authorization removal of a specific service.
      type: object
```

```
        required:
          - authId
        properties:
          authId:
            type: string



# SIMPLE TYPES:



# ENUMS:


    ServiceType:
      anyOf:
        - type: string
          enum:
          - AF_GUIDANCE_FOR_URSP
        - type: string
          description: >
            This string provides forward-compatibility with future
            extensions to the enumeration but is not used to encode
            content defined in the present version of this API.
      description: >
        Possible values are
        - AF_GUIDANCE_FOR_URSP

    InvalidCause:
      anyOf:
        - type: string
          enum:
          - SUBSRIPTION_WITHDRAWAL
          - DNN_REMOVED
          - SLICE_REMOVED
          - AUTHORIZATION_REVOKED
        - type: string
          description: >
            This string provides forward-compatibility with future
            extensions to the enumeration but is not used to encode
            content defined in the present version of this API.
      description: >
        Possible values are
        - SUBSRIPTION_WITHDRAWAL
        - DNN_REMOVED
        - SLICE_REMOVED
        - AUTHORIZATION_REVOKED
```

# A.10   Nudm_ReportSMDeliveryStatus API

```
openapi: 3.0.0
info:
  version: '1.1.0'
  title: 'Nudm_ReportSMDeliveryStatus'
  description: |
    UDM Report SM Delivery Status Service.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.503 Unified Data Management Services, version 17.8.0
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.503/'

servers:
- url: '{apiRoot}/nudm-rsds/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.

security:
  - oAuth2ClientCredentials:
    - nudm-rsds
  - {}
```

```
paths:
  /{ueIdentity}/sm-delivery-status:
    post:
      summary: Report the SM Delivery Status
      operationId: ReportSMDeliveryStatus
      tags:
        - Report SM Delivery Status
      parameters:
        - name: ueIdentity
          in: path
          description: Represents the scope of the UE for which the Service Specific Parameters 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/SmDeliveryStatus'
        required: true
      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


components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nudm-rsds: Access to the nudm-rsds API


  schemas:

# COMPLEX TYPES:

    SmDeliveryStatus:
      description: Represents SM Delivery Status.
      type: object
      required:
        - gpsi
        - smStatusReport
      properties:
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        smStatusReport:
          type: string


# SIMPLE TYPES:


# ENUMS:
```

# A.11   Nudm_UEIdentifier API

```
openapi: 3.0.0
info:
  version: '1.0.0'
```

```
    title: 'Nudm_UEIdentifier'
    description: |
      UDM UE Identifier Service.
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      All rights reserved.

externalDocs:
  description: 3GPP TS 29.503 Unified Data Management Services, version 17.10.0
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.503/'

servers:
  - url: '{apiRoot}/nudm-ueid/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.

security:
  - oAuth2ClientCredentials:
    - nudm-ueid
  - {}

paths:
  /deconceal:
    post:
      summary: Deconceal the SUCI to the SUPI
      operationId: Deconceal
      tags:
        - Deconceal
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DeconcealReqData'
        required: true
      responses:
        '200':
          description: Successful response
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DeconcealRspData'
        '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


components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nudm-ueid: Access to the nudm-ueid API


  schemas:

# COMPLEX TYPES:

    DeconcealReqData:
      description: Deconceal Request Data
      type: object
      required:
        - suci
```

```
      properties:
        suci:
          $ref: 'TS29509_Nausf_UEAuthentication.yaml#/components/schemas/Suci'

    DeconcealRspData:
      description: Deconceal Response Data
      type: object
      required:
        - supi
      properties:
        supi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'

# 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.
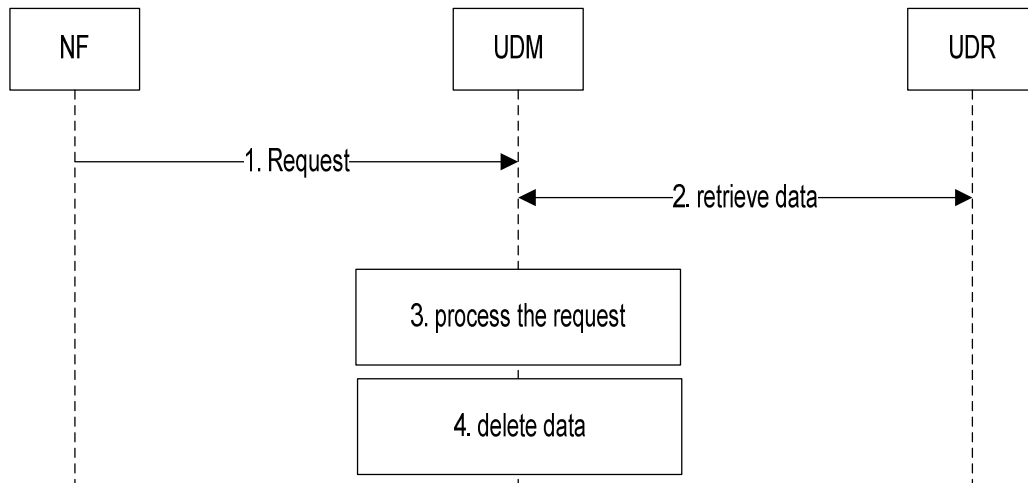


**Figure B-1: Stateless UDM**

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.
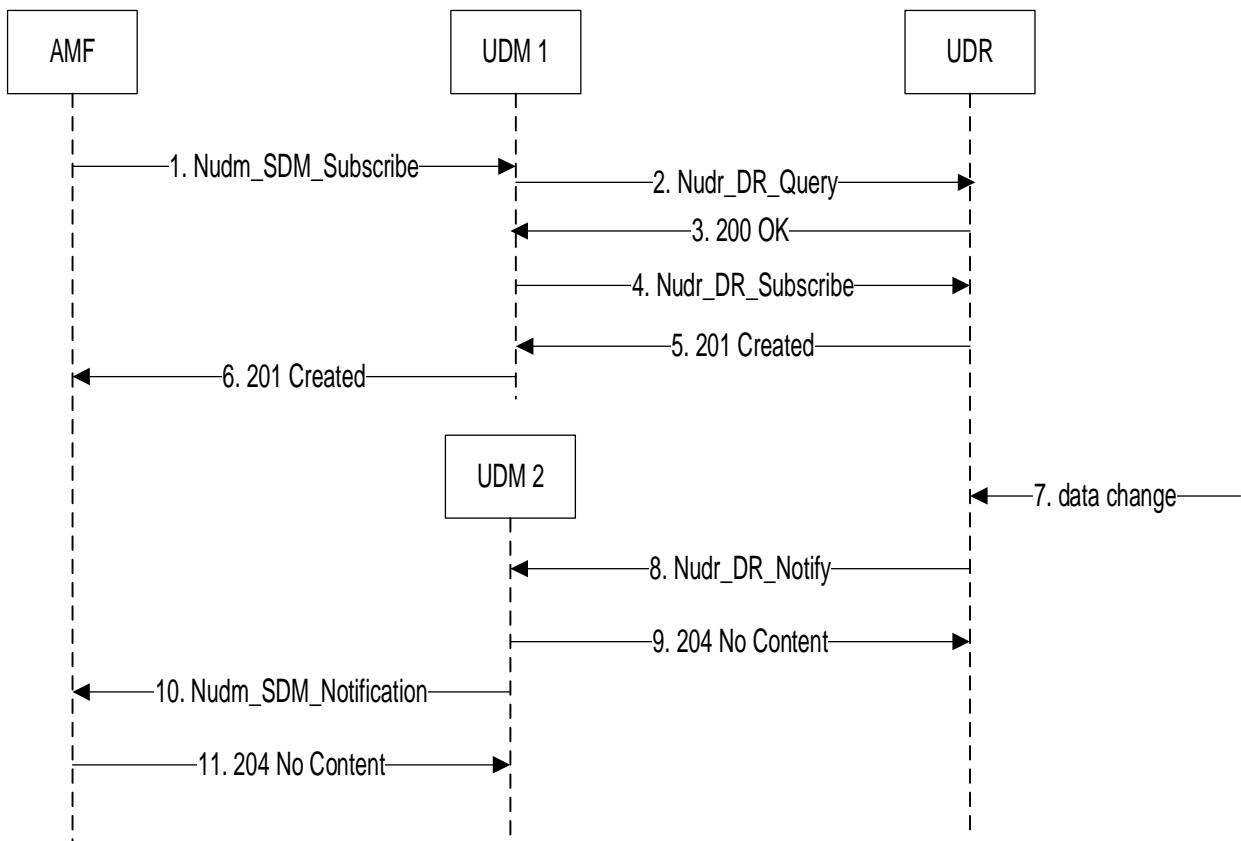
**Figure B-2: Subscription to notification**

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.
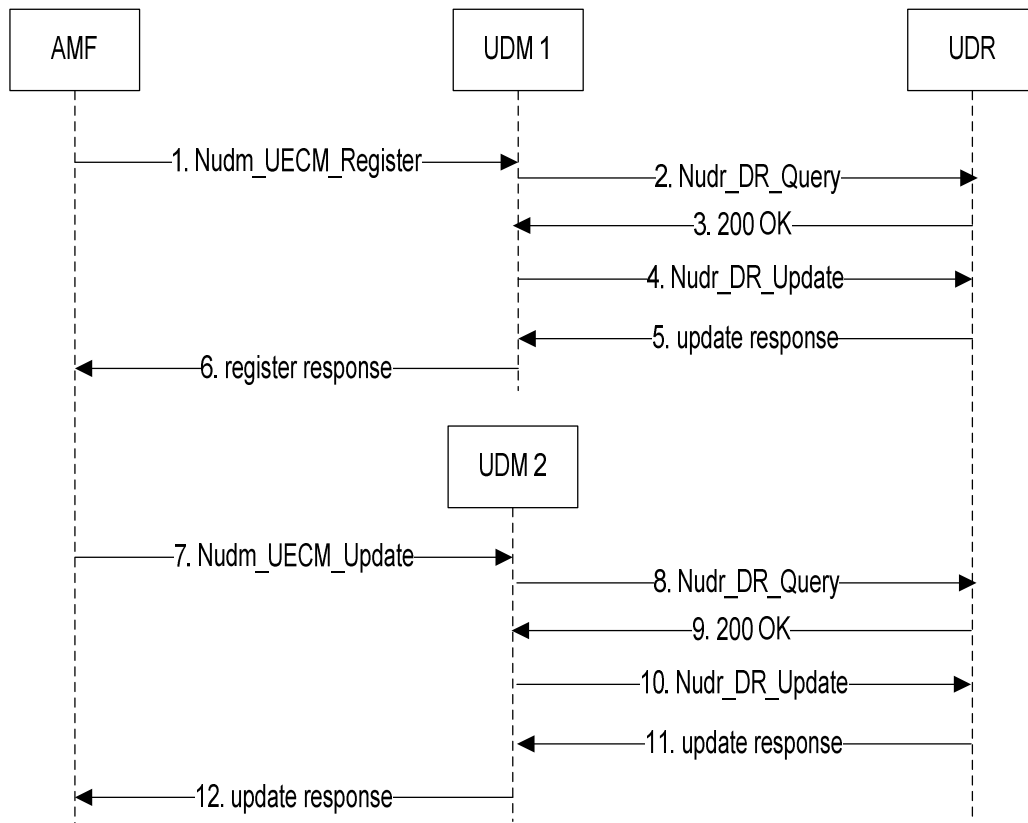


**Figure B-3: AMF Registration and Update**

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.
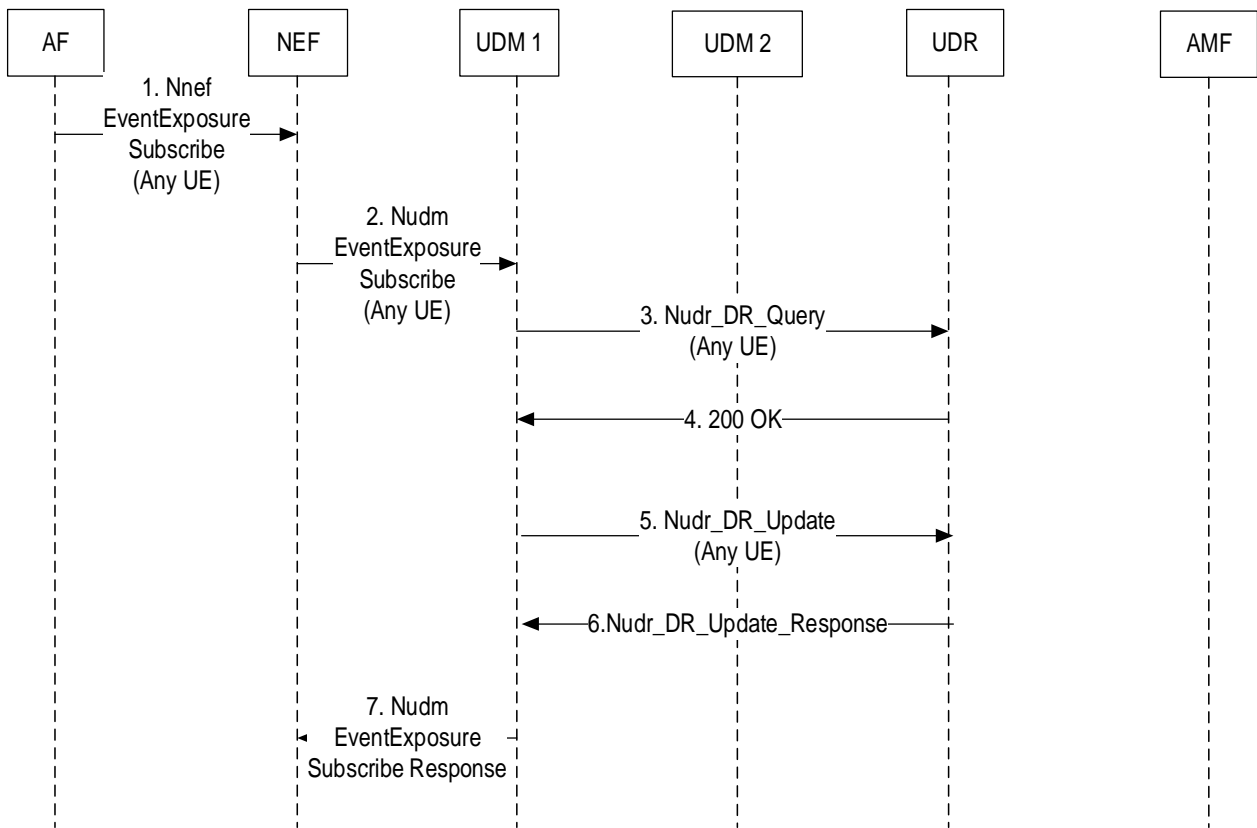
**Figure B-4: Any UE Subscription**

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.

Finally, the above structure is prefixed by the string "suci-", when the SUCI is sent in the "SupiOrSuci" data type definition, as described in 3GPP TS 29.571 [7], Table 5.3.2-1.

For the SUPI types "Network Specific Identifier (NSI)", "Global Line Identifier (GLI)", and "Global Cable Identifier (GCI)", the SUCI sent by the UE to the AMF is always formatted as a NAI (see 3GPP TS 23.003 [8], clauses 28.7.3, 28.15.5 and 28.16.5). In those cases, before sending such SUCI to the UDM or AUSF, the AMF needs to re-encode the received SUCI, and format it according to the structure described above (as an UTF-8 character string, where the different components are separated by the "minus" character "-").

EXAMPLES:

1) SUPI is IMSI-based; MCC=123, MNC=45, MSIN: 0123456789

   SUPI type: 0 (IMSI)

   Routing Indicator: 012

   Protection Scheme: 0 (NULL scheme)

   Home Network Public Key Identifier: 0

   Scheme output = MSIN (cleartext)

   - SUCI UTF-8 string, as sent on the UDM APIs:

     ```
     "suci-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).

2) 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 Indicator: 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 keys and encrypted content below is fictitious).

   - SUCI UTF-8 string, as sent on the UDM APIs:

     `"suci-0-123-45-0002-1-17-`**`e9b9916c911f448d8792e6b2f387f85d3ecab9040049427d9edbb5431b0bc711`**`02`
     `3be6a057`**`b45d936238aebeb7`**`"`

3) SUPI is NAI-based, SUPI = alice@example.com

   SUPI type = 1 (Network Specific Identifier)

   Routing Indicator: 84

   Protection Scheme: 2 (Profile B)

   Home Network Public Key Identifier: 250

   ECC ephemeral public key (33 octets, first bolded part below, in field "ecckey")

   Encrypted username of NAI "alice" (5 octets, italic part below, in field "cip")

   MAC tag (8 octets, last bolded part below, in field "mac")

   (NOTE: the keys and encrypted content below is fictitious)

   - SUCI in NAI format as sent by the UE to the AMF:

     `"type1.rid84.schid2.hnkey250.ecckey`**`e9b9916c911f448d8792e6b2f387f85d3ecab9040049427d9edbb543`**
     **`1b0bc71195`**`.cip`*`023be6a057`*`.mac`**`b45d936238aebeb7`**`@example.com"`

   - SUCI UTF-8 string, as sent on the UDM APIs:

     `"suci-1-example.com-84-2-250-`**`e9b9916c911f448d8792e6b2f387f85d3ecab9040049427d9edbb5431b0bc7`**
     **`1195`**`023be6a057`**`b45d936238aebeb7`**`"`

4) SUPI is NAI-based; SUPI = 00-00-5E-00-53-00@operator.com

   SUPI type: 3 (GCI)

   Routing Indicator: 012

   Protection Scheme: 0 (NULL scheme)

   Home Network Public Key Identifier: 0

Username = 00-00-5E-00-53-00 (in field "userid" below)

- SUCI in NAI format as sent by the UE to the AMF:

    `"type3.rid012.schid0.userid00-00-5E-00-53-00@operator.com"`

- SUCI UTF-8 string, as sent on the UDM APIs:

    `"suci-3-operator.com-012-0-0-00-00-5E-00-53-00"`

5) Anonymous SUCI

   SUPI type: 1 (Network Specific Identifier)

   Operator realm = operator.com

   Routing Indicator: 3456

   Protection Scheme: 0 (NULL scheme)

   Home Network Public Key Identifier: 0

   - Alternative with username = anonymous

       - SUCI in NAI format as sent by the UE to the AMF:

           `"type1.rid3456.schid0.useridanonymous@operator.com"`

       - SUCI UTF-8 string, as sent on the UDM APIs:

           `"suci-1-operator.com-3456-0-0-anonymous"`

   - Alternative with omitted username

       - SUCI in NAI format as sent by the UE to the AMF:

           `"type1.rid3456.schid0.userid@operator.com"`

       - SUCI UTF-8 string, as sent on the UDM APIs:

           `"suci-1-operator.com-3456-0-0-"`

# 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<br>C4-176153<br>C4-176423<br>C4-176365<br>C4-176424<br>C4-176425 | | | | Implementation of pCRs agreed at CT4#81 | 0.3.0 |
| 2018-01 | CT4#82 | C4-181277<br>C4-181278<br>C4-181239<br>C4-181241<br>C4-181245<br>C4-181280<br>C4-181282<br>C4-181131<br>C4-181247<br>C4-181284<br>C4-181250<br>C4-181273<br>C4-181252<br>C4-181254 | | | | Implementation of pCRs agreed at CT4#82 | 0.4.0 |
| 2018-03 | CT4#83 | C4-182178<br>C4-182270<br>C4-182354<br>C4-182352<br>C4-182274<br>C4-182400<br>C4-182402<br>C4-182356<br>C4-182351<br>C4-182401<br>C4-182268 | | | | Implementation of pCRs agreed at CT4#83 | 0.5.0 |
| 2018-04 | CT4#84 | C4-183124<br>C4-183143<br>C4-183221<br>C4-183225<br>C4-183228<br>C4-183230<br>C4-183232<br>C4-183234<br>C4-183244<br>C4-183300<br>C4-183302<br>C4-183304<br>C4-183305<br>C4-183306<br>C4-183307<br>C4-183308<br>C4-183374<br>C4-183381<br>C4-183382<br>C4-183425<br>C4-183427<br>C4-183430<br>C4-183480<br>C4-183483<br>C4-183486<br>C4-183508<br>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<br>C4-184356<br>C4-184210<br>C4-184211<br>C4-184358<br>C4-184359<br>C4-184558<br>C4-184559<br>C4-184381<br>C4-184556<br>C4-184423<br>C4-184557<br>C4-184310<br>C4-184572<br>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 |
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| 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 |
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| 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 |
| 2020-03 | CT#87e | CP-200020 | 0346 | | F | DNN includes DNN NI | 16.3.0 |
| 2020-03 | CT#87e | CP-200039 | 0347 | 1 | D | Editorial corrections | 16.3.0 |
| 2020-03 | CT#87e | CP-200039 | 0348 | 1 | F | Correction-add type definition in the Table title | 16.3.0 |
| 2020-03 | CT#87e | CP-200039 | 0349 | 1 | F | Correction-specify resource type in the clause title | 16.3.0 |
| 2020-03 | CT#87e | CP-200039 | 0350 | 1 | F | Miscellaneous corrections and clarifications | 16.3.0 |
| 2020-03 | CT#87e | CP-200029 | 0352 | 3 | B | SoR Update Indicator | 16.3.0 |
| 2020-03 | CT#87e | CP-200035 | 0353 | 1 | B | SUPI pattern | 16.3.0 |
| 2020-03 | CT#87e | CP-200027 | 0354 | 1 | B | Addition of IAB-Operation Allowed indication to AccessAndMobilitySubscriptionData | 16.3.0 |
| 2020-03 | CT#87e | CP-200036 | 0355 | | B | Subscription data for V2X | 16.3.0 |
| 2020-03 | CT#87e | CP-200183 | 0357 | 1 | F | Initial Registration procedure on a CAG Cell | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0358 | 1 | F | UDM service update for the authentication result removal | 16.3.0 |
| 2020-03 | CT#87e | CP-200037 | 0359 | 1 | B | PDN connectivity Status event | 16.3.0 |
| 2020-03 | CT#87e | CP-200018 | 0360 | 3 | B | UE Location Privacy Profile Update | 16.3.0 |
| 2020-03 | CT#87e | CP-200272 | 0362 | 5 | F | Corrections on LCS related Data Type | 16.3.0 |
| 2020-03 | CT#87e | CP-200271 | 0363 | 4 | B | Location information retrieval for GMLC | 16.3.0 |

| 2020-03 | CT#87e | CP-200018 | 0365 | 3 | B | Provision of UE LCS privacy profile | 16.3.0 |
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| 2020-03 | CT#87e | CP-200238 | 0366 | 1 | B | Translation of Group Id to UE identifier list | 16.3.0 |
| 2020-03 | CT#87e | CP-200018 | 0368 | 1 | B | VGMLC address registration | 16.3.0 |
| 2020-03 | CT#87e | CP-200019 | 0369 |   | B | PEI Update | 16.3.0 |
| 2020-03 | CT#87e | CP-200020 | 0372 |   | F | Attributes and its applicability for specific procedures or operations | 16.3.0 |
| 2020-03 | CT#87e | CP-200052 | 0374 |   | F | API version and External doc update | 16.3.0 |
| 2020-07 | CT#88e | CP-201033 | 0377 | 1 | B | 5G SRVCC Info retrieval | 16.4.0 |
| 2020-07 | CT#88e | CP-201032 | 0379 |   | F | AfId | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0380 |   | F | EpsInterworkingInfo | 16.4.0 |
| 2020-07 | CT#88e | CP-201032 | 0381 |   | F | CmInfoReport | 16.4.0 |
| 2020-07 | CT#88e | CP-201032 | 0382 |   | F | VgmlcAddress | 16.4.0 |
| 2020-07 | CT#88e | CP-201056 | 0384 | 1 | F | Supported Headers Tables for Request and Response codes | 16.4.0 |
| 2020-07 | CT#88e | CP-201056 | 0385 | 1 | F | Add new Notifications Overview Tables | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0386 |   | F | Core Network Restrictions | 16.4.0 |
| 2020-07 | CT#88e | CP-201067 | 0387 | 1 | B | MDT user consent | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0388 |   | F | SDM data re-synchronization | 16.4.0 |
| 2020-07 | CT#88e | CP-201033 | 0389 |   | C | UDM Authn. Vector Generation for HSS | 16.4.0 |
| 2020-07 | CT#88e | CP-201056 | 0390 | 2 | F | Clarification on nfInstanceId in AuthEvent in Nudm_UEAuthentication | 16.4.0 |
| 2020-07 | CT#88e | CP-201047 | 0392 | 1 | B | Feature negotiation for NW slice specific authentication and authorization | 16.4.0 |
| 2020-07 | CT#88e | CP-201046 | 0393 | 1 | B | Define the value range of NB-IoT UE priority | 16.4.0 |
| 2020-07 | CT#88e | CP-201046 | 0394 | 3 | B | Monitoring Configuration for event Loss of Connectivity | 16.4.0 |
| 2020-07 | CT#88e | CP-201056 | 0396 | 1 | F | Support of inter-RAT HO from NR SA to EN-DC | 16.4.0 |
| 2020-07 | CT#88e | CP-201032 | 0397 | 2 | F | Correct the definition of LCS Privacy in SDM service | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0398 | 1 | B | Ongoing registration or handover during P-CSCF Restoration | 16.4.0 |
| 2020-07 | CT#88e | CP-201042 | 0399 |   | F | Correct Cardinality of sorInfoExpectInd | 16.4.0 |
| 2020-07 | CT#88e | CP-201033 | 0400 | 1 | F | ePDG Indication in UeContextInSmfData | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0401 | 1 | F | UDM Initiated AUSF Service Invocation | 16.4.0 |
| 2020-07 | CT#88e | CP-201045 | 0402 | 1 | B | Secondary Authentication and Authorization Information in 5G VN Group Data | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0403 |   | F | Clarification of Implicit Unsubscribe | 16.4.0 |
| 2020-07 | CT#88e | CP-201046 | 0404 | 1 | F | Notification Correlation ID in sub-notify of EE service | 16.4.0 |
| 2020-07 | CT#88e | CP-201033 | 0407 | 1 | B | HSS Authentication Info Request | 16.4.0 |
| 2020-07 | CT#88e | CP-201019 | 0408 | 3 | B | UE Reachability Event | 16.4.0 |
| 2020-07 | CT#88e | CP-201019 | 0409 | 3 | F | UE Reachability for SMS | 16.4.0 |
| 2020-07 | CT#88e | CP-201056 | 0410 | 1 | F | Datatype column in Resource URI variables Table | 16.4.0 |
| 2020-07 | CT#88e | CP-201056 | 0411 | 1 | F | Add Operation Name column in Custom Operations table | 16.4.0 |
| 2020-07 | CT#88e | CP-201045 | 0412 | 1 | F | Add a CAG information Subscription Change Indicator in AccessAndMobilitySubscriptionData | 16.4.0 |
| 2020-07 | CT#88e | CP-201046 | 0416 | 1 | B | Report of UE Max availability time | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0417 | 1 | B | UECM multiple registration data sets retrieval | 16.4.0 |
| 2020-07 | CT#88e | CP-201032 | 0418 | 1 | F | OpenAPI file description on RegistrationLocationInfo data type | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0420 | 1 | F | Implicit Unsubscribe | 16.4.0 |
| 2020-07 | CT#88e | CP-201067 | 0421 | 1 | B | MDT Configuration data for 5G | 16.4.0 |
| 2020-07 | CT#88e | CP-201042 | 0325 | 2 | B | SoR Info parameter Provisioning | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0383 | 2 | F | PEI | 16.4.0 |
| 2020-07 | CT#88e | CP-201191 | 0415 | 3 | F | HTTP Header storage in UDR | 16.4.0 |
| 2020-07 | CT#88e | CP-201176 | 0423 | 1 | F | UE Context in AMF Data | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0424 |   | F | List of specific data types | 16.4.0 |
| 2020-07 | CT#88e | CP-201045 | 0425 |   | F | NID in AMF-registrations | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0427 |   | F | Retrieval of multiple data sets | 16.4.0 |
| 2020-07 | CT#88e | CP-201019 | 0429 | 1 | A | Correct Data Type Names | 16.4.0 |
| 2020-07 | CT#88e | CP-201048 | 0430 | 1 | B | N5GC device Authentication | 16.4.0 |
| 2020-07 | CT#88e | CP-201030 | 0431 |   | F | DeregistrationData | 16.4.0 |
| 2020-07 | CT#88e | CP-201019 | 0434 | 1 | A | Shared Data Clarification | 16.4.0 |
| 2020-07 | CT#88e | CP-201048 | 0436 | 1 | F | Removal of RG-TMBR | 16.4.0 |
| 2020-07 | CT#88e | CP-201056 | 0437 |   | F | RAT Type Restriction | 16.4.0 |
| 2020-07 | CT#88e | CP-201056 | 0438 |   | F | implicitUnsubscribe for SMF | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0439 | 1 | F | Authentication results for multiple registrations | 16.4.0 |
| 2020-07 | CT#88e | CP-201342 | 0440 | 3 | F | Corrections of Enhance Coverage Restriction | 16.4.0 |
| 2020-07 | CT#88e | CP-201042 | 0441 | 1 | B | Timer needed for the SOR-AF to respond | 16.4.0 |
| 2020-07 | CT#88e | CP-201049 | 0443 |   | F | Correction on V2X Subscription data | 16.4.0 |
| 2020-07 | CT#88e | CP-201032 | 0444 | 1 | B | Implementing LCS Broadcast Assistance API | 16.4.0 |
| 2020-07 | CT#88e | CP-201046 | 0445 | 3 | B | Monitoring Configuration for event UE reachability | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0446 |   | F | Miscellaneous Corrections | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0447 | 1 | F | Corrections on resouce Supi of SDM service | 16.4.0 |
| 2020-07 | CT#88e | CP-201045 | 0448 |   | F | 5G VN Group Data Correction | 16.4.0 |
| 2020-07 | CT#88e | CP-201034 | 0449 |   | F | Cardinality of ProblemDetails | 16.4.0 |

| 2020-07 | CT#88e | CP-201034 | 0450 | | F | Removal of error "SERVING_NETWORK_NOT_AUTHORIZED" | 16.4.0 |
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| 2020-07 | CT#88e | CP-201033 | 0452 | 1 | F | Initial Registration | 16.4.0 |
| 2020-07 | CT#88e | CP-201033 | 0453 | 1 | B | Support of SMSoIP | 16.4.0 |
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# History

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